

Capital Structure Decisions: Insights from Private Firms

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2012 Comparative Analysis of Enterprise (Micro) Data

Disclaimer: The contents of this presentation have been subject to vetting and pass the Disclosure Rules & Regulations set forth by Statistics Canada.

Outline

- 1 Introduction
- 2 Data
- 3 Empirical Methodology
- 4 Results & Discussion
- 5 Conclusions

Main Questions

- 1 How does a firm's access to external equity markets affect its choice of financing?
 - Leverage of Private firms versus Public firms
- 2 Do private and public firms have different levels of short-term and long-term leverage?
- 3 What impact do industry conditions have on firm leverage?

Supply of Financing

Issues:

1 Aymmetric information

- Uncertainty regarding quality of firm and manager's actions
- More information available about public firms → fewer information asymmetry problems

2 Role of Banks

- Specialize in acquiring information about borrowers
- Reduce information asymmetries (Diamond (1984))
- More opaque firms rely on bank financing to mitigate asymmetric information problems

3 Pecking-order theory

- Myers and Majluf (1984)
- Firms choose cheapest source of financing first
- Financing with greater information asymmetry → Higher cost

Sources of Financing

Pecking order:

- 1 Retained Earnings
- 2 Debt:
 - Short-term
 - Long-term
- 3 Public equity markets

Short-term debt versus Long-term debt:

- Short-term debt reduces information asymmetries due to continuous monitoring
- Credit constraints

→ Expect private firms to rely more heavily on short-term debt

GIFI-T2LEAP Database

Statistics Canada merged two administrative datasets:

- 1 Revenue Canada General Index of Financial Information-Corporate Tax Return File (GIFI-T2),
 - 2 Longitudinal Employment Analysis Program (LEAP) T4s
- Universe of firms filing tax return and hiring employees.
 - Information in database includes:
 - Balance sheet variables: Profit, total debt, short-term debt, long-term debt, equity, total assets, current assets, capital assets, tangible assets, sales
 - Industry: NAICS
 - Employment

Coverage Period:

- T2-LEAP: 1984-2008
- GIFI: 2000-2008

Most balance sheet variables come from GIFI → 2000-2008 period

Definition: Private versus Public Firms

- Canadian-controlled private corporation (CCPC):
 - 1 Resident incorporated firm not directly or indirectly controlled by non-residents, a public corporation or any combination; or
 - 2 a private, resident corporation not directly or indirectly controlled by one or more public corporations or Federal Crown corporation
- Public corporation:
 - 1 Resident in Canada and having a class of shares listed on a prescribed Canadian stock exchange; or
 - 2 Any Canadian corporation controlled by a public corporation

Table 1: Distribution of Firms

Year	Public	Private	All	CompuStat
2000	1,553	281,956	283,509	1,367
2001	1,708	309,272	310,980	1,379
2002	1,847	332,107	333,954	1,436
2003	1,805	353,241	355,046	1,506
2004	1,799	372,707	374,506	1,611
2005	1,853	385,533	387,386	1,738
2006	1,938	404,192	406,130	1,828
2007	1,943	420,149	422,092	1,834
2008	2,024	440,621	442,645	1,811

Naics	Public	Private	All
11	167	241,356	241,523
21	2,528	43,802	46,330
22	169	2,804	2,973
23	591	516,153	516,744
31-33	3,300	295,868	299,168
41	1661	297,070	298,731
44	597	460,718	461,315
48	529	183,881	184,410
51	1,130	47,554	48,684
54	2,088	487,000	489,088
55	790	92,214	93,004
56	805	171,179	171,984
71	482	48,957	49,439
72	500	197,668	198,168
81	1,133	213,554	214,687
Total	16,470	3,299,778	3,316,248

