Do Hiring Credits Work in Recessions? Evidence from France

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The French President Nicolas Sarkozy announced that any hiring of worker paid below 1.6 times the minimum wage in firms with less than 10 employees was immediately eligible to employer social contributions relief until 31 December 2009.

This hiring credit, called *zéro charges*, reduced the labor cost by 12% at the level of the minimum wage and was linearly decreasing in the gross hourly wage level up to 1.6 times the minimum wage.
Why is it worth evaluating hiring credits?

- This paper evaluates the impact of this hiring credit
- Hiring credits have been implemented in many OECD countries during the 2008-2009 recession
  - In some countries (e.g. Portugal, Ireland) hiring credits were targeted on the long-term unemployed or other disadvantaged groups
  - In other countries (e.g. France and Spain and the US) the scope of hiring credits was larger
- zéro charges: very similar to the US Hiring Incentives to Restore Employment (HIRE) Act implemented in 2010
Why is it worth evaluating hiring credits?

Hiring credits are highly controversial

- Becker (2010): increase churning and wages with very little employment effects
- Posner (2010): in recession, the problem is insufficient demand, the stimulus should stimulate demand, not supply
- New-keynesian macroeconomists: employment subsidies are ineffective during recessions because low employment is the consequence of an insufficient aggregate demand (Gali, 2013)
- Macroeconomists relying on search and matching models achieve different conclusions (Jung and Kuester, 2013)
Why is it worth evaluating hiring credits?

Hiring subsidies are highly controversial

- Neumark (2013): survey of empirical studies:
  - hiring credits targeted to specific demographic groups have no effects on total employment
  - some effects on employment when they are not targeted
- Very little is known about the impact of nontargeted hiring credits
  - especially during recessions
An almost perfect natural experiment

- Zéro charges is an almost perfect natural experiment:
  - it was a real surprise: it has been announced and implemented the same day, on 4 December 2008, and kept secret before the announcement
  - for fiscal reasons only firms with less than 10 employees before the announcement of the measure were eligible, the hiring credit was arbitrarily restricted to a subset of firms comparable to other firms that were not eligible
  - no other new policy targeted at firms below 10 employees
What we do

- Difference-in-differences between firms with more and less than 10 employees
- *Very detailed* information on *all* French firms from 2005 to 2009: take-up, employment, hours, hirings, separations, wages and other variables day by day
- Provide the first evaluation of hiring credits with firm data on
  - employment
  - hours
  - wage
  - labor turnover
What we do

- Evaluate
  - the cost per job created
  - the share of subsidized hires that would have been created absent the hiring credit (windfalls)

- Analyze alternative design:
  - hiring credits conditional on net job creation, above some employment growth threshold
  - New Job Tax Credit (NJTC, 1977) versus Hiring Incentives to Restore Employment (HIRE, 2010)
The policy

- The hiring credit was temporary
  - From 20 December 2008 to 31 December 2009 (extended in November 2009 for 6 months)
  - Hires are subsidized until 31 December 2009
- Not automatic: firms have to require the hiring credit
- Targeted to firms with less than 10 FTE employees: Size is computed on full time equivalent employment
  - averaged from January to November 2008 (before the announcement)
The policy

- To limit strategic turnover, eligible firms should not have fired any workers on the same job during the 6 month before the hiring date, nor previously fired the worker who is hired: not really enforced

- Contracts should at least last one month

- Renewals of contracts are considered as eligible "hires" (many temporary contracts: 90% or hires)
The natural experiment

Timing: policy announced on 4 December 2008 is unanticipated

Figure: Google search index
The natural experiment
No simultaneous event affecting differently small and medium-sized firms

- The only policy in the "Stimulus Package" specific to small firms
- Specific labor institutions or fiscal policy do not change discontinuously at the 10 size threshold (employment protection, wage setting...)

