Financing Constraints and Unemployment: Evidence from the Great Recession

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disclaimer

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motivation

- Lending to small businesses declined from **\$710bil.** to **\$670bil.** (Q2:2008 - Q1:2010)
- What are the macroeconomic implications?
  - Any (causal) impact on **unemployment**?
- 80% of all firms in the economy have <9 employees (U.S. Census Bureau, Statistics of U.S. Businesses)
- Small firms employ $\approx 50\%$ of all Americans (Chairman Bernanke, July 12, 2010, speech in Washington D.C.)

this paper

- We estimate the impact of the recession on unemployment using a triple difference approach
- Exploit variation across:
    - time (before/after the recession)
    - firm size (small/large)
    - external financial dependence (have free cash/need external finance)

method

- Specification of interest is,

$$unemp_{ijrt} = \Lambda\{\alpha_j^d + \lambda_r^d + \boldsymbol{\theta}^d \mathbf{x}_{ijrt} + \delta^d recession_t + \mu^d small_{ijrt} + \\ + \rho^d \left(recession_t \times small_{ijrt}\right) + u_{ijrt}^d\},$$

- i-person, j-industry, r-region, t-time
- $d = \{high, low\}$ indicates external financial dependence
- We are interested in $\widehat{\rho}^{high} - \widehat{\rho}^{low}$
- Standard errors are clustered at the industry level

data

- Current Population Survey (March Supplements 2005-2009)
  - official source of U.S. unemployment statistics
  - large, representative sample of the population
  - this paper: private sector workers, ages 16-65
- COMPUSTAT (1980-1997)
  - "mature" public nonbank firms
  - following Rajan and Zingales (1998) and Cetorelli and Strahan (2006)
- Survey of Small Business Finance (1998)

changes in unemployment (2005=100)

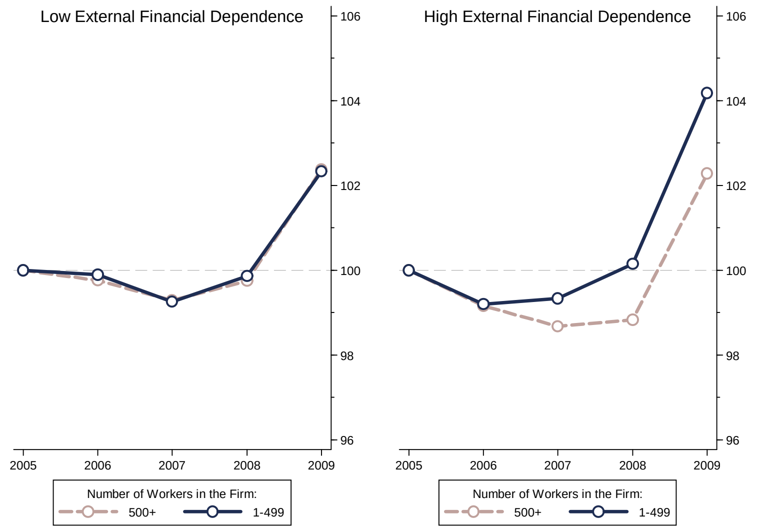


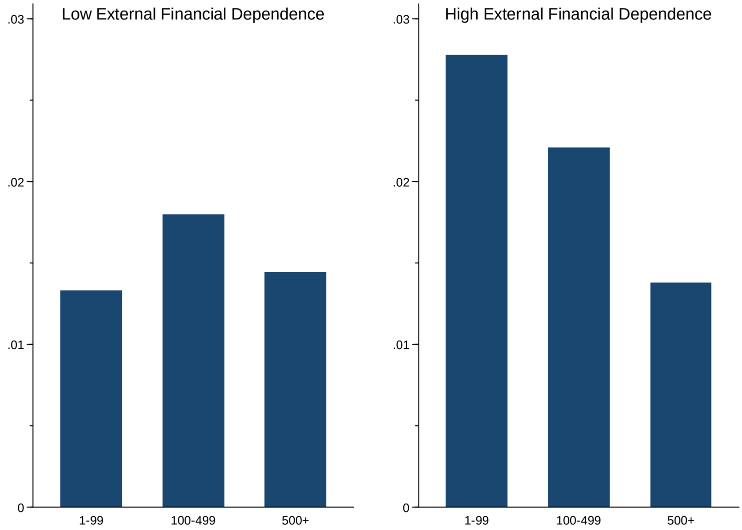
TABLE 3

The Impact of the December 2007 Recession on Unemployment by External Financial Dependence and Firm Size

