Credit Risk and the Life Cycle of Callable Bonds

Implications for Real Corporate Decisions

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Murillo Campello
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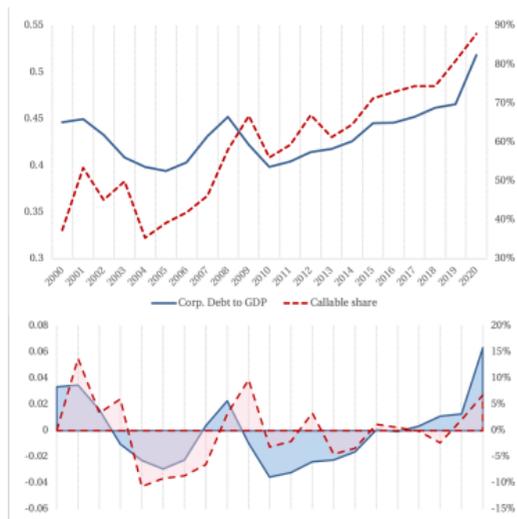Dong Yan

Callability Common for Corporate Bonds

Figure 1. Corporate debt (normalized by GDP) from U.S. Flow of Funds and the callable share of new bond issues from Mergent FISD. Top panel: levels (leverage on left-hand scale); bottom panel: detrended series.

▶ Callable bonds grew substantially from 2000–20

▶ Issuance of callable bonds spiked during recessions

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▶ Callable bonds grew substantially from 2000–20

▶ Issuance of callable bonds spiked during recessions

▶ We provide a comprehensive new assessment of callable bonds

A Bond with a Fixed-Price (FP) Call Provision

- FP strike prices are fixed and predetermined (typically 100-105% of par)

