**Bank Distress and Firms’ Investment during the Great Recession - Evidence from Ireland**

By

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**Abstract:** This paper investigates the impact of bank distress on firms’ performance using unique data during the Great Recession for Ireland. The results show that bank distress, measured as banks’ credit default swap spreads (CDS), has negatively and statistically significantly affected firms’ investment expenditures. Interestingly, firms with access to alternative sources of external finance are not impacted by bank distress. The results are robust to accounting for external finance dependence, demand and trade sensitivities, which affect firm performance and the demand for credit.

Keywords: *firm performance, bank distress, crisis*

JEL classification:

1. **Introduction**

Does bank distress affect firms’ performance? We analyze the impact of banking sector distress on the investment behavior of firms. We focus on the Irish economy during the crisis years, 2008-2014, and use a unique database of the universe of Irish firms and their banking relations. Banks’ Credit Default Swap spreads (CDS) are used to capture bank fundamentals as well as risk premia.

A number of papers identify a “Bank lending channel” where banks themselves face borrowing constraints, and hence may restrict credit due to deterioration in their balance sheet (see Gambacorta and Marques-Ibanez, 2011 for a detailed review). Acharyaa et al (2015) explore the impact of European Sovereign Debt Crisis on loan supply disruptions for GIIPS banks and the impact on the performance of European borrowers that have a significant business relationship with these banks. Carvalho et al (2014), analyses 1,564 large and very large publicly traded firms in 34 countries and finds that, during financial crises, firms with strong relationship with banks are affected by bank distress, and that public debt markets do not mitigate the credit constraint for these firms

Our paper improves upon the previous studies in several ways: first, we include small and medium firms, which are likely to suffer the most, allowing us to provide more precise estimates of the effects of the crises. The above papers used syndicated loans data to match firms with banks, therefore restricting their analysis to publicly traded, large and very large firms, which often have access to alternative sources of external finance, therefore underestimating the importance of the bank lending channel; second, the measure of bank distress is extremely important for the analysis – we use banks’ Credit Default Swap (CDS) spreads, a market based indicator that which allows timely information on the default risk of banks which is not subject to the delay in ratings agencies evaluation of risk; third, we carefully control for both domestic as well as foreign demand, which is especially important for Irish firms, which are very integrated in world markets; fourth, we control for firms’ dependence on external finance, which influences the degree to which firms respond to disruptions in the supply of bank loans. Finally, we account for possible reverse causation in estimation by using instrumental variables.

We find that bank distress negatively affects borrowing firm’s investments and that firms in industries that rely more on external finance for investments, are more sensitive to business cycles and have no access to public debt, will be more negatively affected.

The paper is structured as follows: section 2 describes the data, and the econometric strategy. Section 3 discusses the results. Section 4 provides robustness checks. Section 5 concludes.

**2. Data Description and Econometric Strategy**

**2.1. Data Description**

We use Orbis, Bankscope and Amadeus for firm level, bank specific and bank-firm relationship data respectively, Compustat is used for firm level controls. CDS data were collected from DataStream and SNL Financial. We hand match the names of each bank listed in Amadeus with the names of the banks in Bankscope. After cleaning the data and constructing the variables we are left with 1644 firms in manufacturing and services sectors.

**2.2 Econometric Methodology**

Our basic specification links firms’ changes in capital expenditure to its determinants, including bank distress. We use the following econometric model:

*(CapExp/Toas)ijt - (CapExp/Toas)ijt-1 = β1Ageit + β2Sizeit + β3Cashit/Toasit + β4Bank Distresskt-2 + β5 ExternalFinanceDependancej + β6 BusinessCycleDependencej + β7 TradeDependencej + πt +εijt*

where the dependent variable is the change in firms’ capital expenditure divided by total assets. We follow Claessens et al (2012) and use change in capital expenditure in order to account for other firm characteristics, such as differences in profitability before the crisis. We also account for the age, the size of the firm, and cash holdings/total assets.[[1]](#footnote-2) Firms’ age is the difference between current year and the year the firm was established. Firms’ size is proxied by the logarithm of total assets.

We use monthly 5-year Senior debt CDS spread data to proxy for bank distress using the 5 year Tenor for Senior debt CDS. A higher spread implies a greater risk of default. Since banks distress may not affect supply to finance firms’ investments immediately, we lag the bank distress variable in all regressions. This also corrects for possible issues of reverse causation.

