A European Hangover

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ECB, 6 December 2012

A European Hangover

- Since 2008, large scale bailouts. Many in Europe.
- Private sector targeted bailouts (Ireland 2008, UK 2008, Spain 2012). Internal
- Government economywide bailouts (Greece (...) , Portugal 2011). External
- Very large - from 50 to 200% of GDP.

Bailouts and Economic Performance

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  - Devilish econometric issues, since causality goes both ways between Debt and Growth.
  - Panizza-Presbitero (2011), Patillo, Poirson and Ricci (2002, 2003), Chauvin and Kraay (2005), Imbs-Ranciere (2005), Cechetti, Mohanty, and Zampolli (2011), Baum, Checherita-Westphal, and Rother (2012).

Bailouts and Economic Performance

- Second: Burden Sharing.
  - (Targeted) Bailout can spread burden across the economy, and so favor exit from overhang in target sector. Tax liabilities transferred from bailed out sector to rest of the economy: redistributive consequences.

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  - Under-researched: Clements, Bhattacharya and Nguyen (2003) on public investment in highly indebted countries.
  - (Economywide) Bailout can spread burden over time. Unchanged liabilities (unless information is revealed). Limits distortions caused by sudden tax increases that would otherwise be required. (Greece, Portugal).

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This paper

- This paper takes a stab at second channel. Estimates firm performance post bailout announcements using daily equity returns.
- Focuses on dispersion in the response of returns.
  - Depending on firms' ability to relocate profits, and thus dodge tax liabilities

- Such heterogeneous response cannot be explained by countrywide overhang exit.
- Corrects for third channel, using a firm-specific measure of default risk.

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    - Depending on firms' reliance on government demand
- Such heterogeneous response cannot be explained by countrywide overhang exit.
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- Sector Bailouts in Ireland and UK have asymmetric consequences
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  - Clear Redistributive consequences.
  - No discernable effect of international dimension.

Results

- Government bailouts in Portugal and Greece have homogeneous consequences across sectors.

    - In Portugal, no significant response on average.

- % responses to be understood as (i) abnormal returns, i.e. in deviation from market factor loading, and average firm return, (ii) cumulated over 5 working days after bailout announcement date.

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  - In Portugal, no significant response on average.
  - In Greece, positive response on average, about 0.6%.

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Methodology: Abnormal returns

- Inspired from Raddatz (2011). Define abnormal returns relative to a conventional factor model:

$$R_{i,t} = \alpha_i + \beta_i \ RM_t + \sum_{\tau=t_1}^{t_2} \delta_\tau \ D_{\tau,t} + \sum_{\tau=t_1}^{t_2} \gamma_\tau \ D_{\tau,t} \bullet X + \varepsilon_{i,t}$$

where $R_{i,t}$ denotes the stock return of firm i at time t, RM_t is the market return at time t, and $D_{\tau,t}$ is an event-time indicator variable that takes value 1 whenever $\tau \in [t_1, t_2]$. X is a firm- or sector-level characteristic.

- Announcement date is t_1; $t_2 - t_1$ is estimation window, typically 5 working days.

- Paper asks whether cumulated abnormal returns are heterogeneous across firms, i.e. evaluates significance of:

$$CAR = \sum_{\tau=t_1}^{t_2} \delta_\tau \text{ and } CARX = \sum_{\tau=t_1}^{t_2} \gamma_\tau$$

Methodology: Heterogeneity

- Paper considers three splits.
- First, $X = FA_i$, the size of foreign assets as a percentage of total assets in firm i, on the year of the bailout.
- Second, $X = FIRE_2$, binary variable which takes value 1 whenever firm i belongs to the Finance, Insurance and Real Estate (FIRE) sector.
- Third, $X = GOV_3$, a measure of the amount of output that is typically consumed by the government in the NAICS sector category where firm i belongs.

Methodology: Firm-level Risk

- European bailouts were at least partly triggered by a concern with the solvency of financial firms (Ireland, the UK), or indeed that of the sovereign (Greece, Portugal).
- So bailouts are likely to have altered the risk profile of some firms. Important to correct for such changes.
- Measuring solvency risk is challenging because the conventional approach (Merton, 1974 or Leland, 1994) requires the market value and volatility of a firm's underlying assets, as well as the value of its liabilities. Both are difficult to observe.