A Bond with a Fixed-Price (FP) Call Provision

To investor

To firm

Proceeds

Issue date

Maturity date

Time

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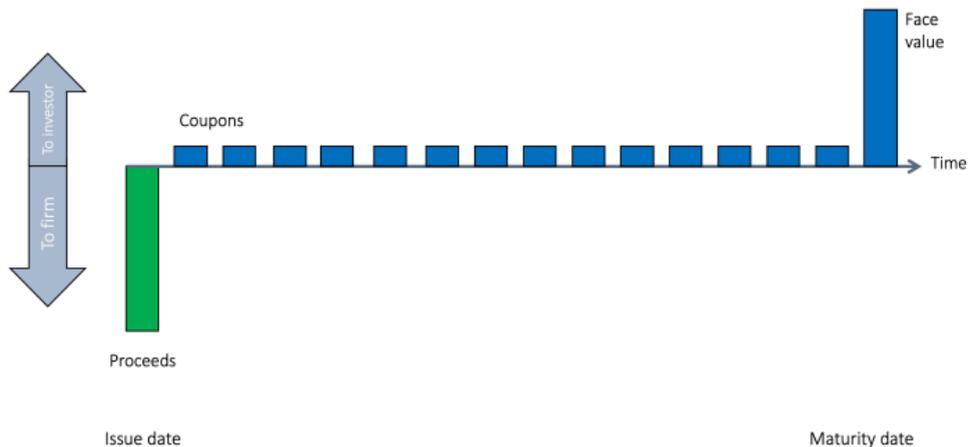
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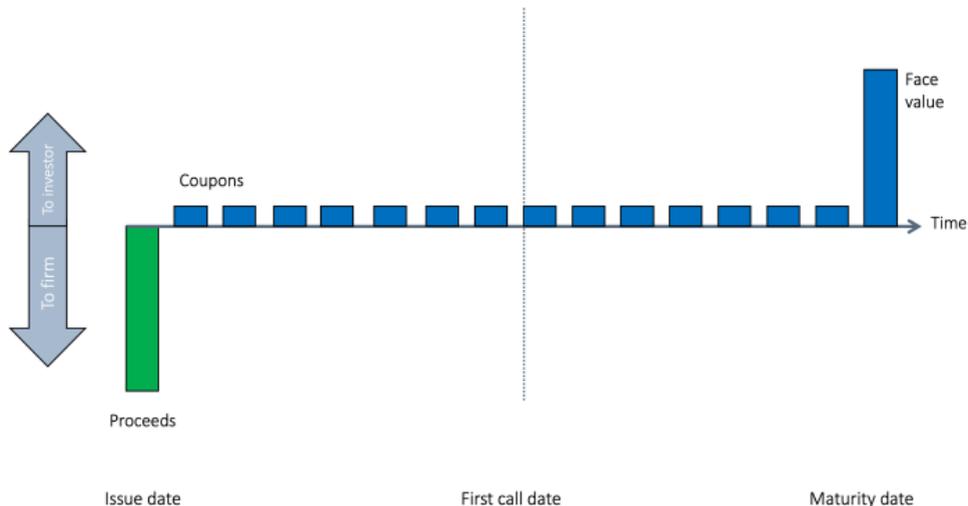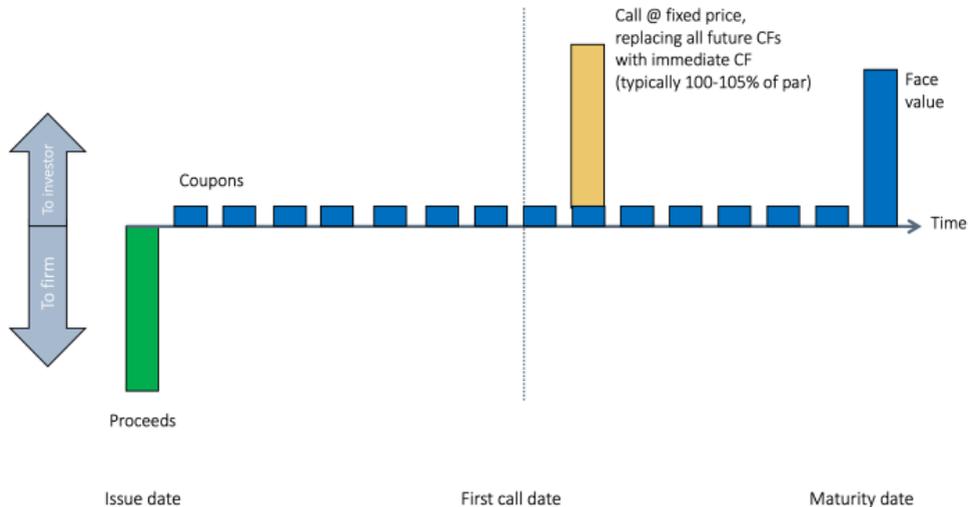
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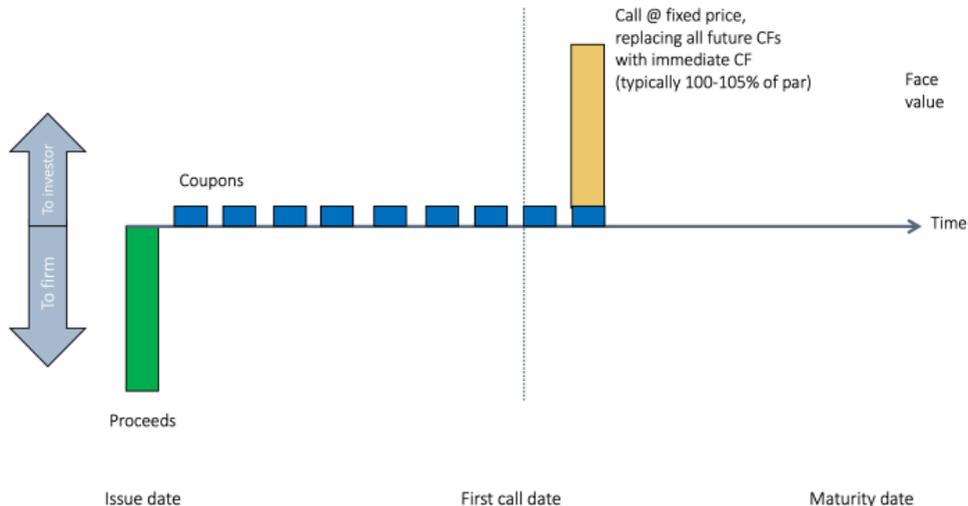
A Bond with a Make-Whole (MW) Call Provision

Call @
max [PV(all future CFs;
LIBOR + spread), par]

Face value

Coupons

To investor

To firm

Time

Proceeds
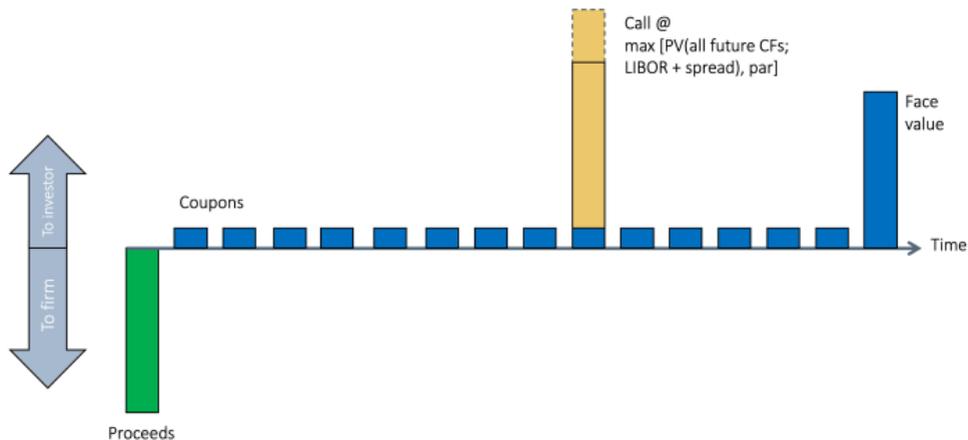
▶ MW strike prices are virtually never be below the market value

