Online Appendix

1. Sensitivity results relating priority structure.

In this appendix, we explore sensitivity outcomes concerning alternative debt priority rules used when the firm defaults. Specifically, we concentrate on the "me-first" priority for initial debt (expressed in equations 10a and 10b), contrasting it with the outcomes from the prior analysis that employed equal priority.

Table A1. Sensitivity with respect to priority rule: "me-first" priority for initial debt with sensitivity with respect to volatility

Panel A: Optimal coupon and thresholds

σ	R_0	R_1	x_I	v_L	x_b
0.23	0.68	0.51	1.006	-0.601	-0.471
0.30	0.58	0.54	1.163	-1.007	-0.825
0.40	**0.5**	**0.59**	**1.386**	**-1.461**	**-1.218**
0.50	0.45	0.67	1.599	-1.818	-1.565

Panel B: Values at t = 0 and the investment trigger T

	Values at t = 0							Values at investment trigger T		
σ	Fb(x)	Db(x)	Ub(x)	NBb(x)	Lev_b	Inv_b	Cr_b	Lev_T	ΔLev	Cr_T
0.23	20.888	11.166	28.273	2.551	0.535	9.935	0.0009	0.624	0.090	0.0016
0.30	20.585	9.417	27.161	2.068	0.457	8.644	0.0016	0.552	0.095	0.0029
0.40	**20.562**	**7.924**	**26.469**	**1.679**	**0.385**	**7.586**	**0.0031**	**0.487**	**0.102**	**0.0052**
0.50	20.823	6.899	26.290	1.521	0.331	6.989	0.0052	0.451	0.119	0.0082

Notes: In the above sensitivity the following was used: initial earnings level $x = 1$, risk-free rate of $r = 0.06$, tax rate $\tau = 0.15$ and proportional bankruptcy costs $b = 0.5$. For modelling the growth option, we use $e = 2$, investment cost $I = 10$. For the mean-reverting stochastic model parameters we vary σ, use a mean reversion speed $q = 0.1$ and long-term mean of earnings $\theta = 1$. ΔLev stands for change in leverage and is calculated as $Lev_T - Lev_b$. Base case parameters highlighted in bold. In this sensitivity results we use "me-first" priority for first debt (see equations 10a and 10b).

Table A1 displays the volatility of earnings sensitivity using the "me-first" priority, allowing for comparison with the analogous sensitivity analysis (Table 2) in the main text, where equal priority among debt holders was considered.[1]

[1] We have conducted extensive sensitivity across all parameters using a "me-first" priority rule for initial debt. Like Hackbarth and Mauer (2012) we find no significant differences in firm values or leverage ratios. Importantly,

Compared to equal priority (refer to Table 2, Panel B), adopting a "me-first" priority rule for initial debt leads to an enhancement in firm value. This outcome echoes findings by Hackbarth and Mauer (2012), where "me-first" priority yielded higher values. Notably, the increase in firm value across different priority rules remains limited.

Under "me-first" priority for initial debt, there's an inclination towards a more conservative debt issuance at t = 0. This is evident through the lower initial coupon R_0 and initial debt level relative to equal priority. This approach affords the firm increased financial flexibility to issue more debt upon investment execution. Despite the heightened coupon on new debt, leverage ratios and overall credit spreads at the investment trigger remain akin between the two priority rule cases. This results from an offsetting effect due to lower initial leverage under "me-first," counterbalancing the subsequently elevated R_1 at the investment trigger.

The initial conservative debt approach, along with augmented protection for initial debt and delayed default (Panel A of Table A1 vs Table 1), induces a substantial reduction in initial (t = 0) credit spreads compared to equal priority in Table 1. In terms of other firm policies (Panel A of Table A1), adopting a "me-first" priority leads to a delay in investment initiation (also evident in lower expected investment cost in Panel B of Table A1). This observed underinvestment effect under "me-first" reaffirms Hackbarth and Mauer's findings within a context of earnings mean reversion (p.774).

The directional effects of volatility remain consistent with equal priority, though a more distinct surge in the leverage ratio is observed at the final investment stage (post depletion of growth options) under "me-first" priority for initial debt, in contrast to equal priority.