We introduce three major controls. First, to account for differences in the reliance on external finance we calculate industry level external finance sensitivities, using the methodology devised by Rajan and Zingales (1998).

Second, credit demand and supply shocks may be correlated. We control for correlation by first accounting for firm specific variables in the regression. Second, we introduce in the regression an industry level business cycle sensitivity variable, which accounts for the domestic demand for credit, following the methodology developed by Tong and Wei (2008)).

We also control for the possibility that firms in industries that are more dependent on international trade being more adversely affected than firms that serve domestic market.[[2]](#footnote-3)

All three above controls are calculated using US firm level data from Compustat for 2000-2006. These controls allow us to check to what extent ex ante ﬁrms’ intrinsic characteristics (external financial dependence, sensitivity to domestic and foreign demand) help explain changes in their ex post performance, i.e. investments during the crisis.

**3. Results**

The results from our baseline specification are shown in Table 1. We start with baseline specification, column 1 and find a negative and statistically significant coefficient of the bank distress variable. We introduce one by one, industry specific sensitivities. The coefficients of the external finance dependence, of the business cycle sensitivity, and of trade sensitivity variables are all negative and statistically significant. Finally, we introduce all three sectoral sensitivities. (Last column of Table 1). All the coefficients of sensitivities variables have the expected signs, are negative and statistically significant. The bank distress variable remains negative and statistically significant in all regressions. This suggests that, even after accounting for other possible factors, banks’ distress was transmitted to their customers and negatively affected their investments.

**4. Robustness checks**

To control for the possibility that ﬁrms may have anticipated the crisis, and took precautionary measure by changing their level of cash holdings (see Claessens et al (2012)), we use the pre-crisis values (i.e. year 2006) of size, age and cash holdings/total assets. This also corrects for possible reverse causality between the change in capital expenditure and cash holdings. The results, presented in Table 2 are not substantially changed.

Secondly, we analyze the impact of access to public debt as a substitution channel. We follow Chava and Purnanandam (2011) and use the absence of credit rating as a proxy for a lack of access to public debt. Firms *without* credit ratings, show negative and statistically significant coefficient of the banks distress variable. Conversely, firms *with* access to public debt markets are not impacted by bank distress (Table 3).

To address concerns about possible endogeneity we estimate a GMM regression[[3]](#footnote-4) for the initial specification, using the lag of bank distress variable as an instrument. The results, presented in Table 4, confirm our previous findings.

**5. Conclusions**

This paper asks if bank distress restricts Irish firms’ investments by transmitting a shock from the banking sector into the real economy. We find that bank distress, proxied by market CDS spreads resulted in lower investments by firms, but only in the case of firms dependent on banks for external finance, i.e. firms with no access to public debt. The size of the effect on capital expenditure reduction is significant in magnitude as well. The results indicate a 100 basis point increase in the level of the CDS swap spread on 5 Year Senior Debt translated to $3.3 m fall in expenditure on investment.

The results are robust to accounting for various other firms’ characteristics and channels through which the great recession spread across borders and impacted firms’ capital expenditure and loan demand. These findings highlight the importance of banks as providers of funds for Irish firms’ investments.

