Internet Appendix for

Do temporary changes in earnings caused by mean reversion affect firms' refinancing decisions?

Abstract

The internet appendix includes Appendix A which focuses on alternative risk measures and additional control variables and Appendix B which explains the choice of refinancing events. Online Appendix C provides the theoretical model simulation.

Keywords: finance; leverage; mean-reversion; refinancing; capital structure

JEL classification: G30; G31; G32; G13

Appendix A. Alternative risk measures and additional control variables

Table A.1. Summary statistics of earnings growth

Variable	Earnings Growth			Positive Earnings Growth			Negative Earnings Growth		
Fiscal Year	Mean	Median	SD	Mean	Median	SD	Mean	Median	SD
Full Sample									
1985-2019	-0.0241	-0.0008	28.8931	1.6196	0.2375	28.3314	-1.6621	-0.2812	29.3508
1985-1989	-0.1856	-0.0066	26.6032	1.4277	0.2792	9.70186	-1.7532	-0.3131	36.0421
1990-1994	0.1222	-0.0052	13.1917	1.72739	0.2620	15.6323	-1.4415	-0.3208	10.0266
1995-1999	-0.1890	0.0109	30.8408	1.5483	0.2405	24.1647	-2.0313	-0.2995	36.5238
2000-2004	0.1952	-0.0038	45.2122	2.1322	0.2482	52.0638	-1.7069	-0.3035	37.1801
2005-2009	-0.0999	-0.0022	21.4971	1.4868	0.2323	18.9284	-1.6685	-0.2763	23.6610
2010-2014	-0.0969	0.0035	29.7486	1.4742	0.2113	25.1095	-1.7015	-0.2357	33.7612
2015-2019	0.0288	-0.0069	12.4207	1.3469	0.2059	14.7466	-1.2301	-0.2351	9.5226
Stationary Firms									
1985-2019	-0.0236	-0.0065	30.4639	1.7531	0.2553	30.6645	-1.7443	-0.2999	30.1690
1985-1989	-0.2392	-0.0130	28.6819	1.5137	0.2985	9.4466	-1.8964	-0.3300	38.8642
1990-1994	0.1676	-0.0118	13.8350	1.9042	0.2789	16.9762	-1.4798	-0.3437	9.6965
1995-1999	-0.1462	0.0035	30.6973	1.6669	0.2600	25.9239	-1.9877	-0.3157	34.7871
2000-2004	0.1901	-0.0097	49.7103	2.3361	0.2630	57.3064	-1.8597	-0.3202	41.0627
2005-2009	-0.2126	-0.0072	22.3011	1.4724	0.2505	17.3738	-1.8377	-0.2902	26.0866
2010-2014	-0.0295	-0.0026	29.8986	1.7071	0.2315	28.3403	-1.7429	-0.2554	31.2666

2015-2019	0.0456	0.0094	13.2390	1.4680	0.2188	16.1611	-1.2991	-0.2566	9.5047

Table A.2. Leverage and profitability's relation with debt-financed rebalancing events for mean reverting firms: Risk is calculated over twenty contiguous quarters

This table presents coefficient estimates from the following empirical linear regressions model:

$$L_{it} = \alpha_0 + \beta_0 \pi_{i,t-1} + \beta_1 \pi_{i,t-1} d_{it} + \gamma d_{it} + \kappa Z_{i,t-1} + \varepsilon_{it}$$

$$\text{Debt-financed rebalancing: } a_t = 1 \text{ if } \frac{\Delta D_t^e}{A_t} > s \text{ and } \frac{ER_t^e}{A_t} > s$$

where L_{it} is the gross market leverage ratio of firm *i* in quarter *t*, and $\pi_{i,t-1}$ is the operating profit of firm i in lagged quarter. $Z_{i,t-1}$ is the lagged control variables of firm i. Furthermore, d_{it} is an indictor variable equal to one if firm *i* is refinancing at quarter *t* and zero otherwise, while ε_{it} is the remainder stochastic error term.

Dependent variable $L_{i,t}$ is the gross market leverage ratio (=D/MV); *D* is the book value of total debt (=debt in current liabilities + long-term debt); *MV* is the sum of *D* and market value of total equity (=closing price X no. of common shares outstanding + short-term debt + long-term debt); ΔD_t^e is the change in long-term debt; ER_t^e is the equity retirement in excess of equity issues; *A* is the book value of total assets; *P* is the operating profit divided by *A*; the constant issue-size threshold *s* is in percent of *A*. The control variables include the following: *Risk* is the standard deviation of profitability calculated over twenty contiguous quarters; *M/B* is the market-to-book ratio (=closing price X no. of common shares outstanding + short-term debt + long-term debt / assets); *Tan* is the ratio of tangible assets to *A*; *Size* is the log (*A*) adjusted for inflation.