First Make-Whole and Later Fixed-Price
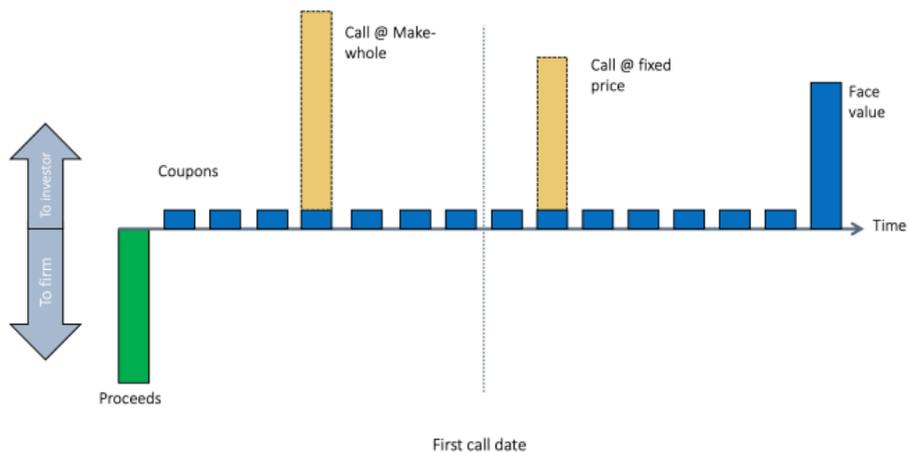
- Bonds having both calls are invariably *first* MW callable and *later* FP callable
- ... account for 18% of all bonds issued (and $> 50\%$ after 2010)

Existing Views of Callable Bonds

(FP) Callable Debt = Take advantage of falling risk-free interest rates

- ▶ Calls can be triggered by a reduction in risk-free rates
- ▶ $ytm_i = r_f + \sigma_i \gamma$
- ▶ Allows issuers to reissue at lower costs

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Callable Debt = Allow issuers to re-contract their existing bonds

- ▶ Alter restrictive covenants (King and Mauer 2000, Green 2018)
- ▶ Manage maturity structure (Xu 2018, Elsaify and Roussanov 2018)
- ▶ ...
- ▶ Do not differentiate between FP calls, MWs, and often tender offers
- ▶ Have no implication for wealth transfers/debt overhang

The "Credit View" of Callable Bonds

FP calls might be triggered by <u>anything</u> that raises price above call price

- ▶ Equivalently, calls can be triggered by any reduction in yield
- ▶ $ytm_i = r_f + \sigma_i \gamma$
- ▶ ... a fall in either interest rates, a firm's risk, or credit spreads

The "credit view" is the focus of this paper

- ▶ finds strong support in the data
- ▶ connects calls to agency costs of debt such as debt overhang

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Testable Hypotheses

Callable bonds mitigate debt overhang and improve investment incentives (Bodie and Taggart 1978, Diamond and He 2014)

- ▶ (FP) Callable bonds are called when value exceeds strike price
- ▶ ... can limit the upside gains (wealth transfers) to debtholders
- ▶ ... increase corporate propensity to take on positive-NPV projects

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Our identification strategy utilizes

▶ the takeover market as a laboratory to capture debt overhang
▶ the call protection period as a quasi-random assignment
▶ deregulation events as unexpected shocks to takeover incentives
▶ make-whole bonds as a "placebo" group

What We Find

1. Issuance, pricing, and call decisions are highly associated with (levels or changes of) issuer-specific credit quality (e.g. credit ratings)

2. Callable bonds present "capped-upside" for investors in the price distribution, and specifically in takeovers

3. Firms with callable bonds are more likely to become takeover targets and are more willing to invest in good states of the world

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   Financial mechanism

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   ⋆ Real effects

Data

US corporate bond data from Mergent FISD

- ▶ Bonds issued 1970-2017
- ▶ First calls reported in 1977. We use 1985–2017 to avoid any reporting bias due to missing data
- ▶ Call provisions at issuance and actions taken after issuance are identified using the Redemption and Notes files from Mergent

Bond prices from TRACE

- ▶ Reporting started in 2002. We use 2005– to avoid biases.