The natural experiment

Firm size density (no manipulation of past size)

Source: DADS (Insee)
Data

- Employment registers (DADS postes) from 2005 to 2009
- Matched at the establishment/plant level with actual claims for tax exemption collected by Pole emploi (Public employment services)
- Selection of firms in the business sector; exclusion of associations, personal employer, agriculture sector and overseas French departments
- Trim the data (exclude observations in the highest percentile of employment growth, growth of hours, growth of hires)
Data

Fraction of firms and of hires that benefited from the hiring credit by firm’s size

![Graph showing take-up rate and attention rate against full-time equivalent employment in 2008.](graph.png)

Source: DADS (Insee); "0 charges" claims (Pole emploi)
Empirical strategy
Employment, hours and churning

- Impact on employment:
  \[ L = L_{-1} + H - S, \]
  - \( L_{-1} \): employment inherited from the previous period
  - \( H \): the number of entries during the period
  - \( S \): the number of separations during the period

- Problems
  - Churning: substitute subsidized workers for non-subsidized workers
  - Hours: reduce hours of non-subsidized workers
Empirical strategy

- We estimate the following difference-in-differences model:

\[ Y_{it} = \alpha + \beta Z_{it} + \gamma D_{it} + \delta Z_{it}D_{it} + bX_{it} + u_{it} \]

- \( Y_{it} \): outcome of firm \( i \) in year \( t \),
- \( Z_{it} \): eligibility dummy equal to 1 if the firms’ size in year \( t - 1 \) is below 10
- \( D_{it} \): dummy for year 2009 when subsidies can be claimed
- \( X_{it} \): set of covariates (sector, region, firm’s age, share of white collars, share of female workers...)

- \( \delta \) is our parameter of interest. It captures the differential evolution of the group targeted by the hiring credit
Outcomes

- Employment
  \[
  \text{Employment 30 Nov year } t - \text{Employment 30 Nov year } t - 1
  \]
  \[
  \text{Employment 30 Nov year } t - 1
  \]

- Hours worked (total hours per firm)
  \[
  \text{Hours Nov year } t - \text{Hours Nov year } t - 1
  \]
  \[
  \text{Hours Nov year } t - 1
  \]

- Hiring rate
  \[
  \text{Hires from 30 Nov year } t - 1 \text{ to 30 November year } t
  \]
  \[
  \text{Employment 30 Nov year } t - 1
  \]

- Similar for separations
Common trends

Differences in average employment growth rates

Note: firms with 6-9.99 employees in blue, with 10-14 employees in red.
Source: DADS (Insee).
Common trends

Differences in average hours worked per firm growth rates

Note: firms with 6-9.99 employees in blue, with 10-14 employees in red.
Source: DADS (Insee).
### Difference-in-differences estimates

#### Employment and hours

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Covariates</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Employment growth</td>
<td>0.010*** (0.002)</td>
<td>0.008*** (0.002)</td>
<td>0.009*** (0.002)</td>
</tr>
<tr>
<td>Hours growth</td>
<td>0.010*** (0.002)</td>
<td>0.009*** (0.002)</td>
<td>0.008*** (0.002)</td>
</tr>
<tr>
<td>Survival rate</td>
<td>0.000 (0.001)</td>
<td>0.000 (0.001)</td>
<td>0.000 (0.001)</td>
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<tr>
<td>Nb. Observations</td>
<td>405,376</td>
<td>405,376</td>
<td>206,854</td>
</tr>
</tbody>
</table>
Difference-in-differences estimates

Employment effects month by month

Source: DADS (Insee)
## Difference-in-differences estimates

Eligible and non eligible jobs in firms with less than 10 FTE

<table>
<thead>
<tr>
<th></th>
<th>Eligible jobs</th>
<th>Non eligible jobs</th>
<th>All jobs</th>
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<tbody>
<tr>
<td>Employment growth</td>
<td>.010***</td>
<td>.002</td>
<td>.008***</td>
</tr>
<tr>
<td></td>
<td>( .003)</td>
<td>( .004)</td>
<td>( .002)</td>
</tr>
<tr>
<td>Hours growth</td>
<td>.012***</td>
<td>.005</td>
<td>.008***</td>
</tr>
<tr>
<td></td>
<td>( .003)</td>
<td>( .004)</td>
<td>( .002)</td>
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<tr>
<td>Nb. Observations</td>
<td>349,996</td>
<td>349,996</td>
<td>349,996</td>
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</table>
Difference-in-differences estimates