<table>
<tr><th></th><th colspan="2">Low External Financial Dependence</th><th colspan="2">High External Financial Dependence</th></tr>
<tr><th></th><th>Small Firms (1)</th><th>Large Firms (2)</th><th>Small Firms (3)</th><th>Large Firms (4)</th></tr>
<tr><td>December 2007 recession</td><td>.014
(.003)***</td><td>.014
(.003)***</td><td>.027
(.006)***</td><td>.014
(.004)***</td></tr>
<tr><td></td><td colspan="2">.000
(.004)</td><td colspan="2">.013
(.004)***</td></tr>
<tr><td></td><td colspan="4">.013
(.006)**</td></tr>
<tr><td>Observations</td><td>61,262</td><td>36,457</td><td>135,386</td><td>84,601</td></tr>
</table>

Note - The dependent variable is an indicator that equals to one if a person is unemployed. The table reports Ordinary Least Squares estimates. Standard errors are adjusted for clustering at 2-digit Standard Industrial Classification code and appear in parentheses. The sample includes respondents to the March Current Population Surveys (CPS) in the years 2005-2009. Information about each worker's employer size is available for the year prior to the survey, i.e., 2004-2008. The sample is limited to adult civilians aged 16-65 in the year of the survey and excludes workers in the military, the public sector, and the financial sector. External financial dependence equals the proportion of capital expenditures financed with external funds. A negative value indicates that firms have free cash flow, whereas a positive value indicates that firms must issue debt or equity to finance their investment. External financial dependence is calculated using mature COMPUSTAT firms for the period 1980-1996. Mature firms are firms that have been on COMPUSTAT for at least 10 years. Recession equals to one in the years 2008 and 2009. Small firms have at most 499 employees. Large firms have at least 500 employees. All specifications control for workers' characteristics which include: age, gender, ethnicity (white indicator), and indicators of years of completed education (0-11, 12, 13-15, 16, and 17+). The specifications also control for region fixed effects (New England, Middle Atlantic, East North, West North, South, East South, West South, Mountain, and Pacific), industry fixed effects (manufacturing non-durable goods, manufacturing durable goods, trade, services, and other), and metropolitan area growth rate of household income over the period 2004-2008. All estimates are weighted by probability sampling weights provided by the CPS. ** and *** indicate statistical significance at the 5% and 1% levels, respectively.

continuity by firm size



continuity by external financial dependence

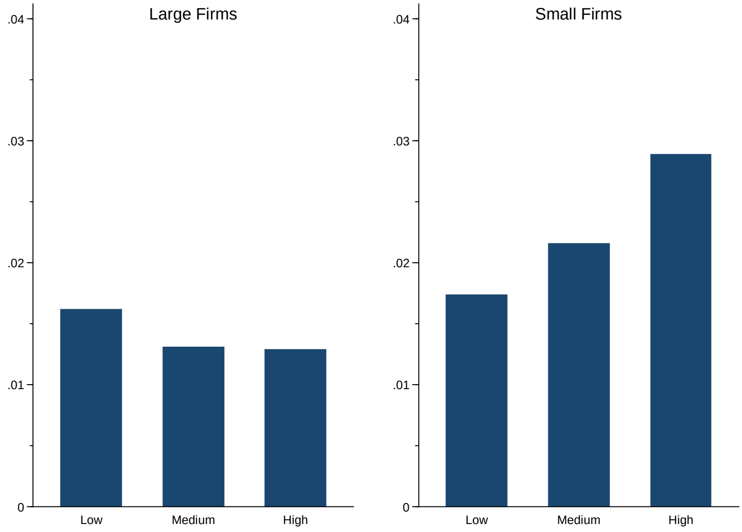


TABLE 5
The Impact of the March 2001 Recession on Unemployment
by External Financial Dependence and Firm Size