2. Additional robustness sensitivity results showing the U-shape of leverage with x

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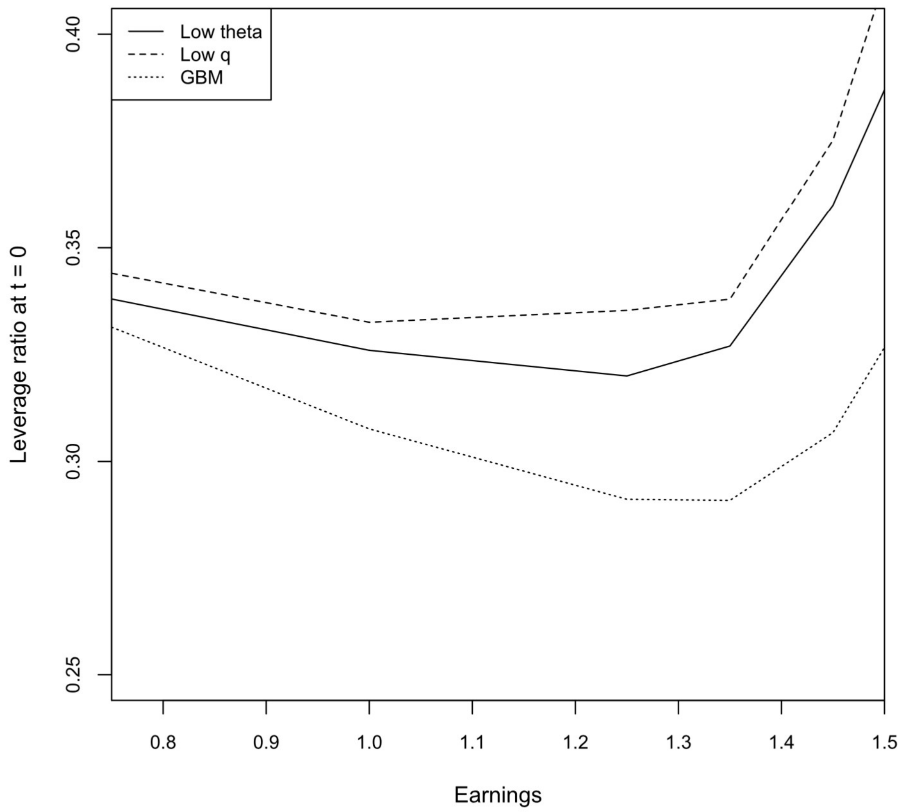
the predictions highlighted in the rest of the paper appear intact under a "me-first" priority rule. Thus, in the main text we discuss only the qualitative implications of the "me-first" compared to the equal priority rule.

We have examined alternative parametrizations of the model and have determined the robustness of the U-shaped relationship between leverage and profitability (x). Below, we provide illustrative evidence that this U-shaped trend remains consistent even for scenarios with low long-term profitability and when q is small. The latter case approximates the impact of profitability on leverage that would be anticipated for non-stationary firms as $q \rightarrow 0$.

Figure A1. Robustness of U-shape of profitability with leverage in AMR mean reversion setting and also for non-stationary earnings (GBM)



Notes: For the mean reverting cases "low theta" and "low q" we use risk-free rate r = 0.06, tax rate $\tau = 0.15$, proportional bankruptcy costs $b = 0.5$, growth option rate $e = 2$, investment cost $I = 10$, $\sigma = 0.4$. For the "low theta" case we use mean reversion speed q = 0.1 and long-term mean of earnings $\theta = 0.75$. For the "low q" case we use q = 0.075 and long-term mean of earnings $\theta = 1$. For the GBM case we implement Hackbarth and Mauer (2012) with parameters (using the notation of our paper) r = 0.06, $\delta = 0.05$, tax rate $\tau = 0.15$, proportional bankruptcy costs $b = 0.5$, growth option rate $e = 1.6$, investment cost $I = 10$, $\sigma = 0.25$.

To verify the U-shaped pattern for non-stationary firms, we incorporated the Hackbarth and Mauer (2012) model, utilizing an earnings process following a Geometric Brownian Motion (GBM). The figure demonstrates the persistence of the U-shaped behaviour, aligning with the earnings process under the GBM model of Hackbarth and Mauer (2012).

Furthermore, we conducted several sensitivity analyses within the Hackbarth and Mauer (2012) model, consistently finding that the U-shaped relationship holds across different parametrizations (detailed results available upon request). We note that the prominence of the U-shape diminishes with higher expansion factors of the option, yet it still remains evident at elevated values of *x*.