Accounting data from COMPUSTAT

M&A activities from SDC

The Prevalence of Callable Bonds
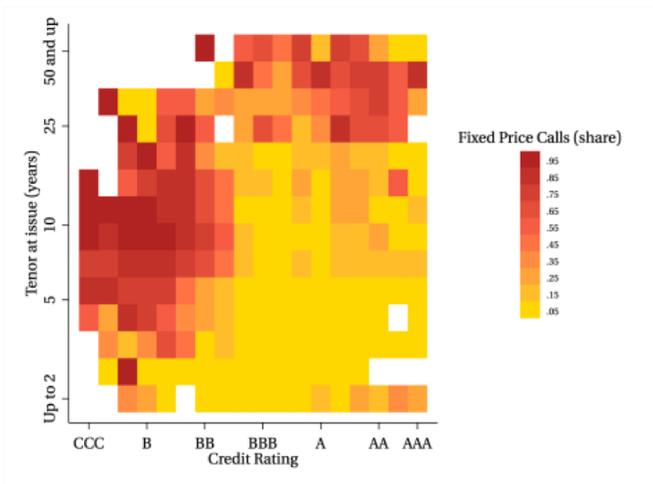

Figure 2. The share of callable corporate bonds issues.

Bond rated BBB-/Baa3 or higher are classified as Investment Grade (IG) and bonds with lower ratings are classified as High Yield (HY).

▶ Callable bonds more prevalent for HY issuers and longer maturities

▶ higher credit risk
more potential upside
more subject to D/O

▶ Shadow cost (yield at issue)
27bps on average, 38bps for HY

Bond Call Decisions: The Impact of Credit Quality

Firm credit quality significantly predicts future call decisions beyond interest rates, credit spreads, and bond features

Dependent variable:	Call		
Dep. Var. Mean (%):	8.69	9.60	20.85
	(1)	(2)	(3)
Ratings change	1.052***	-	-
	(0.228)		
Leverage dropped	-	9.236***	-
		(2.305)	
Change in bond price	-	-	0.297***
			(0.071)
Other bond characteristics	Yes	Yes	Yes
Year F.E.	Yes	Yes	Yes
Clusters	Issuer	Issuer	Issuer
R-squared	0.074	0.093	0.043
Observations	32,426	6,702	5,865

Capped-Upside for Investors Holding Callable Bonds

Capped-Upside for Investors Holding Callable Bonds
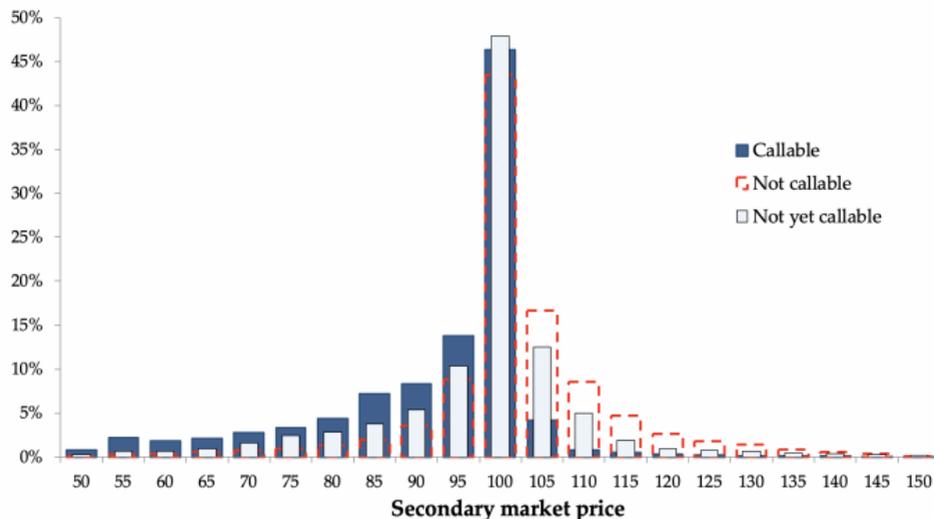
▶ 1/3 non-callable bonds trade above 1.03×par. Only 1/20 callable bonds do so

The Real Effects of Callability on Debt Overhang

Key prediction: Callable bonds mitigate debt overhang and increase corporate propensity to take on positive-NPV projects

Empirical challenges:

▶ Measuring debt overhang (under-investment) is difficult
▶ Firms with callable bonds are different in other (unobserved) dimensions
▶ Capital structure is endogenous to investment opportunities

Testing Debt Overhang in the Takeover Market

Our identification utilizes the takeover market as a laboratory

▶ Acquisitions are harder to anticipate in advance for the targets
▶ Callable bonds issued by the target before the deal are less endogenous