Methodology: Firm-level Risk

- Atkeson et al (2012) introduce a simple sufficient statistic, labeled "Distance to Insolvency", DOI. equal to the (inverse of) volatility in the firm's equity. The measure is valid in a broad range of credit risk models – all that is needed are aggressive creditors $+$ adequate institutions so that insolvent firm is forced into bankruptcy.

- Augment estimation with additional control:

$$R_{i,t} = \alpha_i + \beta_i \ RM_t + \sum_{\tau=t_1}^{t_2} \delta_\tau \ D_{\tau,t} + \sum_{\tau=t_1}^{t_2} \gamma_\tau \ D_{\tau,t} \bullet X + \theta \ DOI_{i,t} + \varepsilon_{i,t}$$

where

$$DOI_{i,t} = \left[\sum_{\tau=t-30}^{t} \left(R_{i,\tau} - R_{i,t} \right)^2 \right]^{-1},$$

and $R_{i,t} = \sum_{\tau=t-30}^{t} R_{i,\tau}$ is the firm's average return over 30 working days periods ending on t.

Data: Bailout Announcements

- September 29, 2008, Ireland: "guarantee arrangement to safeguard all deposits, covered bonds, senior debt and dated subordinated debt (lower tier II)" of six Irish banks: Allied Irish Banks, Bank of Ireland, Anglo Irish Bank, Irish Life and Permanent, Irish Nationwide and the EBS Building Society. $400 billion, about twice Irish GDP.

- October 8, 2008, UK: rescue package of its financial system, aimed at facilitating inter-bank lending. Participation to the scheme required a formal agreement with the Financial Service Authority. Signed by three banks: Royal Bank of Scotland, Lloyd TSB and HBOS. $850 billion, about 130% British GDP.

Data: Bailout Announcements

- Sunday May 2, 2010: Greece: IMF and EU agreed on a three-year, \$145 billion rescue package to bail out the Greek economy. Greek government agreed to a brutal fiscal contraction in order to benefit from the low-interest loan. About 50% Greek GDP.

- May 17, 2011, Portugal: IMF and EU support for a total amount of EUR78 billion, in exchange of fiscal consolidation. About 45% of Portuguese GDP.

Data: Equity Returns and Sample Splits

- Daily data on stock prices from Thomson Reuters' Worldscope. For the four European countries, universe of stock quotes is collected between January 1 2007 and December 31 2011.

- Four measures: (i) the share price (P), or (ii) a price index (PI) adjusted for capital changes, or (iii) a return index (RI) assuming dividends are re-invested, or (iv) the market value (MV) share price multiplied by the number of ordinary shares in issue, updated for capital change. Text reports MV, but results similar.

- Foreign Assets *FA* from Worldscope: from those firms reporting yearly accounts data (substantially reduced sample).

- Sector classification *FIRE* from Worldscope, measured at 2-digit SIC level.

Data: Equity Returns and Sample Splits

- Government dependence GOV: share of output in each 4-digit industry that is consumed (final or intermediate use) by the government sector.

- Government is: Federal Government Enterprises, State and Local Government Enterprises, General Federal Defense Government Services, General Federal Nondefense Government Services, and General State and Local Government Services.

- Measure collected *in the US*, from the 2002 input-output table constructed by the Bureau of Economic Analysis (BEA). Available at 4-digit NAICS classification. Converted into 3-digit SIC classification used in Worldscope.

Table 1: Ireland (29 September 2008)

Panel A	(i)	(ii)	(iii)	(iv)	(v)	(vi)
Bailout	-5.082*** (-9.12)	-10.057*** (-4.45)	-5.502*** (-9.62)	-12.267*** (-5.24)	-4.746** (-2.32)	-10.565*** (-3.68)
Foreign Assets		0.446 (1.17)		0.542 (1.42)		0.692* (1.86)
FIRE sector			8.248*** (3.26)	14.215*** (3.63)		3.728 (0.72)
Gov. inputs					-0.471* (-1.83)	-0.471* (-1.65)
Obs.	205,230	62,883	205,230	62,883	77,049	50,375

Panel B	(i)	(ii)	(iii)	(iv)	(v)	(vi)
Bailout	-4.796*** (-8.56)	-7.524*** (-3.27)	-5.201*** (-9.04)	-9.492*** (-3.98)	-3.580* (-1.73)	-6.954** (-2.38)
Foreign Assets		0.102 (0.26)		0.181 (0.47)		0.303 (0.80)
FIRE sector			7.990*** (3.14)	13.031*** (3.31)		2.159 (0.41)
Gov. inputs					-0.548** (-2.12)	-0.568** (-1.98)
Obs.	200,845	61,542	200,845	61,542	75,204	49,200