Labor demand elasticity

- Labor cost reduced by 0.4 percent, employment increased by 0.8 percent
  - Elasticity about 2 (95% confidence interval: [1,3])
- Lower bound
  - Wages might have increased
  - Temporary subsidy
  - Estimation: varying the bandwidth
### Difference-in-differences estimates

Hourly wage growth (observe wage in previous year even in different firm)

<table>
<thead>
<tr>
<th>Cohorts</th>
<th>2006-2009</th>
<th>2006-2009</th>
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<tr>
<td>Covariates</td>
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<tr>
<td>All wages</td>
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<td>−.001</td>
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<tr>
<td></td>
<td>(.001)</td>
<td>(.001)</td>
</tr>
<tr>
<td>Low wages incumbents</td>
<td>.000</td>
<td>−.001</td>
</tr>
<tr>
<td></td>
<td>(.001)</td>
<td>(.001)</td>
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<tr>
<td>Low wages of entrants</td>
<td>.000</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>(.002)</td>
<td>(.002)</td>
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</table>
Difference-in-differences estimates

Wage growth of entrants
Difference-in-differences estimates

Share of firms’ that benefited from the hiring credit and firms’ past size
### Difference-in-differences estimates

Varying the bandwidth

<table>
<thead>
<tr>
<th>Size bandwidth</th>
<th>7-13</th>
<th>6-14</th>
<th>5-15</th>
<th>[5,8]-[13,16]</th>
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<tr>
<td>Employment growth</td>
<td><strong>.005</strong>*</td>
<td><strong>.008</strong>*</td>
<td><strong>.011</strong>*</td>
<td><strong>.015</strong>*</td>
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<td></td>
<td>(.002)</td>
<td>(.002)</td>
<td>(.002)</td>
<td>(.002)</td>
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<tr>
<td>Hours growth</td>
<td><strong>.006</strong>*</td>
<td><strong>.009</strong>*</td>
<td><strong>.012</strong>*</td>
<td><strong>.016</strong>*</td>
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<td></td>
<td>(.002)</td>
<td>(.002)</td>
<td>(.002)</td>
<td>(.002)</td>
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<td>Nb. Observations</td>
<td>283,737</td>
<td>405,376</td>
<td>549,022</td>
<td>363,101</td>
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</table>

Note: *p < .05, **p < .01, ***p < .001*
Difference-in-differences estimates

At the industry level

<table>
<thead>
<tr>
<th></th>
<th>Manufacturing</th>
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<tbody>
<tr>
<td>Employment growth</td>
<td>.016***</td>
<td>.000</td>
<td>.009***</td>
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<tr>
<td></td>
<td>(.004)</td>
<td>(.004)</td>
<td>(.002)</td>
</tr>
<tr>
<td>Hours growth</td>
<td>.017***</td>
<td>.000</td>
<td>.009***</td>
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<tr>
<td></td>
<td>(.004)</td>
<td>(.004)</td>
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<td>73,726</td>
<td>260,923</td>
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## Difference-in-differences estimates

### Churning and separations

<table>
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<tr>
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<tbody>
<tr>
<td><strong>Covariates</strong></td>
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<tr>
<td>No</td>
<td>.009***</td>
<td>.008***</td>
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<tr>
<td>Yes</td>
<td>.008***</td>
<td>.008***</td>
<td>.008***</td>
</tr>
<tr>
<td>Employment growth</td>
<td>(.002)</td>
<td>(.002)</td>
<td>(.002)</td>
</tr>
<tr>
<td>Hiring rate</td>
<td>.014***</td>
<td>.012***</td>
<td>.019***</td>
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<tr>
<td>Separation rate</td>
<td>.005</td>
<td>.004</td>
<td>.010*</td>
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<tr>
<td>Nb. Observations</td>
<td>405,376</td>
<td>405,376</td>
<td>206,854</td>
</tr>
<tr>
<td></td>
<td>(.005)</td>
<td>(.004)</td>
<td>(.005)</td>
</tr>
</tbody>
</table>
Difference-in-differences estimates