Our model characterizes D/O in takeovers

▶ Acquirers tend to be large and financially strong (Andrade et al. 2001, Almeida et al. 2011, and Eckbo 2014)
▶ Target bondholders stand to make a capital gain (Billett et al. 2004)
▶ D/O: Wealth transfer from acquirers' shareholders to targets' bondholders can discourage bids
▶ Callability limits the upside value of target bonds and encourages takeovers

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Bond Returns around Merger Announcements

H1. *Holders of callable bond in target firms benefit less from acquisitions*

$$R_{i,k} = \alpha + \beta_1 \times Callable_{i,k} + \beta_2 \times Not\ yet\ Callable_{i,k} + \gamma \times Controls_{i,k} + \theta_i + \varepsilon_{i,k}$$

Dependent variable:	Bond announcement return			
Dep. Var. Mean (%):	0.016	0.016	0.025	0.025
	(1)	(2)	(3)	(4)
Callable	**−0.032****	**−0.034****	**−0.047*****	**−0.050*****
	(0.015)	(0.017)	(0.015)	(0.017)
Not-yet Callable	−0.024	−0.024	−0.025	−0.024
	(0.019)	(0.020)	(0.017)	(0.017)
Other bond characteristics	Yes	Yes	Yes	Yes
Issuer F.E.	Yes	Yes	Yes	Yes
Event window	[−1,+5]	[−1,+5]	[−5,+15]	[−5,+15]
Sample restrictions No	Yes	No	Yes	
R-squared	0.531	0.548	0.592	0.610
Observations	449	419	449	419

▶ Controls include bond size, remaining time to maturity, and bid-ask spreads

Takeover Incidence

H2. *Firms with callable bonds are more frequent targets in acquisitions*

H2 can be estimated using firm-year panel data

$$
\begin{aligned}
Target_{i,t} = \; & \alpha + \beta_1 \times Callable\ Bond\ Debt_{i,t-1} \\
& + \beta_2 \times Not\ yet\ Callable\ Bond\ Debt_{i,t-1} \\
& + \beta_3 \times Non\ callable\ Bond\ Debt_{i,t-1} \\
& + \gamma \times Controls_{i,t-1} + \theta_{j,t} + \varepsilon_{i,t}
\end{aligned}
$$

However, firms with callable bonds may have some (unobserved) features that make them more likely to become takeover targets.

Identifying Exogenous Variation in Callability

We exploit the *ex-ante* contractually-set "call protection period"

Identifying Exogenous Variation in Callability

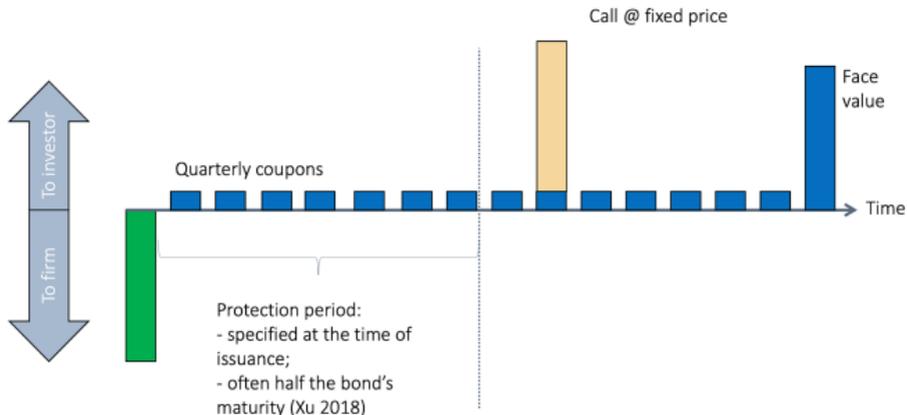We exploit the *ex-ante* contractually-set "call protection period"
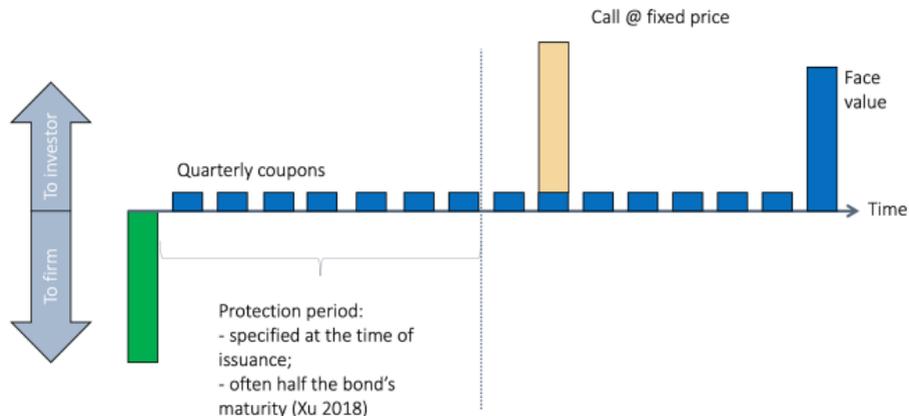
Identifying Exogenous Variation in Callability

We exploit the *ex-ante* contractually-set "call protection period"

We only consider firms issued callable bonds (selection bias eliminated!)