Notes: All estimations include market factor loadings and firm-specific intercepts, as described in the text. The dependent variable is the log-change in Market Value (MV) in panel A, and the residual of a regression of the log-change in MV on the Distance to Insolvency (defined in the text) in panel B. "Bailout" reports the percentage Cumulated Abnormal Return (CAR). "Foreign Assets" denotes the cumulated response to an interaction between the bailout date and the percentage of Foreign Assets computed on the year of the bailout. Coefficients are multiplied by 10^3. "FIRE Sector" denotes the percentage cumulated response to an interaction between the bailout date and an indicator variable that takes value one when the SIC sector is part of FIRE (i.e. SIC2=60, 61, 62, 63, 64, 65, 66, and 67). "Gov. Inputs" denotes the cumulated response to an interaction between the bailout date and the consumption of each NAICS3 industry used by the government sector. F-statistics associated with the joint significance of the coefficients in CAR are reported between parentheses. *** (**,*) denotes significance at 1% (5%, 10%) confidence level.

Table 2: UK (8 October 2008)

Panel A	(i)	(ii)	(iii)	(iv)	(v)	(vi)
Bailout	-0.452*** (-5.59)	-1.166*** (-4.06)	-0.376 (-0.43)	-1.460*** (-4.69)	-2.156*** (-8.92)	-2.027*** (-3.73)
Foreign Assets		-0.108* (-1.74)		-0.088 (-1.40)		-0.43 (-0.65)
FIRE sector			-2.667*** (-11.94)	1.459** (2.46)		1.629** (2.26)
Gov. inputs					-0.065** (-2.25)	0.009 (0.20)
Obs.	5,984,314	1,471,039	5,984,314	1,471,039	2,422,171	1,201,799

Panel B	(i)	(ii)	(iii)	(iv)	(v)	(vi)
Bailout	-0.451*** (-5.55)	-1.159*** (-4.01)	-0.035 (-0.40)	-1.454*** (-4.65)	-2.144*** (-8.82)	-2.019*** (-3.70)
Foreign Assets		-0.109* (-1.74)		-0.088 (-1.40)		-0.043 (-0.64)
FIRE sector			-2.663*** (-11.89)	1.459** (2.44)		1.629** (2.25)
Gov. inputs					-0.067** (-2.31)	0.009 (0.20)
Obs.	5,822,658	1,437,474	5,822,658	1,437,474	2,536,770	1,172,801

Notes: All estimations include market factor loadings and firm-specific intercepts, as described in the text. The dependent variable is the log-change in Market Value (MV) in panel A, and the residual of a regression of the log-change in MV on the Distance to Insolvency (defined in the text) in panel B. "Bailout" reports the percentage Cumulated Abnormal Return (CAR). "Foreign Assets" denotes the cumulated response to an interaction between the bailout date and the percentage of Foreign Assets computed on the year of the bailout. Coefficients are multiplied by 10^3. "FIRE Sector" denotes the percentage cumulated response to an interaction between the bailout date and an indicator variable that takes value one when the SIC sector is part of FIRE (i.e. SIC2=60, 61, 62, 63, 64, 65, 66, and 67). "Gov. Inputs" denotes the cumulated response to an interaction between the bailout date and the consumption of each NAICS3 industry used by the government sector. F-statistics associated with the joint significance of the coefficients in CAR are reported between parentheses. *** (**,*) denotes significance at 1% (5%, 10%) confidence level.