	Low External Financial Dependence				High External Financial Dependence		
	Small Firms (1)		Large Firms (2)		Small Firms (3)		Large Firms (4)
March 2001 recession	.011 (.002)***		.011 (.003)***		.008 (.002)***		.010 (.003)***
		-.000 (.003)				-.003 (.002)	
				-.003 (.004)			
Observations	55,006		33,133		111,157		73,602

Note - The dependent variable is an indicator that equals to one if a person is unemployed. The table reports Ordinary Least Squares estimates. Standard errors are adjusted for clustering at 2-digit Standard Industrial Classification code and appear in parentheses. The sample includes respondents to the March Current Population Surveys (CPS) in the years 1998-2002. Information about each worker's employer size is available for the year prior to the survey, i.e., 1997-2001. The sample is limited to adult civilians aged 16-65 in the year of the survey and excludes workers in the military, the public sector, and the financial sector. External financial dependence equals the proportion of capital expenditures financed with external funds. A negative value indicates that firms have free cash flow, whereas a positive value indicates that firms must issue debt or equity to finance their investment. External financial dependence is calculated using mature COMPUSTAT firms for the period 1980-1996. Mature firms are firms that have been on COMPUSTAT for at least 10 years. Recession equals to one in the years 2001 and 2002. Small firms have at most 499 employees. Large firms have at least 500 employees. All specifications control for workers' characteristics which include: age, gender, ethnicity (white indicator), and indicators of years of completed education (0-11, 12, 13-15, 16, and 17+). The specifications also control for region fixed effects (New England, Middle Atlantic, East North, West North, South, East South, West South, Mountain, and Pacific), industry fixed effects (manufacturing non-durable goods, manufacturing durable goods, trade, services, and other), and metropolitan area growth rate of household income over the period 1997-2001. All estimates are weighted by probability sampling weights provided by the CPS. *** indicates statistical significance at the 1% level.

TABLE 6
The Impact of the December 2007 Recession on Unemployment in Manufacturing
by External Financial Dependence and Firm Size
(Rajan-Zingales Measure of External Financial Dependence)

<table>
<tr><td></td><td colspan="2">Low External Financial Dependence</td><td colspan="2">High External Financial Dependence</td></tr>
<tr><td></td><td>Small Firms (1)</td><td>Large Firms (2)</td><td>Small Firms (3)</td><td>Large Firms (4)</td></tr>
<tr><td>December 2007 recession</td><td>.031
(.004)***</td><td>.029
(.005)***</td><td>.042
(.009)***</td><td>.028
(.009)***</td></tr>
<tr><td></td><td colspan="2">.002
(.006)</td><td colspan="2">.014
(.007)*</td></tr>
<tr><td></td><td colspan="4">.012
(.009)</td></tr>
<tr><td>Observations</td><td>14,229</td><td>10,697</td><td>10,561</td><td>12,237</td></tr>
</table>

Note - The dependent variable is an indicator that equals to one if a person is unemployed. The table reports Ordinary Least Squares estimates. Standard errors are adjusted for clustering at U.S. Census of Bureau industrial codes and appear in parentheses. The sample includes respondents to the March Current Population Surveys (CPS) in the years 2005-2009. Information about each worker's employer size is available for the year prior to the survey, i.e., 2004-2008. The sample is limited to adult civilians aged 16-65 in the year of the survey whose primary industry is manufacturing. External financial dependence is the proportion of capital expenditures financed with external funds based on Table 1 in Rajan and Zingales [1998]. Recession equals to one in the years 2008 and 2009. Small firms have at most 499 employees. Large firms have at least 500 employees. All specifications control for workers' characteristics which include: age, gender, ethnicity (white indicator), and indicators of years of completed education (0-11, 12, 13-15, 16, and 17+). The specifications also control for region fixed effects (New England, Middle Atlantic, East North, West North, South, East South, West South, Mountain, and Pacific) and metropolitan area growth rate of household income over the period 2004-2008. All estimates are weighted by probability sampling weights provided by the CPS. * and *** indicate statistical significance at the 10% and 1% levels, respectively.