▶ **Callable**: firms whose callable bonds have reached the first call dates
▶ **Not-yet Callable**: matched firms that are still in the protection period Matching

Takeover Incidence using Matched Samples

H2. *Firms with callable bonds are more frequent targets in acquisitions*

$$Target_{i,t} = \alpha + \beta \times Callable_{i,t-1} + \gamma \times Controls_{i,t-1} + \theta_{j,t} + \varepsilon_{i,t}$$

Dependent variable:	**Target**			
Dep. Var. Mean (%):	0.030	0.030	0.035	0.035
Model	OLS	Cox	OLS	Cox
	(1)	(2)	(3)	(4)
Callable	**0.014***	**1.442***	**0.019***	**1.551***
	(0.004)	(0.150)	(0.008)	(0.236)
Other characteristics	Yes	Yes	Yes	Yes
Treatment	Callable share	Callable share	Callable share	Callable share
	> 20%	> 20%	= 100%	= 100%
Control	Not-yet	Not-yet	Not-yet	Not-yet
Industry X Year F.E.	Yes	Yes	Yes	Yes
# of unique firms	1,841	1,841	1,284	1,284
Observations	29,244	29,244	10,854	10,854

▶ Controls include Book assets, *q*, Leverage, Age, average initial tenor of the bonds, and covenant

Additional Evidence

- ▶ obs. falling within the narrow band around the first call date
- ▶ firms whose bond debt exceeds 50% of total debt

Deregulation events (Andrade et al. 2001, Campello and Gao 2017)

- ▶ M&A activity spiked in the affected industries after deregulation
- ▶ Results: firms' share of callable bond *prior to* the shock affects their probability of being targeted *after* the industry deregulation Table

Capital expenditure tests

- ▶ Results: firms with callable bonds are more willing to invest in good states of the world than similar firms with similar leverage Table

Placebo Tests using Make-Whole Calls
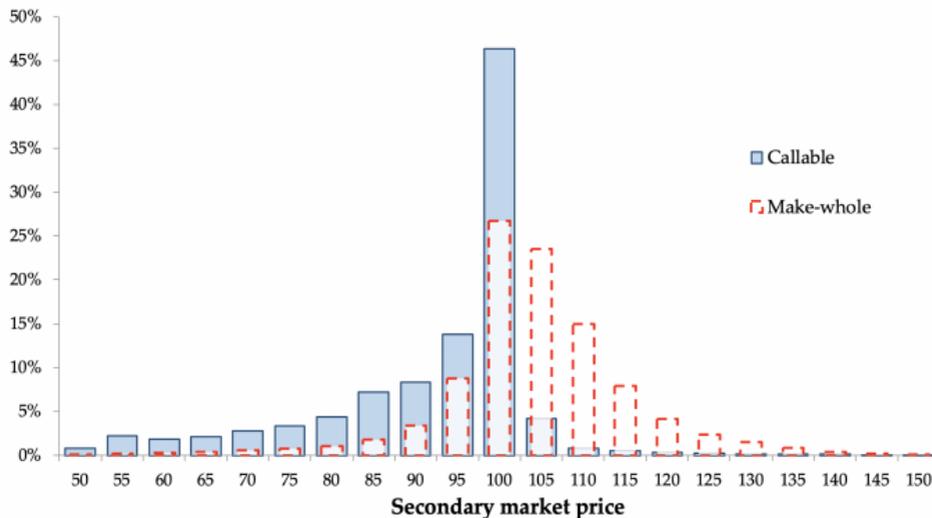
Results:

▶ MW bonds do not limit the potential upside for bondholders `Table`
▶ ... do not mitigate debt overhang `Table`

Conclusion

Callable debt plays an under-appreciated role in reducing debt overhang

▶ *"... debt with state-contingent maturities, especially bonds with automatically reset longer maturity in bad times and shorter maturity in good times, is value-improving."* – Diamond and He (2014)

Unprecedented corporate leverage post-Covid raises concerns about debt overhang (FSB 2022)

Our results point broadly to the importance in understanding the details of financial contracting to draw inferences about investment efficiency

Thank You
Comments Welcome

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A Quarter of Corporate Bonds are Called

