A Online Appendix for "Do Empty Creditors Matter? Evidence from Distressed Exchange Offers"

A.1 Fraction of CDS contracts with No Restructuring clause

I calculate summary statistics about the fraction of No Restructuring clauses traded in the CDS market. The starting point for the calculation is the Markit database containing all single name CDS quotes. I restrict this sample by dropping sovereign CDS spreads, all currencies except USD, and only keeping reference entities in the North America region. The result is a sample of North American corporate CDS quotes. Next, I calculate the fraction of No Restructuring clauses for each year from 2006 to 2012. To be included in the calculation, a firm needs to have at least one day of quotes during a year.

Table 13

	2006	2007	2008	2009	2010	2011	2012
No Restructuring	26.65%	27.12%	27.35%	32.06%	33.58%	40.52%	40.35%

Table 13 shows that the fraction of No Restructuring clauses in Markit increased steadily from 26.65% in 2006 to 40.35% in 2012. The other CDS quotes in Markit are Full Restructuring, Modified Restructuring, and Modified-Modified Restructuring. The table shows that while the other three clauses remain important, No Restructuring became significantly more popular over time.

A.2 The effect of transaction costs on the identification strategy

If there are transaction costs associated with tendering, then a bondholder who is fully hedged with a Modified Restructuring (MR) contract is not perfectly indifferent between tendering and not tendering. MR contracts were more common before the Big Bang. Consider a simple example to illustrate. Assume for simplicity that a single bondholder owns the face value of F, and is fully hedged with an MR contract. If he tenders in full, he gets bF from the firm, where $b \in (0,1)$ is the firm's bid per unit of face value. He also gets F from the protection seller, and has to pay her bF. The total payoff is $bF + F - bF = F$. If there are transaction costs $t > 0$ associated with tendering, then the total payoff is only $(1-t)bF + F - bF$. If he does not tender, his expected payoff is F, since he is fully hedged. If t is positive, then he prefers not to tender, since his payoff with tendering is slightly lower than his payoff without tendering, or $(1-t)bF + F - bF < F$.

Compare this to the case where the bondholder is insured with No Restructuring (XR) contracts, which became more common after the Big Bang. If he tenders, his payoff is $(1-t)bF$. If he does not tender, he gets F. He prefers not to tender, since $(1-t)bF < F$, which is the same outcome as in the previous case. Even though transaction costs are likely to be very small, especially since the bondholder simply has to respond whether he wants to tender or not, the identification strategy using the Big Bang might not work very well. The reason is that both before and after the Big Bang, fully hedged bondholders have an incentive not to tender.

The situation changes if we allow for bondholders who are not fully hedged, which is a more realistic assumption (see the discussion in Section 4). Let the hedge ratio be a fraction $\beta \in (0,1)$ of face value. If the bondholder uses MR contracts, and if he tenders everything, his payoff is $(1-t)bF + \beta F - \beta bF$. If he does not tender, he gets $\beta F + (1-\beta)m$, where m is the market value of his bond if he does not tender, with $m < F$. The market value is less than face value because there is a positive probability of bankruptcy, especially if he does not tender. Note that it is no longer true that he strictly prefers not to tender. The optimal tendering decision depends on the hedge ratio β, the bid b, the transaction costs t, and the value of debt without tendering m. The bondholder prefers to tender if

$$(1-t)bF + \beta F - \beta bF > \beta F + (1-\beta)m.$$

In the case of XR contracts, tendering everything yields a payoff of $(1-t)bF$. Not tendering produces $\beta F + (1-\beta)m$. Again, depending on the parameter values, tendering or not tendering can both be optimal. The bondholder will tender if

$$(1-t)bF > \beta F + (1-\beta)m.$$

For the identification strategy using the Big Bang to work, one needs to show that tendering is more likely before the Big Bang. In the simple example presented here, that is indeed the case. This follows immediately from the previous two inequalities, assuming that transaction costs are small. Both inequalities have the same right hand side. However, the left hand side of the first inequality is larger than the left hand side of the second inequality. If follows that whenever the bondholder with XR contracts prefers to tender, he also prefers to tender if he has MR contracts, but not the other way around. In simple terms, the bondholder is more likely to tender in a world with MR contracts, which is exactly what is needed for the identification strategy to work.