Churning and separations

- Possible impact on separations
- But does not necessarily mean that firms substituted subsidized workers for non subsidized workers
- Abowd et al. (1999): in France, each job created in a given year is associated with 3 hires and 2 separations

\[
\frac{H}{L_{-1}} = \frac{L - L_{-1}}{L_{-1}} + \frac{S}{L_{-1}},
\]

- The relation between employment growth rates and hiring rates remained stable before and after 2009
- No evidence of “strategic” churning
Difference-in-differences estimates

![Graph showing hiring rate vs employment growth for small and medium firms before and in 2009.](image-url)
Robustness checks

- Year placebo tests
- Size threshold:
  - size 13-16 versus 16-19
  - size -4 versus 4-7
- Equilibrium effects
# Robustness checks

## Year placebo tests

<table>
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<tr>
<td><strong>Covariates</strong></td>
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<td>Yes</td>
</tr>
<tr>
<td>Employment growth</td>
<td>−.001 (.002)</td>
<td>.001 (.002)</td>
</tr>
<tr>
<td>Hours growth</td>
<td>−.001 (.003)</td>
<td>.001 (.002)</td>
</tr>
<tr>
<td>Hiring rate</td>
<td>.001 (.003)</td>
<td>−.004 (.003)</td>
</tr>
<tr>
<td>Separation rate</td>
<td>.002 (.003)</td>
<td>−.005* (.003)</td>
</tr>
<tr>
<td>Survival rate</td>
<td>.000 (.001)</td>
<td>.001 (.001)</td>
</tr>
<tr>
<td><strong>Nb. Observations</strong></td>
<td>178,603</td>
<td>270,593</td>
</tr>
</tbody>
</table>
Robustness checks

Different size / different behavior in recessions

- Small and medium size firms might react differently during recessions
- Moscarini and Postel-Vinay (2012)
  - Small firms (below 20 employees) versus large firms (above 500 employees)
  - Large firms destroy proportionally more jobs in net terms relative to small firms when unemployment is above trend in France
Robustness checks

![Graph showing employment growth from 2006 to 2009 for firms with 13-16 FTE and 16-19 FTE. The graph indicates a decrease in employment growth over the years for both categories.](image-url)
Robustness checks
Size threshold: size 1-3.99 versus 4-7

![Graph showing employment growth for firms with 1-4 FTE and 4-7 FTE over years 2006 to 2009.](image-url)
Robustness checks

Equilibrium effects

- The validity of difference-in-differences estimations relies on the assumption that the control group is not affected by the policy
  - The hiring credit may provide competitive advantage to small firms that expand their market share at the expense of larger firms
  - The supplementary hires induced by the hiring credit may increase the labor market tightness and then the recruiting costs for all firms
  - Potential wage increases induced by the hiring credit may affect the control group.

- All these mechanisms imply a potential negative impact of the hiring credit on employment and hours worked of the control group
Robustness checks

Equilibrium effects

- We estimate the following simple model:

\[ Y_j = \alpha + \beta Share_j + bX_j + u_j \]  \hspace{1cm} (1)

- \( Y_j \): the average outcome of employment pool \( j \) between 1 December 2008 and 30 November 2009 among firms from 10 to 14 full time equivalent employees in previous year
- \( Share_j \) is the share of subsidized hires in employment pool \( j \)
- \( X_j \): area-specific controls (mean of firms’ age, growth rate of employment, the hiring and separation rates in the employment pool in 2008)

- If the coefficient \( \beta \) is negative and significant, this indicates the presence of equilibrium effects
Robustness checks

Equilibrium effects

- $Share_j$ instrumented by
  - the share of eligible hires among all hires in an employment zone in 2008 (when the subsidy was not yet implemented)
  - the share of small firms below 10 full-time-equivalent employees at the end of 2007 and still present in 2008 among all firms present the same year in an employment zone
## Robustness checks