TABLE 7

The Impact of the December 2007 Recession on Unemployment
by Bank Dependence Based on Survey of Small Business Finance

<table>
<tr><td></td><td colspan="2">Low Bank Dependence</td><td colspan="2">High Bank Dependence</td></tr>
<tr><td></td><td>Small Firms (1)</td><td>Large Firms (2)</td><td>Small Firms (3)</td><td>Large Firms (4)</td></tr>
<tr><td>December 2007 recession</td><td>.013
(.003)***</td><td>.013
(.004)***</td><td>.032
(.006)***</td><td>.017
(.004)***</td></tr>
<tr><td></td><td colspan="2">.000
(.003)</td><td colspan="2">.015
(.004)***</td></tr>
<tr><td></td><td colspan="4">.015
(.005)***</td></tr>
<tr><td>Observations</td><td>88,686</td><td>60,694</td><td>93,664</td><td>52,757</td></tr>
</table>

Note - The dependent variable is an indicator that equals to one if a person is unemployed. The table reports Ordinary Least Squares estimates. Standard errors are adjusted for clustering at 2-digit Standard Industrial Classification (SIC) code and appear in parentheses. The sample includes respondents to the March Current Population Surveys (CPS) in the years 2005-2009. Information about each worker's employer size is available for the year prior to the survey, i.e., 2004-2008. The sample is limited to adult civilians aged 16-65 in the year of the survey and excludes workers in the military, the public sector, and the financial sector. Bank dependence is the share of assets financed with debt. We use the 1998 Survey of Small Business Finance (SSBF) to calculate measures of bank dependence for each 2-digit SIC industry. The SSBF includes 3,561 small firms with fewer than 500 employees. Recession equals to one in the years 2008 and 2009. Small firms have at most 499 employees. Large firms have at least 500 employees. All specifications control for workers' characteristics which include: age, gender, ethnicity (white indicator), and indicators of years of completed education (0-11, 12, 13-15, 16, and 17+). The specifications also control for region fixed effects (New England, Middle Atlantic, East North, West North, South, East South, West South, Mountain, and Pacific), industry fixed effects (manufacturing non-durable goods, manufacturing durable goods, trade, services, and other), and metropolitan area growth rate of household income over the period 2004-2008. All estimates are weighted by probability sampling weights provided by the CPS. *** indicates statistical significance at the 1% level.

summary

- Small firms layoff workers more than large firms ONLY in industries with **high external financial dependence**
- Results do not hold for **2001 recession**
- **Robust to measures** of external financial dependence
- **Continuity** by firm size and external financial dependence

economic magnitude

- Triple difference point estimate is 1.30 (Table 3)
- Affects 43% of workers (N from Table 3)
- Thus, financial constraints contribute 0.55 percentage points to unemployment rate

$$\frac{\text{Num. Unemployed}}{\text{Num. in Labor Force}} = \frac{14,860,000}{154,110,000} = 9.64\%$$

$$\frac{14,860,000 - \mathbf{850,000}}{154,110,000} = 9.09\%$$

APPENDIX TABLE 2

External Financial Dependence by Industrial Sectors

Industry	SIC	EFD
Forestry	08	-4.63
Insurance carriers	63	-3.96
Leather and leather products	31	-0.96
Tobacco products	21	-0.92
Apparel and other finished products made from fabrics and similar materials	23	-0.61
Educational services	82	-0.55
…		
…		
…		
Transportation by air	45	0.48
Construction	15-16-17	0.57
Water transportation	44	0.67
Home furniture, furnishings, and equipment stores	57	0.69
Metal mining	10	0.96
Pipelines, except natural gas	46	1.00

Note - This table reports measures of external financial dependence (EFD) for each industry at the 2-digit SIC category. External financial dependence equals the proportion of capital expenditures financed with external funds. A negative value indicates that firms have free cash flow, whereas a positive value indicates that firms must issue debt or equity to finance their investment. External financial dependence is calculated using mature COMPUSTAT firms for the period 1980-1996. Mature firms are firms that have been on COMPUSTAT for at least 10 years.