We winsorize the continuous variables *M/B*, *P*, *Size*, and *Risk* by 1% in both tails of the distribution, and set the naturally bounded variables (*L*, *Tan*) within the unit interval. We report the details construction of variables in the appendix Table A.1, sample period 1984–2019. Rebalancing obs. and total obs.

indicates the number of refinancing firm-quarter observations and total firm-quarter observations, respectively. Superscript *, **, and *** refer significance at the 10%, 5%, and 1% levels, respectively. Standard errors are clustered at the firm level in parentheses.

Dependent variable	Market leverage					
Issue size threshold *s*	*s* = 5 %		*s* = 1.25%		*s* = 7.5%	
	(1)	(2)	(3)	(4)	(5)	(6)
π (β_0)	-0.717***	-0.700***	-0.713***	-0.696***	-0.717***	-0.700***
	(0.036)	(0.037)	(0.036)	(0.037)	(0.036)	(0.037)
d **(γ)**	0.050***	0.049***	0.012*	0.013*	0.081***	0.0811***
	(0.012)	(0.012)	(0.007)	(0.007)	(0.013)	(0.013)
d X **π (β_1)**	-0.189	-0.195	-0.235*	-0.265*	-0.260	-0.281
	(0.249)	(0.263)	(0.143)	(0.149)	(0.267)	(0.279)
Risk	-0.414***	-0.426***	-0.413***	-0.426***	-0.414***	-0.426***
	(0.129)	(0.129)	(0.129)	(0.129)	(0.129)	(0.129)
Size	0.014***	0.015***	0.014***	0.015***	0.014***	0.015***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
M/B	-0.054***	-0.053***	-0.054***	-0.053***	-0.054***	-0.053***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Tan	0.209***	0.209***	0.209***	0.210***	0.209***	0.210***
	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)
Growth Dummy		-0.010***		-0.011***		-0.010***
		(0.001)		(0.001)		(0.001)
Intercept	Yes	Yes	Yes	Yes	Yes	Yes
Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.226	0.226	0.226	0.226	0.226	0.226
Rebalancing obs.	804	785	5,059	4,840	438	430
Total obs.	189,009	185,888	189,009	185,888	189,009	185,888
Hypothesis H_0: $\beta_0 + \beta_1 = 0$						
$\beta_0 + \beta_1$	**-0.906*** **	**-0.895*** **	**-0.948*** **	**-0.961*** **	**-0.977*** **	**-0.981*** **

Wald test (β_0 + β_1 =0)	0.000	0.000	0.000	0.000	0.000	0.000

Table A.3. Leverage and profitability relation with debt-financed rebalancing events and additional controls for mean-reverting firms

This table presents coefficient estimates from the following empirical linear regressions model:

$$L_{it} = \alpha_0 + \beta_0\pi_{i,t-1} + \beta_1\pi_{i,t-1}d_{it} + \gamma d_{it} + \kappa Z_{i,t-1} + \varepsilon_{it}$$

Debt-financed rebalancing: a_t =1 if $\frac{\Delta D_t^e}{A_t}$>s and $\frac{ER_t^e}{A_t}$>s

where L_{it} is the gross market leverage ratio of firm *i* in quarter *t*, and $\pi_{i,t-1}$ is the operating profit of firm i in lagged quarter. $Z_{i,t-1}$ is the lagged control variables of firm i. Furthermore, d_{it} is an indictor variable equal to one if firm *i* is refinancing at quarter *t* and zero otherwise, while ε_{it} is the remainder stochastic error term.