To conclude, the presence of transaction costs does not necessarily affect the identification strategy using the Big Bang as a natural experiment. If transaction costs are small, and if bondholders are not fully hedged using CDSs, then the probability of tendering should be higher before the Big Bang. This is sufficient for the identification strategy to work even in the presence of transaction costs.

A.3 Sample of distressed exchange offers

Company Name	Offer Date	Company Name	Offer Date
Abitibi Bowater	2009-03-16	Hovnanian Enterprises	2009-06-19
Allis Chalmers Energy	2009-05-20	Insight Health Services	2007-03-21
American Achievement Group	2009-06-04	Intelsat	2009-01-14
American Capital Ltd.	2010-05-03	Level 3 Communications	2008-11-17
American Media Operations	2008-08-27	Loehmanns Holdings Inc.	2010-09-24
Appleton Papers	2009-08-18	Marsico Parent Holdco	2010-10-08
Atlantic Express Transp.	2009-10-20	McClatchy	2009-05-21
Autocam	2007-03-01	Metaldyne Corporation	2008-10-30
BMS Holdings Inc.	2010-08-17	MF Global Holdings Ltd.	2010-06-01
Broder Bros	2009-04-20	MGM Mirage	2009-05-13
Brookstone	2010-06-11	Momentive Performance Mat.	2009-05-12
Builders Firstsource	2009-10-23	Morris Publishing Group	2009-12-14
C&D Technologies Inc.	2010-10-21	MXEnergy Holdings	2009-06-26
Centro NP	2009-02-17	NCI Building Systems	2009-09-11
Century Aluminum	2009-10-28	Neff	2008-11-17
Charter Communications	2007-08-29	Network communications	2010-11-16
Charter Communications	2007-03-06	Nexstar Broadcasting	2009-02-27
Charter Communications	2008-05-29	North Atlantic Holding Co.	2007-05-09
Charter Communications	2008-09-30	OSI Restaurant Partners	2009-02-18
Citizens Republic Bancorp	2009-07-31	Pac-West Telecomm	2006-11-15
Clear Channel Comm.	2008-11-24	Primus Telecommunications	2008-05-22
CMP Susquehanna	2009-03-09	Quality Distribution	2009-08-28
Commercial Vehicle Group	2009-08-04	Quantum	2009-03-27
Delta Mills	2006-04-17	R.H. Donnelley	2008-05-06
Duane Reade	2009-07-08	Radio One	2010-06-16
E-Trade Financial Corp.	2009-06-22	RBS Global	2009-03-25
Energy Future Holdings Corp.	2010-07-16	Realogy	2010-11-30
Energy XXI Gulf Coast	2009-09-04	Residential Capital ResCap	2008-05-02
Evergreen Solar Inc.	2011-01-03	Sensata Technologies	2009-03-03
Fairpoint Communications	2009-06-24	Six Flags	2008-05-14
FiberTower Corp.	2009-10-26	Standard Motor Products	2009-03-20
Finlay Fine Jewelry	2008-11-17	Suncom Wireless	2007-01-31
First Data	2010-11-17	Tekni-Plex Inc.	2008-03-28
Ford Motor Company	2009-03-04	The Dress Barn Inc.	2009-12-23
Freescale Semiconductor	2009-02-10	Unisys	2009-04-30
French Lick Resorts	2008-03-31	Vertis Holdings Inc.	2010-04-15
Georgia Gulf	2009-03-31	Viskase Companies	2008-08-04
Haights Cross Comm.	2009-06-08	William Lyon Homes	2009-04-13
Harrahs Entertainment	2008-11-14	Wolverine Tube	2009-02-25
Hawker Beechcraft	2009-05-04	XM Satellite Radio Holdings	2009-02-13
Hexion Specialty Chemicals	2009-05-11	YRC Worldwide	2009-11-09