End event for all US corporate bonds issued 1985-2017
that are no longer outstanding
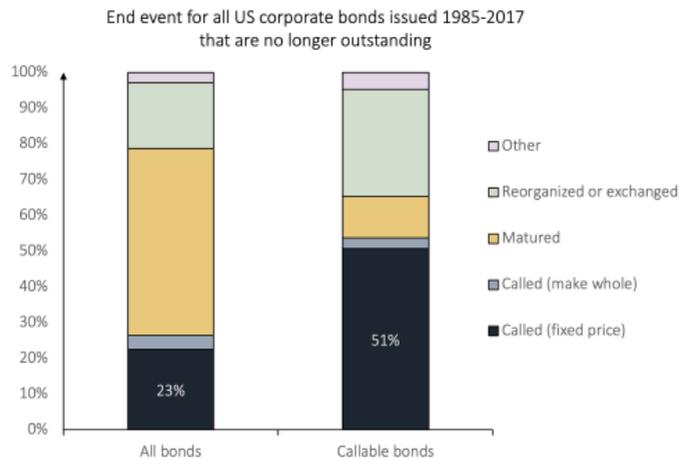
Yields at Issue

| Dependent variable:	Yield to maturity		
Dep. Var. Mean (%):	6.018	6.018	6.191
	(1)	(2)	(3)
Fixed-price callable	0.267***	-	-
	(0.056)		
Fixed-price callable (IG)	-	0.160**	0.172***
		(0.077)	(0.054)
Fixed-price callable (HY)	-	0.381***	0.382***
		(0.093)	(0.093)
Make-whole callable	0.152*	0.156*	0.136*
	(0.087)	(0.086)	(0.070)
Other bond characteristics	Yes	Yes	Yes
Year-month X Maturity F.E.	No	Yes	Yes
Year-month X IG F.E.	Yes	Yes	Yes
Year-month X Duration F.E.	Yes	Yes	Yes
Year-month X issuer F.E.	Yes	Yes	No
Year X issuer F.E.	No	No	Yes
Clusters	Issuer, time	Issuer, time	Issuer, time
R-squared	0.914	0.914	0.891
Observations	20,187	20,187	20,187

▶ The "shadow cost" of callability is 27 bps

▶ higher for worse credit quality

▶ within issuer-month estimations

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The Likelihood of a Call
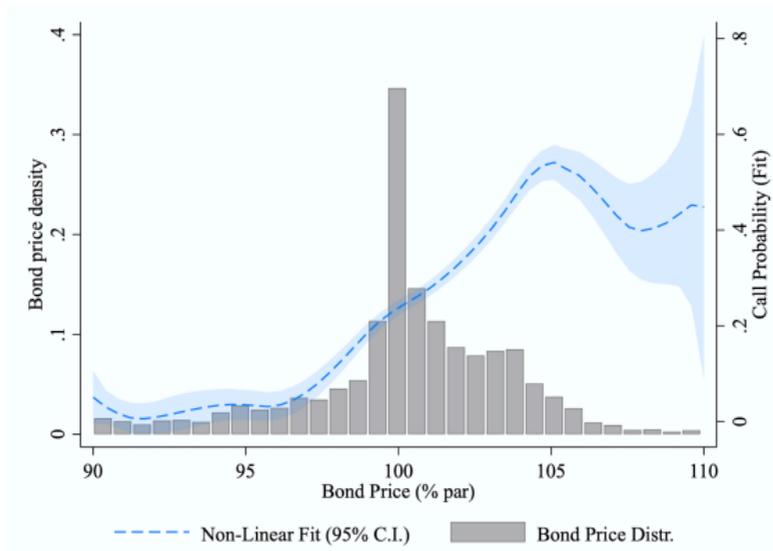
- 5% (40%) of bonds trade below (above) par are called

Matched Samples Around First Call Dates

Panel A. Pre-matching difference in characteristics

	Callable	Not-yet	Difference	t-stats
	(1)	(2)	(1) − (2)	
Total assets (log)	3.336	3.567	−0.231	(−0.327)
Leverage (Book)	0.420	0.401	0.019	(0.181)
Tobin's q	1.722	1.679	0.044	(0.086)
Age (since IPO, log)	2.501	2.319	0.182	(0.607)
Callable (or not-yet callable) share	0.860	0.786	0.073	(0.545)
HY issuer rating	0.627	0.589	0.038	(0.188)

Panel B. Post-matching difference in characteristics

	Callable	Not-yet	Difference	t-stats
	(1)	(2)	(1) − (2)	
Total assets (log)	3.367	3.531	−0.164	(−0.510)
Leverage (Book)	0.403	0.393	0.010	(0.221)
Tobin's q	1.620	1.604	0.015	(0.085)
Age (since IPO, log)	2.498	2.399	0.098	(0.793)
Callable (or not-yet callable) share	0.858	0.817	0.041	(0.732)
HY issuer rating	0.626	0.598	0.028	(0.350)