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| **Table 1. Regressions** |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| Dependent variable - change in capital expenditure / total assets | | | |  |  |  |  |
|  |  |  |  |  |  |  |  |
| Age |  | -0.0006\*\*\* | -0.0009\*\*\* | -0.0009\*\*\* | -0.0010\*\*\* | -0.0009\*\*\* |
|  |  | [-4.455] | [-6.672] | [-6.602] | [-7.755] | [-6.594] |
| Size |  | 0.001 | 0.00354\*\*\* | 0.00341\*\* | 0.00373\*\*\* | 0.00376\*\*\* |
|  |  | [0.719] | [2.584] | [2.495] | [3.323] | [2.706] |
| Cash holdings/total assets |  | -0.0320\*\*\* | -0.0199\*\* | -0.0203\*\* | -0.0237\*\*\* | -0.0198\*\* |
|  |  | [-4.166] | [-2.275] | [-2.312] | [-3.614] | [-2.268] |
| **Bank distress\_lag** |  | **-0.0199\*** | **-0.0320\*\*** | **-0.0316\*\*** | **-0.0331\*\*\*** | **-0.0328\*\*** |
|  |  | **[-1.760]** | **[-2.337]** | **[-2.311]** | **[-3.312]** | **[-2.393]** |
| Dependence on external finance |  |  | -0.0042\* |  |  | -0.0042\* |
|  |  |  | [-1.798] |  |  | [-1.813] |
| Business cycle sensitivity |  |  |  | -0.0349\*\* |  | -0.0311\* |
|  |  |  |  | [-2.084] |  | [-1.887] |
| Trade Sensitivity |  |  |  |  | -0.0093\*\*\* | -0.007\*\*\* |
|  |  |  |  |  | [-3.586] | [-2.668] |
| Constant |  | 0.025 | 0.0433\*\* | 0.0425\*\* | 0.0439\*\*\* | 0.0420\*\* |
|  |  | [1.297] | [2.184] | [2.144] | [3.067] | [2.114] |
|  |  |  |  |  |  |  |
| Observations |  | 7,230 | 5,147 | 5,147 | 8,258 | 5,147 |
| R-squared |  | 0.062 | 0.017 | 0.017 | 0.019 | 0.018 |
|  |  |  |  |  |  |  |
| year dummies |  | yes | yes | yes | yes | yes |
| industry dummies |  | yes | no | no | no | no |
| \*\*\* p<0.01, \*\* p<0.05, \* p<0.1 |  |

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| **Table 2. Regressions with predetermined controls** | | |  |  |  |  |
|  |  |  |  |  |  |  |
| Dependent variable - change in capital expenditure / total assets | | | |  |  |  |
|  |  |  |  |  |  |  |
| Age 2006 | -0.0003\*\* | -0.0003\*\* | -0.0004\*\*\* | -0.0004\*\*\* | -0.0004\*\*\* | -0.0004\*\*\* |
|  | [-2.303] | [-2.414] | [-3.515] | [-3.324] | [-4.445] | [-3.474] |
| Size 2006 | -0.000255 | -0.0011 | 0.000874 | 0.000682 | 0.001 | 0.000915 |
|  | [-0.262] | [-0.932] | [0.749] | [0.588] | [1.139] | [0.780] |
| Cash holdings/total assets 2006 | -0.00443 | -0.00785 | -0.0147\* | -0.0159\* | -0.00514 | -0.0147\* |
|  | [-0.660] | [-0.999] | [-1.715] | [-1.872] | [-0.766] | [-1.719] |
| **Bank distress\_lag** |  | **-0.0219\*\*** | **-0.0243\*\*** | **-0.0240\*\*** | **-0.0390\*\*\*** | **-0.0242\*\*** |
|  |  | **[-2.400]** | **[-2.241]** | **[-2.219]** | **[-4.550]** | **[-2.236]** |
| Dependence on external finance | |  | -0.00440\*\* |  |  | -0.00443\*\* |
|  |  |  | [-2.017] |  |  | [-2.028] |
| Business cycle sensitivity |  |  |  | -8.54E-05 |  | 0.0008 |
|  |  |  |  | [-0.0102] |  | [0.0959] |
| Trade Sensitivity |  |  |  |  | -0.0030 | -0.0014 |
|  |  |  |  |  | [-1.216] | [-0.560] |
| Constant | 0.0507\*\* | 0.0145 | 0.0104 | 0.012 | 0.0389\*\* | 0.0102 |
|  | [1.994] | [0.832] | [0.465] | [0.534] | [2.225] | [0.457] |
|  |  |  |  |  |  |  |
| Observations | 8,722 | 6,146 | 4,324 | 4,324 | 7,242 | 4,324 |
| R-squared | 0.035 | 0.045 | 0.008 | 0.008 | 0.009 | 0.008 |
|  |  |  |  |  |  |  |
| year dummies | yes | yes | yes | yes | yes | yes |
| industry dummies | yes | yes | no | no | no | no |