A.4 Details of simulation study

In this simulation study, I compare the main test in Bedendo, Cathcart, and El-Jahel (2015) to the test in equation (1) using simulated data. Bedendo et al. specify a probit model where the dependent variable measures the outcome of a debt restructuring. The value of this variable is one if a firm files for bankruptcy, and zero if it successfully restructures its debt in a distressed exchange offer. To compare their methodology with the present one, it is convenient to switch the values of the dependent variable, so it can be interpreted as a measure of the success of a debt restructuring. Bedendo et al. argue that under the empty creditor hypothesis, a firm is more likely to file for bankruptcy if it is a reference entity in the CDS market. In the theoretical framework in the appendix, this is indeed the case. Equation (A-6) shows that the probability of default (i.e., bankruptcy) is increasing in the bondholder's insurance ratio. The simulation study shows that, in principle, the bankruptcy dummy suggested by Bedendo et al. is able to identify the effect of empty creditors on debt restructurings. However, the statistical relationship between the CDS insurance ratio and bankruptcy is very noisy. To see this, suppose that the CDS insurance ratio is very low (i.e., the empty creditor problem is not severe). The operating performance of a firm might deteriorate following the distressed exchange offer, which would force the firm to file for bankruptcy. Thus, the realization of bankruptcy might not be caused by an unsuccessful restructuring, but by bad luck. By looking at the result of the out-of-court restructuring directly, one can estimate the effect of empty creditors with less noise.

The following steps are used to simulate a sample of distressed exchange offers and bankruptcies. Produce n random draws of the following independently distributed random variables: $\xi \sim N(0,1), \quad \varepsilon \sim N(0,1)$. Define the true CDS insurance ratio of the bondholder as $\beta = \Phi(\xi)$, where Φ denotes the cumulative distribution function of the standard normal distribution. The observed CDS insurance ratio is defined as $\beta^o = \Phi(\xi + \varepsilon)$. In other words, the true CDS insurance ratio is observed with an error, which is very likely to be the case with the CDS dummy employed in the empirical analysis. Also, the insurance ratio lies in the unit interval, which is consistent with the theoretical model. The participation rate x/F in the distressed exchange offer of a generic company is given by equation (A-5), using the true insurance ratio β and a recovery rate of $\rho = 0$.[15] Then the following specification is estimated using ordinary least squares,

$$\frac{x}{F} = \alpha_0 + \alpha_1 \beta^o + u,$$

[15] This is assumed for simplicity. Different values for the recovery rate do not change the qualitative nature of the results.

where u is the usual error term. The expected sign of α_1 is negative, which would be interpreted as evidence in favor of the empty creditor hypothesis. In order to compared this specification with that in Bedendo, Cathcart, and El-Jahel (2015), define

$$z = \begin{cases} 1 & \text{if } y \geq F - x \text{ (no bankruptcy)} \\ 0 & \text{else (bankruptcy),} \end{cases}$$

where y follows a uniform distribution as in the theoretical model, $y \sim U(0, \bar{y})$. It is assumed that y is independent from ξ and ε. The remaining parameter values used in the simulations are $F/\bar{y} = 0.5$, which implies that the expected value of operating cash flow equals the face value of debt. This value is chosen to capture the nature of financially distressed firms, but the main results do not depend on this particular value.

The simplified specification of Bedendo et al. can then be written as:

$$z = a_0 + a_1 \beta^o + v,$$

where a negative value for the coefficient a_1 is consistent with the empty creditor hypothesis. The second specification is written as a linear equation for better comparison, but it is estimated as a probit model.

A.5 Theoretical model: Sufficient condition for interior solution

Proof. In the appendix it is claimed that in equilibrium x, derived from the first-order condition, is at an interior solution, that is $x \in (0, F)$. To see that $x < F$, note that from (A-7) it follows that $\beta \in (0, 1/4]$. Therefore, $b < 1$ using (A-4), which implies that $x < F$ using (A-3).

To see that $x > 0$, substitute (A-7) into (A-5). The resulting expression can be shown to be larger than zero if and only if:

$$\frac{2\left(3 - 5\rho + 2\rho^2\right)}{4 - 3\rho} > 0,$$

which itself is equivalent to the inequality:

$$3 - 5\rho + 2\rho^2 > 0.$$

Solving the associated quadratic equation in ρ reveals that $\rho < 1$ is sufficient for $x > 0$. □