Dependent variable $L_{i,t}$ is the gross market leverage ratio (=D/MV); *D* is the book value of total debt (=debt in current liabilities + long-term debt); *MV* is the sum of *D* and market value of total equity (=closing price X no. of common shares outstanding + short-term debt + long-term debt); ΔD_t^e is the change in long-term debt; ER_t^e is the equity retirement in excess of equity issues; *A* is the book value of total assets; *P* is the operating profit divided by A; the constant issue-size threshold *s* is in percent of *A*. The control variables include the following: *Risk* is the standard deviation of profitability calculated over four contiguous quarters; *M/B* is the market-to-book ratio (=closing price X no. of common shares outstanding + short-term debt + long-term debt / assets); *Tan* is the ratio of tangible assets to *A*; *Size* is the log (*A*) adjusted for inflation; *HHI* is the Herfindahl industry concentration measure; *Rating* dummy variable indicates whether a company holds an S&P rating in a particular quarter; *ILev* is mean industry leverage. We set the naturally bounded variables (*L*, *Tan*) within the unit interval and winsorize all other variables by 1% in both tails of the distribution. We report the details construction of variables in the appendix Table A.1, sample period 1984–2019. Rebalancing obs. and total obs. indicates the number of refinancing firm-quarter observations and total firm-quarter observations, respectively. Superscript *, **, and *** refer significance at the 10%, 5%, and 1% levels, respectively. Standard errors are clustered at the firm level in parentheses.

Panel A

Dependent variable	Market leverage					
Issue size threshold *s*	*s* = 5 %		*s* = 1.25%		*s* = 7.5%	
	(1)	(2)	(3)	(4)	(5)	(6)
π (β_0)	-0.609***	-0.592***	-0.604***	-0.587***	-0.609***	-0.593***
	(0.030)	(0.030)	(0.030)	(0.030)	(0.030)	(0.030)
d **(γ)**	0.047***	0.045***	0.011*	0.012**	0.071***	0.070***
	(0.010)	(0.011)	(0.005)	(0.006)	(0.012)	(0.012)
d X **π (β_1)**	-0.191	-0.174	-0.320***	-0.327***	-0.119	-0.125
	(0.205)	(0.213)	(0.116)	(0.120)	(0.242)	(0.250)
Risk	-0.170**	-0.201**	-0.169**	-0.199**	-0.171**	-0.201**
	(0.083)	(0.084)	(0.083)	(0.084)	(0.083)	(0.084)
Size	0.010***	0.010***	0.010***	0.010***	0.010***	0.010***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
M/B	-0.050***	-0.050***	-0.050***	-0.050***	-0.050***	-0.050***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Tan	0.176***	0.177***	0.176***	0.177***	0.176***	0.177***
	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)
Rating	0.102***	0.104***	0.103***	0.104***	0.102***	0.104***
	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)
HHI	0.052***	0.051***	0.052***	0.051***	0.052***	0.0517***
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
ILev	0.380***	0.375***	0.380***	0.375***	0.380***	0.375***
	(0.061)	(0.061)	(0.061)	(0.062)	(0.0614)	(0.061)
Growth Dummy		-0.009***		-0.009***		-0.009***
		(0.001)		(0.001)		(0.000971)
Intercept	Yes	Yes	Yes	Yes	Yes	Yes
Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.249	0.249	0.249	0.249	0.249	0.249
Rebalancing obs.	998	976	6,011	5,762	556	548
Total obs.	240,963	237,334	240,963	237,334	240,963	237,334

Hypothesis H$_0$: $\beta_0 + \beta_1 = 0$						
$\boldsymbol{\beta_0 + \beta_1}$	**-0.800*** **	**-0.767*** **	**-0.923*** **	**-0.915*** **	**-0.729*** **	**-0.718*** **
Wald test ($\beta_0 + \beta_1 = 0$)	0.000	0.000	0.000	0.000	0.000	0.000

Panel B

Dependent variable	**Market leverage**					
Issue size threshold *s*	*s* = 5 %		*s* = 1.25%		*s* = 7.5%	
	(1)	(2)	(3)	(4)	(5)	(6)
π (β_0)	-0.619***	-0.603***	-0.615***	-0.598***	-0.619***	-0.603***
	(0.030)	(0.030)	(0.030)	(0.030)	(0.030)	(0.030)
d **(γ)**	0.042***	0.043***	0.005	0.007	0.068***	0.070***
	(0.011)	(0.011)	(0.006)	(0.006)	(0.013)	(0.013)
d X **π (β_1)**	-0.084	-0.100	-0.200*	-0.218*	-0.060	-0.101
	(0.210)	(0.220)	(0.117)	(0.122)	(0.261)	(0.269)
Risk	-0.057	-0.087	-0.055	-0.085	-0.057	-0.087
	(0.080)	(0.080)	(0.080)	(0.080)	(0.080)	(0.080)
Size	0.009***	0.010***	0.009***	0.010***	0.009***	0.010***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
M/B	-0.048***	-0.047***	-0.048***	-0.047***	-0.048***	-0.047***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Tan	0.210***	0.211***	0.210***	0.211***	0.210***	0.211***
	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)
Rating	0.090***	0.091***	0.090***	0.091***	0.090***	0.091***
	(0.010)	(0.011)	(0.010)	(0.011)	(0.010)	(0.011)
HHI	0.011	0.010	0.011	0.010	0.011	0.010
	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)
ILev	0.569***	0.583***	0.573***	0.587***	0.571***	0.585***