Table 3: Greece (3 May 2010)

Panel A	(i)	(ii)	(iii)	(iv)	(v)	(vi)
Bailout	0.664** (2.33)	0.766 (0.92)	0.662** (2.21)	0.708 (0.78)	1.062 (1.57)	0.814 (0.53)
Foreign Assets		-0.035 (-0.10)		-0.041 (-0.12)		-0.044 (-0.10)
FIRE sector			0.0191 (0.02)	0.287 (0.17)		0.251 (0.10)
Gov. inputs					0.086 (0.83)	0.052 (0.25)
Obs.	564,594	130,461	564,594	130,461	310,617	86,096

Panel B	(i)	(ii)	(iii)	(iv)	(v)	(vi)
Bailout	0.655** (2.27)	0.731 (0.86)	0.653** (2.16)	0.664 (0.72)	1.056 (1.55)	0.783 (0.51)
Foreign Assets		-0.028 (-0.08)		-0.035 (-0.10)		-0.034 (-0.08)
FIRE sector			0.025 (0.02)	0.315 (0.18)		0.275 (0.11)
Gov. inputs					0.086 (0.81)	0.049 (0.23)
Obs.	549,061	127,381	549,061	127,381	303,046	83,977

Notes: All estimations include market factor loadings and firm-specific intercepts, as described in the text. The dependent variable is the log-change in Market Value (MV) in panel A, and the residual of a regression of the log-change in MV on the Distance to Insolvency (defined in the text) in panel B. "Bailout" reports the percentage Cumulated Abnormal Return (CAR). "Foreign Assets" denotes the cumulated response to an interaction between the bailout date and the percentage of Foreign Assets computed on the year of the bailout. Coefficients are multiplied by 10^3. "FIRE Sector" denotes the percentage cumulated response to an interaction between the bailout date and an indicator variable that takes value one when the SIC sector is part of FIRE (i.e. SIC2=60, 61, 62, 63, 64, 65, 66, and 67). "Gov. Inputs" denotes the cumulated response to an interaction between the bailout date and the consumption of each NAICS3 industry used by the government sector. F-statistics associated with the joint significance of the coefficients in CAR are reported between parentheses. *** (**,*) denotes significance at 1% (5%, 10%) confidence level.

Table 4: Portugal (17 May 2011)

Panel A	(i)	(ii)	(iii)	(iv)	(v)	(vi)
Bailout	0.395 (0.87)	-1.876 (-1.50)	0.443 (0.96)	-1.776 (-1.32)	-0.414 (-0.18)	-3.167 (-1.30)
Foreign Assets		0.498 (1.61)		0.492 (1.58)		0.606* (1.67)
FIRE sector			-1.709 (-0.62)	-0.498 (-0.20)		
Gov. inputs					0.052 (0.19)	0.088 (0.28)
Obs.	182,814	29,437	182,814	29,437	47,337	17,470

Panel B	(i)	(ii)	(iii)	(iv)	(v)	(vi)
Bailout	0.402 (0.88)	-1.864 (-1.48)	0.450 (0.97)	-1.763 (-1.30)	-0.403 (-0.18)	-3.155 (-1.29)
Foreign Assets		0.498 (1.60)		0.491 (1.57)		0.606* (1.66)
FIRE sector			-1.704 (-0.62)	-0.495 (-0.20)		
Gov. inputs					0.052 (0.19)	0.088 (0.28)
Obs.	178,087	28,862	178,087	28,862	46,113	17,137

Notes: All estimations include market factor loadings and firm-specific intercepts, as described in the text. The dependent variable is the log-change in Market Value (MV) in panel A, and the residual of a regression of the log-change in MV on the Distance to Insolvency (defined in the text) in panel B. "Bailout" reports the percentage Cumulated Abnormal Return (CAR). "Foreign Assets" denotes the cumulated response to an interaction between the bailout date and the percentage of Foreign Assets computed on the year of the bailout. Coefficients are multiplied by 10^3. "FIRE Sector" denotes the percentage cumulated response to an interaction between the bailout date and an indicator variable that takes value one when the SIC sector is part of FIRE (i.e. SIC2=60, 61, 62, 63, 64, 65, 66, and 67). "Gov. Inputs" denotes the cumulated response to an interaction between the bailout date and the consumption of each NAICS3 industry used by the government sector. F-statistics associated with the joint significance of the coefficients in CAR are reported between parentheses. *** (**,*) denotes significance at 1% (5%, 10%) confidence level.

Conclusion

- Targeted bailouts had redistributive consequences: benefited target sectors, but at the cost of others.
- In fact, in the UK, benefited few firms only.
- Could mean (i) sharing of tax liabilities, (ii) targeted exit of an overhang zone.
- Economywide bailouts had no redistributive consequences.
- In fact had no consequence at all in Portugal. Confirms tax liabilities not affected by bailout in PV.
- In Greece, bailout had positive economywide consequences.
- Could mean (i) less distortion from sudden tax adjustment, (ii) economywide exit of an overhang zone.