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

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| **Table 3. Results for firms *with* and *without* access to public debt and predetermined controls** | | | | | | |  |  | |  | |  | |  | |
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| Dependent variable - change in capital expenditure / total assets | | | | | |  |  | |  | |  | |  | |  | |
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|  | **Firms *without* access to public debt** | | | |  |  | **Firms *with* access to public debt** | | | | | |  | |  | |
|  |  | |  |  |  |  |  | |  | |  | |  | |  | |
| **Bank distress\_lag** | **-0.0225\*\*** | | **-0.0269\*\*** | **-0.0267\*\*** | **-0.0417\*\*\*** | **-0.0268\*\*** | -0.0101 | | -0.00773 | | -0.00783 | | -0.0137 | | -0.00846 | |
|  | **[-2.145]** | | **[-2.103]** | **[-2.083]** | **[-4.263]** | **[-2.096]** | [-0.570] | | [-0.481] | | [-0.484] | | [-0.988] | | [-0.524] | |
| Age 2006 | -0.0004 | | -0.0006\*\*\* | -0.0006\*\*\* | -0.0007\*\*\* | -0.0006\*\*\* | -0.0002 | | -0.0002 | | -0.0002 | | -7.06E-05 | | -0.0001 | |
|  | [-1.630] | | [-3.237] | [-3.032] | [-4.386] | [-3.215] | [-0.903] | | [-1.131] | | [-1.131] | | [-0.619] | | [-1.030] | |
| Size 2006 | -0.000889 | | 0.00148 | 0.00126 | 0.00176\* | 0.00146 | -0.00156 | | -0.00182 | | -0.00174 | | -0.000951 | | -0.00164 | |
|  | [-0.648] | | [1.063] | [0.911] | [1.681] | [1.042] | [-0.465] | | [-0.639] | | [-0.617] | | [-0.465] | | [-0.579] | |
| Cash holdings/total assets 2006 | -0.00498 | | -0.0129 | -0.0138 | -0.0037 | -0.013 | -0.00915 | | -0.0353 | | -0.0343 | | -0.0302 | | -0.0339 | |
|  | [-0.583] | | [-1.413] | [-1.511] | [-0.511] | [-1.420] | [-0.274] | | [-1.255] | | [-1.257] | | [-1.528] | | [-1.210] | |
| Dependence on external finance | | | -0.00617\*\* |  |  | -0.00618\*\* |  | | 0.00064 | |  | |  | | 0.000438 | |
|  |  | | [-2.177] |  |  | [-2.177] |  | | [0.229] | |  | |  | | [0.156] | |
| Business cycle sensitivity | | | | 0.00805 |  | 0.00973 |  | |  | | -0.00232 | |  | | 0.000181 | |
|  |  |  | | [0.811] |  | [0.976] |  | |  | | [-0.176] | |  | | [0.0136] | |
| Trade Sensitivity | |  | |  | -0.00308 | 0.00123 |  | |  | |  | | -0.00206 | | -0.00621\* | |
|  |  |  | |  | [-0.915] | [0.359] |  | |  | |  | | [-0.673] | | [-1.852] | |
| Constant | -0.199\*\*\* | 0.0360\* | | 0.0377\* | 0.0489\*\*\* | 0.0364\* | 0.0688 | | 0.036 | | 0.0349 | | 0.0385 | | 0.036 | |
|  | [-3.561] | [1.846] | | [1.936] | [3.493] | [1.868] | [1.181] | | [1.232] | | [1.216] | | [1.618] | | [1.224] | |
|  |  |  | |  |  |  |  | |  | |  | |  | |  | |
| Observations | 4,940 | 3,302 | | 3,302 | 5,777 | 3,302 | 1,206 | | 1,022 | | 1,022 | | 1,465 | | 1,022 | |
| R-squared | 0.054 | 0.01 | | 0.009 | 0.011 | 0.01 | 0.071 | | 0.009 | | 0.009 | | 0.008 | | 0.01 | |
|  |  |  | |  |  |  |  | |  | |  | |  | |  | |
| Year dummies | yes | yes | | yes | yes | yes | yes | | yes | | yes | | yes | | yes | |
| Industry dummies | yes | no | | no | no | no | yes | | no | | no | | no | | no | |

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

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1. Accounting for profitability does not change the results. [↑](#footnote-ref-2)
2. See Claessens et al (2012) [↑](#footnote-ref-3)
3. Blundell and Bond (1998) [↑](#footnote-ref-4)