	(0.069)	(0.070)	(0.069)	(0.070)	(0.069)	(0.070)
Growth Dummy		-0.009***		-0.010***		-0.009***
		(0.001)		(0.001)		(0.001)
Intercept	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE (SIC2)	Yes	Yes	Yes	Yes	Yes	Yes
Quarter FE						
Adj. R^2	0.292	0.292	0.292	0.292	0.292	0.292
Rebalancing obs.	998	976	6,011	5,762	556	548
Total obs.	240,963	237,334	240,963	237,334	240,963	237,334
Hypothesis H_0: $\beta_0 + \beta_1 = 0$						
$\beta_0 + \beta_1$	**-0.619*** **	**-0.703*** **	**-0.814*** **	**-0.816*** **	**-0.679** **	**-0.703** **
Wald test ($\beta_0 + \beta_1 = 0$)	0.001	0.002	0.000	0.000	0.011	0.010

Appendix B. Types of rebalancing events

In this appendix we explain our choice of rebalancing which is based on debt financed rebalancing events following the arguments of Eckbo and Kisser (2021). Rebalancing events can be identified by three different proxies: report debt-financed rebalancing (type a_t), cash-and-debt-financed rebalancing (type a_t^N), and cash-financed leverage rebalancing (type a_t^C) respectively. Based on previous studies (e.g., Leary and Roberts, 2005, 2010; Eckbo et al., 2007; Eckbo and Kisser ,2021) we use an issue-size threshold of 5% and employ the following formulas are used to estimate rebalancing events:

$$\text{Debt-financed rebalancing: } a_t = 1 \text{ if } \frac{\Delta D_t^e}{A_t} > 5\% \text{ and } \frac{ER_t^e}{A_t} > 5\%$$

$$\text{Cash -and- debt-financed rebalancing: } a_t^N = 1 \text{ if } \frac{\Delta D_t^e - \Delta C_t}{A_t} > 5\% \text{ and } \frac{ER_t^e}{A_t} > 5\%$$

$$\text{Cash -only financed rebalancing: } a_t^C = 1 \text{ if } \frac{-\Delta C_t}{A_t} > 5\% \text{ and } \frac{ER_t^e}{A_t} > 5\%$$

where ΔD_t^e is the change in long-term debt, ΔC_t is the change in cash balances, ER_t^e equity retirement in excess of equity issues, and A is the book value of total assets.

In our empirical analysis, we require the following: i) rebalancing event periods must exclude probable confounding cash flow events, and ii) these financing must be considerable both in absolute and relative size compared to other sources and uses of funds. We can verify our requirements by examining the firm's cash flow statement in the refinancing quarter by using the following equation:

$$OCF - INV + OTH + (-CH + IVSTCH) = ER^e - DI^e$$

where *OCF* = operating cash flow; *INV* = total net investment outflows; *OTH* = other small financing cash flows; $-CH$ = cash balance drawdown; *IVSTCH* = net sale of short-term marketable securities; $-CH+IVSTCH$ = contribution of cash and cash equivalents; ER^e = net equity retirement (dividends and share repurchase net of equity issues); and DI^e = net debt issue (debt issues in excess of debt retirements). We scale all variables by the book value of total assets. Table A.4. shows the sources and uses of funds when firms take different types of capital structure rebalancing.

Table A.4. Sources-uses of funds of mean reverting firms rebalancing capital structure

The table shows aspects of firms' cash flow identity based on the three types of rebalancing event. We report debt-financed rebalancing (type a_t), cash-and-debt-financed rebalancing (type a_t^N), and cash-financed leverage rebalancing (type a_t^C) in panels A, B, and C, respectively. We use the following formulas are used to estimate rebalancing events:

$$\text{Debt-financed rebalancing: } a_t = 1 \text{ if } \frac{\Delta D_t^e}{A_t} > 5\% \text{ and } \frac{ER_t^e}{A_t} > 5\%$$

$$\text{Cash -and- debt-financed rebalancing: } a_t^N = 1 \text{ if } \frac{\Delta D_t^e - \Delta C_t}{A_t} > 5\% \text{ and } \frac{ER_t^e}{A_t} > 5\%$$

$$\text{Cash -only financed rebalancing: } a_t^C = 1 \text{ if } \frac{-\Delta C_t}{A_t} > 5\% \text{ and } \frac{ER_t^e}{A_t} > 5\%$$

where ΔD_t^e is the change in long-term debt, ΔC_t is the change in cash balances, ER_t^e equity retirement in excess of equity issues, and A is the book value of total assets. The cash flow identity of a firm can be summarized as follows.