3. Single-stage model results showing a negative relation between leverage and x when x follows Arithmetic Mean Reversion (AMR) and comparison with Geometric Mean Reversion (GMR)

In investigating the drivers of the U-shaped pattern, we performed sensitivity analyses by excluding the growth option from our model, akin to the approach in Sarkar and Zapatero (2003), while adopting the AMR assumption in place of the GMR. The outcomes of our sensitivity analysis, as illustrated below (see Table A2), reaffirm the presence of a negative relationship between leverage even for high *x* values. Essentially, these findings unequivocally attribute the underlying force behind the U-shaped pattern to the presence of the growth option.

Our comparison with Sarkar and Zapatero (2003) reveals some differences in how the firm chooses its coupon as profitability changes. Sarkar and Zapatero (2003, see p. 848, Table 1) show that under the GMR process, coupons only marginally change (remain almost unchanged) as profitability increases. Under our model using the AMR process, on the other hand, we find that for the same mean reversion speed, optimal coupons increase more significantly with profitability (see Panel A). However, we also observe a less significant increase in coupons as profitability increases in our model, particularly when mean reversion speed becomes higher (see Panel B). In sum, although neither of the two models nests the other as a special case, they appear to share similar implications as to the negative relation between profitability and leverage in the absence of growth options. Our AMR process suggests a less conservative coupon adjustment as profitability increases and allows for negative earnings.

Table A2. Sensitivity with respect to x for the model in the absence of growth option

Panel A: Low q (q=0.1)

x	x_L	x_A	R	**Firm (Fb(x))**	**Debt (Db(x))**	**Equity (Eb(x))**	**Lev.**
-0.5	-1.387	-1.667	0.240	6.608	3.539	3.069	0.536
0	-1.163	-1.667	0.340	9.430	5.124	4.306	0.543
0.5	-0.990	-1.667	0.420	12.236	6.407	5.829	0.524
1	-0.843	-1.667	0.490	15.019	7.514	7.505	0.500
1.5	-0.700	-1.667	0.560	17.783	8.582	9.200	0.483
2	-0.601	-1.667	0.610	20.531	9.370	11.161	0.456
2.5	-0.504	-1.667	0.660	23.268	10.137	13.132	0.436
3	-0.409	-1.667	0.710	25.997	10.887	15.110	0.419
3.5	-0.335	-1.667	0.750	28.719	11.499	17.219	0.400
4	-0.262	-1.667	0.790	31.435	12.102	19.333	0.385
4.5	-0.190	-1.667	0.830	34.148	12.697	21.451	0.372
5	-0.120	-1.667	0.870	36.858	13.286	23.572	0.360

Panel B: High q (q=0.2)

x	x_L	x_A	R	**Firm (Fb(x))**	**Debt (Db(x))**	**Equity (Eb(x))**	**Lev.**
-0.5	-1.388	-3.333	0.490	10.394	8.060	2.334	0.775
0	-1.152	-3.333	0.550	12.155	9.034	3.121	0.743
0.5	-0.999	-3.333	0.590	13.866	9.673	4.193	0.698
1	-0.923	-3.333	0.610	15.546	10.001	5.545	0.643
1.5	-0.886	-3.333	0.620	17.210	10.172	7.038	0.591
2	-0.850	-3.333	0.630	18.865	10.333	8.532	0.548
2.5	-0.813	-3.333	0.640	20.515	10.488	10.026	0.511
3	-0.777	-3.333	0.650	22.161	10.640	11.522	0.480
3.5	-0.777	-3.333	0.650	23.806	10.651	13.155	0.447
4	-0.741	-3.333	0.660	25.449	10.799	14.650	0.424
4.5	-0.741	-3.333	0.660	27.092	10.808	16.284	0.399
5	-0.706	-3.333	0.670	28.733	10.953	17.780	0.381

Notes: Risk-free rate r = 0.06, tax rate $\tau = 0.15$, proportional bankruptcy costs $b = 0.5$. For the mean-reverting stochastic model parameters we use $\sigma = 0.4$, mean reversion speed q = 0.1 or q = 0.2 and long-term mean of earnings $\theta = 1$. Lev_b is calculated as Db(x)/ Fb(x).