### Equilibrium effects

<table>
<thead>
<tr>
<th>IV 2SLS</th>
<th>Covariates</th>
<th>No</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Employment growth</td>
<td>.030</td>
<td>.060</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(.082)</td>
<td>(.073)</td>
</tr>
<tr>
<td>First stage: dept variable share of sub. hires in 2009</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Share of eligible hires in 2008</td>
<td>.236***</td>
<td>.225***</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(.023)</td>
<td>(.027)</td>
</tr>
<tr>
<td></td>
<td>Share of small firms in 2008</td>
<td>.410***</td>
<td>.414***</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(.038)</td>
<td>(.038)</td>
</tr>
<tr>
<td></td>
<td>Nb. Observations</td>
<td>348</td>
<td>348</td>
</tr>
</tbody>
</table>

Note: The significance levels are indicated by *** for p < 0.001.
Cost analysis

Cost per job created

- Gross cost per job created about 12,000 euros (about 60 percent of the annual labor cost at the min wage)
- Net cost per job created: about zéro
- Large windfalls for firms: about 90 percent of the subsidies go to hires that would have been created absent the subsidy
Hiring credit conditional on net job creation

- We can compute the cost per job created of hiring credit conditional on net job creation above the employment growth threshold $\bar{g}$
  - Less job creation
  - Lower cost?

- Assume that
  - identical subsidy $\sigma$ per job created for both types of hiring credit
  - identical take-up
  - homogeneous impact of the hiring credit across firms with different growth rates
Hiring credit conditional on net job creation

- Cost per job created of non conditional hiring credit

\[ c = \sigma \left( 1 + \frac{\eta}{\delta} \right) \]

- \( \delta \): impact of zéro charges on average employment growth rate
- \( \eta \): average hiring rate of the treatment group of zéro charges absent the hiring credit
Hiring credit conditional on net job creation

- Cost per job created of conditional hiring credit above the threshold $\bar{g}$:

$$c(\bar{g}) = \sigma \left[ 1 + \frac{1}{l(\bar{g})} \sum_{i \mid g_i > \bar{g}} (g_i - \bar{g}) \right]$$

- $g_i$: employment growth rate of firm $i$ absent the hiring credit
- $l(\bar{g})$: number of firms eligible to the conditional hiring credit

- Cost ratio

$$\frac{c(\bar{g})}{c}$$
Hiring credit conditional on net job creation
Hiring credit conditional on net job creation

- What is the value of the threshold $\bar{g}$ that maximizes the number of job created for a given budget?

- Assume that
  - the employment elasticity with respect to the subsidy (expressed in labor cost percentage) is constant
  - the amount of the subsidy per hire is adjusted to balance the budget constraint when $\bar{g}$ is changed.

- Then, job creation is maximized when the cost per job created is minimized.

- This means that it is optimal to set the employment growth rate threshold at $-4$ percent.
  - The number of jobs created would be 40 percent higher
  - But the take-up rate is likely lower with conditional hiring credit
Conclusion

- Temporary hiring credit targeted at low wage jobs in the French context with high minimum wage:
  - positive effect on employment in the hollow of the recession
  - strong elasticity of labor demand
  - no strategic churning

- At odds with the Keynesian view and the Beckerian view

- Need to know more about hiring credits
  - large windfalls for firms of hiring credits non conditional on net job creation
  - hiring credits conditional on net job creation might be more effective, but much uncertainty on this issue
## Appendix

<table>
<thead>
<tr>
<th>Nb employees</th>
<th>Number of firms</th>
<th>Number of employees (end of 2008)</th>
</tr>
</thead>
<tbody>
<tr>
<td>all</td>
<td>below 10</td>
<td>below 10</td>
</tr>
<tr>
<td></td>
<td>934,879</td>
<td>3,301,440</td>
</tr>
<tr>
<td></td>
<td>above 10</td>
<td>above 10</td>
</tr>
<tr>
<td></td>
<td>155,186</td>
<td>10,900,920</td>
</tr>
<tr>
<td>6-10 and 10-14</td>
<td>below 10</td>
<td>below 10</td>
</tr>
<tr>
<td></td>
<td>91,763</td>
<td>818,602</td>
</tr>
<tr>
<td></td>
<td>above 10</td>
<td>above 10</td>
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<td>40,828</td>
<td>553,835</td>
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