$$OCF - INV + OTH + (-CH + IVSTCH) = ER^e - DI^e$$

where left hand side of the equations shows operating cash flow (*OCF*), total net investment outlays (*INV*), (generally small) other financing cash flows (*OTH*) and Cash and cash equivalents (*-CH+IVSTCH*). Cash and cash equivalents further be divided into two components: drawdown of cash balances (–*CH*) and the net sale of short-term marketable securities (*IVSTCH*). Right-hand side of the equations shows net equity retirement (ER^e) and net debt issues (DI^e). We scale all variables based on book value. We report the details construction of variables in the appendix Table A4, sample period 1984–2019.

	Cash and equivalents					Debt-financed rebalancing	
	OCF	*INV*	*OTH*	*-CH*	*IVSTCH*	ER^e	DI^e
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Debt-financed rebalancing (type a_t)							
All	0.03	0.02	0.00	0.00	0.00	0.16	0.15
Panel B: Cash-and-Debt-financed rebalancing (type a_t^N)							
All	0.02	0.01	0.00	0.08	0.02	0.15	0.05
Panel C: Cash-only financed rebalancing (type a_t^C)							
All	0.02	0.01	0.00	0.11	0.02	0.16	0.01

We observe that only debt-financed rebalancing (Panel A) fulfils our requirements. Net equity retirement (16%; Column 6) and net debt issue (15%; Column 7) are almost equal. Further, the left-hand side variables—*OCF* (3%; Column 1), *INV* (2%; Column 2), *OTH* (0%; Column 4), *CH* (0%; Column 5), and *IVSTCH* (0%; Column 6)—are small. The results imply that during debt-financed rebalancing, firms retire net equity by issuing net debt.

On the other hand, the analysis indicates that cash-and-debt financed rebalancing and cash-only financed rebalancing do not properly capture refinancing events since they imply large cash balance drawdown and small debt issues. Indeed, the cash balance drawdown (-CH) is large: (8%, Column 4, Panel B) for cash-and-debt financed rebalancing and (11%, Column 4, Panel C) for cash-only financed rebalancing while the size of the net debt issue is small for both cash-and-debt financed rebalancing (5%, Column 6, Panel B) and cash-only financed rebalancing (1%, Column 6, Panel C).[1] In sum, the results indicate that cash-and-debt financed rebalancing and cash-only financed rebalancing imply large cash balance drawdown and small debt issues. Hence, only debt-financed rebalancing events fulfil our conditions, and we employ this event as a proxy for refinancing. Our argument is in line with Eckbo and Kisser (2021) which is shown here to hold also for a sample of firms following mean reverting earnings.

[1] In comparison, we observe that net equity retirement is much higher for cash-and-debt financed rebalancing (15%, Column 6, Panel B) and cash-only financed rebalancing (16%, Column 6, Panel C).

Appendix C. Simulation of theoretical model

To simulate leverage and profitability dynamics analogously to empirical studies, we follow the following approach. To create different paths for the mean reverting process (1) $dx = q(\theta - x)dt + \sigma dz$, we vary the initial profits level $x = x_0$. Note that depending on whether θ is higher (lower) than x_0, firms start above (below) the long-term mean and hence are expected to have a temporarily positive (negative) drift. Thus, our approach for the mean reverting process is closely related to Danis et al.'s (2014) approach used for the GBM case about varying growth rates to generate cross-sectional variation in leverage ratios.

We focus on a group of firms with temporary positive growth ($x_0 > \theta$) and one group with temporary negative growth ($x_0 < \theta$). In simulation exercise we ensure we have an equal number of refinancing and non-refinancing firms for the two groups. For the mean reverting process, the earnings process (1) is as follows (see Dixit and Pindyck, 1994, p. 76, eq. 19):

$$\Delta x_t = \theta\left(1 - e^{-qdt}\right) + \left(e^{-qdt} - 1\right)x_{t-1} + \sigma_\varepsilon Z_t \tag{A1}$$

where $Z_t \sim N(0,1)$ and the error volatility per unit of interval is $\sigma_\varepsilon = \sigma\sqrt{\frac{1-e^{-2qdt}}{2q}}$.