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Evidence from Deregulation

Firms' share of callable bond *prior to* the shock affects their probability of being targeted *after* the industry deregulation

Dependent variable:	**Target**			
Dep. Var. Mean (%):	0.013	0.045	0.013	0.048
Model	OLS	OLS	OLS	OLS
	(1)	(2)	(3)	(4)
Callable	**0.134*****	**0.168****	**0.286*****	**0.337*****
	(0.041)	(0.077)	(0.055)	(0.112)
Other characteristics	Yes	Yes	Yes	Yes
Industry F.E.	Yes	Yes	Yes	Yes
Sample				
Treatment	Callable share > 20%	Callable share > 20%	Callable share > 50%	Callable share > 50%
Control	None	None	None	None
Post-event window	1	3	1	3
R-squared	0.352	0.359	0.472	0.396
Observations	83	88	79	84

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Placebo Tests using Make-Whole Calls

Make-whole bonds do not limit the potential upside for bondholders

Dependent variable:	Bond announcement return			
Dep. Var. Mean (%):	0.016	0.016	0.025	0.025
	(1)	(2)	(3)	(4)
Make-whole	**0.001**	**0.003**	**0.008**	**0.011**
	(0.010)	(0.010)	(0.010)	(0.010)
Other bond characteristics	Yes	Yes	Yes	Yes
Issuer F.E.	Yes	Yes	Yes	Yes
Event window	$[-1,+5]$	$[-1,+5]$	$[-5,+15]$	$[-5,+15]$
Sample restrictions				
Time to maturity $>= 1$	No	Yes	No	Yes
Pre-event trades $>= 5$	No	Yes	No	Yes
R-squared	0.588	0.536	0.634	0.622
Observations	346	322	346	322

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Placebo Tests using Make-Whole Calls

Make-whole bonds do not mitigate debt overhang

Dependent variable:	Target			
Dep. Var. Mean (%):	0.042	0.042	0.039	0.039
Model	OLS	Cox	OLS	Cox
	(1)	(2)	(3)	(4)
Make-whole	**0.005**	**1.141**	**0.001**	**1.006**
	(0.005)	(0.130)	(0.006)	(0.146)
Controls	Yes	Yes	Yes	Yes
Placebo Treatment	MW share	MW share	MW share	MW share
	> 20%	> 20%	= 100%	= 100%
Control	Not-yet	Not-yet	Not-yet	Not-yet
Industry X Year F.E.	Yes	Yes	Yes	Yes
# of unique firms	1,775	1,775	1,492	1,492
Observations	23,636	23,636	17,106	17,106

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Capital Expenditure

Prediction: Callability reduces debt overhang in greenfield investment

Investment opportunities: input price changes at the industry level

- ▶ low price change = good investment opportunity (Campello 2003 and Dasgupta et al. 2018)
- ▶ Not dependent on firm characteristics and equity valuation
- ▶ Reasonably unanticipated

Firms that are likely to face debt overhang = high yield issuers

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Capital Expenditure using Matched Samples

Firms with callable bonds are more willing to invest in good states of the world than similar firms with similar leverage

Sample	All HY		Narrow band		$Bond/Debt \geq 50\%$	
Dependent variable:	Investment		Investment		Investment	
Dep. Var. Mean (%):	0.092	0.081	0.092	0.082	0.095	0.079
	(1)	(2)	(3)	(4)	(5)	(6)
HighOpp X Callable	**0.018****	**0.036****	**0.021****	**0.037****	**0.023****	**0.039****
	(0.009)	(0.014)	(0.007)	(0.014)	(0.011)	(0.017)
LowOpp X Callable	0.004	0.002	0.007	0.003	−0.001	0.000
	(0.009)	(0.011)	(0.009)	(0.012)	(0.011)	(0.012)
Callable	−0.017***	−0.009	−0.011	−0.011	−0.005	−0.005
	(0.006)	(0.009)	(0.007)	(0.010)	(0.008)	(0.011)
Other characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Matching						
Treatment	Callable share > 20%	Callable share = 100%	Callable share > 20%	Callable share = 100%	Callable share > 20%	Callable share = 100%
Control	Not-yet	Not-yet	Not-yet	Not-yet	Not-yet	Not-yet
Industry X Year F.E.	Yes	Yes	Yes	Yes	Yes	Yes
# of unique firms	902	595	768	538	693	452
Observations	6,174	2,476	5,131	2,238	4,447	1,761

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