For each panel, we store the leverage ratio for each firm and time period. $Lev_b(x_0)$ arises from the theoretical model leverage at time 0 for x_0. In calculating the leverage ratio for each firm in each period, we apply the theoretical model valuation, assuming (as in the theoretical model) the firm does not adjust debt financing and thus calculating a new leverage ratio for each new $x(t)$ at *t*. For each firm, depending on its corresponding optimal policies for different x_0, we check if $x(t) \geq x_I$. We store the firm's leverage ratio in a generated data set with $Lev_1(x_I)$ (i.e., the leverage ratio at the refinancing threshold and then stop the simulation path for that firm).[2]. For each firm and simulation path, we also check if $x(t) \leq x_b$, in which case we interrupt the simulation path (because the firm has reached the default threshold before refinancing). In our simulated data sets, we also keep track of the state of each firm using a dummy

[2] In principle, we could have continued calculating leverage ratios until the firm defaults at x_R; however, this creates only some additional passive variations in leverage ratios similar to the initial period and does not offer any new insights in the periods of interest, the initial and refinancing periods.

variable d_{it}, which equals zero if the firm is not at a refinancing threshold and one if it is. For each firm's x(t), we also calculate the theoretical measure of return on asset as $\pi_{i,t-1} = \frac{x(t)(1-\tau)}{Ub(x(t-1))}$. Our simulated data sets allow us to estimate panel regressions on the simulated data panel as follows:

$$L_{it} = \alpha_0 + \beta_0\pi_{i,t-1} + \beta_1\pi_{i,t-1}d_{it} + \gamma d_{it} + \varepsilon_{it} \, . \qquad \text{(A2)}$$

where L_{it} is the gross market leverage ratio, $\pi_{i,t-1}$ is the operating profit of firm *i* in the lagged period, and d_{it} is the indicator variable (equal to one if firm *i* is in the refinancing period and zero if not). ε_{it} denotes the error term.

Our simulation and estimation exercise provides predictions on β_0, β_1, and γ as well as $\beta_0 + \beta_1$.

Simulation results and hypotheses

Our base case parameters are motivated from earlier studies as follows. For the mean reverting stochastic process parameters, we follow Sarkar and Zapatero (2003) and use a normalized level of current earnings at x = 1, σ = 0.4, mean reversion speed q = 0.1, and long-term mean θ = 1. We follow Goldstein et al. (2001) and Danis et al. (2014) using a tax rate of τ = 0.3 and proportional bankruptcy costs of b = 0.15 and r = 0.06. Because the long-term mean is normalized to 1, $x_0 < 1$ implies positive trending earnings firms; it is vice versa when $x_0 > 1$. To illustrate, we pick $x_0 = 0.5$ and $x_0 = 1.15$. For $x_0 = 1.15$ we simulate 5,000 firms we obtain N_l = 46 events. Note that using more symmetric deviations from the long-term mean may affect the statistical significance of the interaction dummy of refinancing with profitability, something that is also observed in the actual data.

Table A5 presents our simulation exercises regarding the estimation of model (A2) using the theoretical model predictions as input (as described in section 2.3). In all models, we use pooled regression, as in the empirical literature. We provide more general predictions below.

First, we obtain $\beta_0 < 0$. This is as expected and is driven by firms' inaction in frequently adjusting leverage. Second, we observe that the dummy variable coefficient $\gamma > 0$ when negative growth firms are combined with positive growth firms. Third, we obtain predictions regarding the interaction term between the refinancing dummy and profits. We obtain $\beta_1 < 0$ and find that $\beta_0 + \beta_1 = 0$ is strongly rejected. However, unlike Danis et al.'s (2014) suggestion for positive adjustments ($\beta_0 + \beta_1 > 0$), our results for mean reverting firms suggest the opposite. From the above, we empirically test the following empirical hypotheses for our sample of mean reverting firms:

$$H1: \beta_0 < 0 \text{ and } \beta_1 < 0 \quad \beta_0 + \beta_1 < 0 \tag{A3}$$

Table A5. Leverage and profitability's relation based on the simulated model panel data

π (β_0)	-2.010***
	(0.012)
d (γ)	0.367***
	(0.038)
d X π (β_1)	-1.417***
	(0.261)
Intercept	0.679***
	(0.001)
Model	Pooled
Rebalancing obs.	92
Total obs.	18,844
% of events	0.005
Growth group control	Yes
Adj. R^2	0.637
Wald test ($\beta_0 + \beta_1 = 0$)	0.000