Measures of Financial Structure

1 Leverage:

$$Lev_{it} = \frac{Total_debt_{it}}{Total_assets_{it}}$$

2 Shortterm Leverage:

$$Lev_{it} = \frac{Shortterm_debt_{it}}{Total_assets_{it}}$$

3 Longterm Leverage:

$$Lev_{it} = \frac{Longterm_debt_{it}}{Total_assets_{it}}$$

Table 2: Descriptive Statistics

		Public	Private	T-stat
Leverage	Mean	0.440	0.508	-29.250***
	St.Dev	(0.295)	(0.293)	
Long-term Leverage	Mean	0.172	0.172	-0.322
	St.Dev	(0.221)	(0.227)	
Short-term Leverage	Mean	0.262	0.331	-36.056***
	St.Dev	(0.242)	(0.257)	
Log Size	Mean	14.802	13.029	89.392***
	St.Dev	(2.494)	(1.837)	
Profitability	Mean	0.027	0.120	-47.49***
	St.Dev	(0.243)	(0.275)	
Sales Growth	Mean	0.513	0.188	27.639***
	St.Dev	(1.508)	(0.875)	
Tangibility	Mean	0.402	0.658	-64.861***
	St.Dev	(0.494)	(0.684)	

Figure 1: Leverage

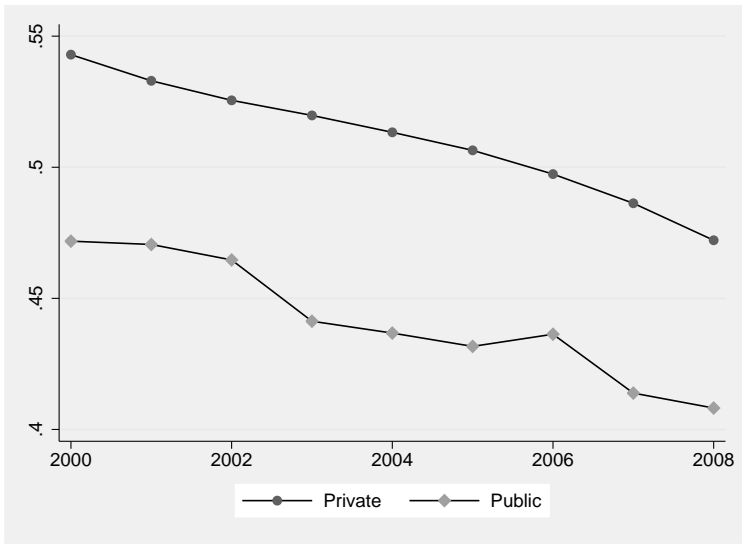


Figure 2: Long-term Leverage

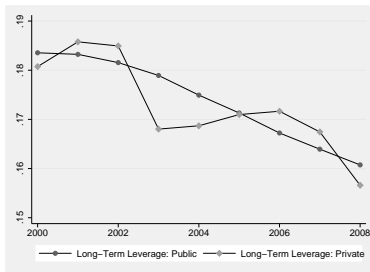
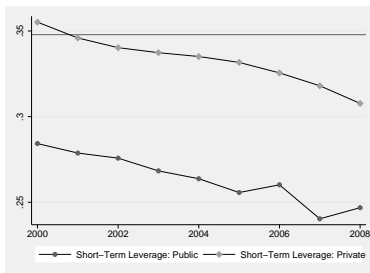


Figure 3: Short-term Leverage



Determinants of Leverage

Regression specification:

$$\text{Leverage}_{it} = \alpha \text{Private}_{it} + \beta X_{it-1} + \eta_i + \epsilon_{it}. \quad (1)$$

where:

- *Private* is a private/public indicator variable ($\text{Private} = 1 \rightarrow$ Private firm)
- X_{it-1} includes measures of profitability ($\frac{\text{profit}_{i,t-1}}{\text{total assets}_{i,t-1}}$), log size ($\text{sales}_{i,t-1}$), tangibility ($\frac{\text{tangible assets}_{i,t-1}}{\text{total assets}_{i,t-1}}$) and sales growth ($\text{Sales Growth}_{t-1}$).
- Interact *Private* with other variables

Table 4: Fixed Effects regressions: Determinants of Leverage

	All	Private	Public	Small	Large	Interact
<i>Private</i>	.02978 (.01127)***			.02881 (.07063)	.03255 (.01131)***	.00921 (.01096)
<i>Size_{t-1}</i>	.01168 (.00025)***	.01168 (.00025)***	.00857 (.00250)***	.00546 (.00030)***	.01845 (.00070)***	.01018 (.00068)***
<i>Profitability_{t-1}</i>	-.10110 (.00096)***	-.10118 (.00096)***	-.09472 (.01572)***	-.07677 (.00111)***	-.15751 (.00192)***	-.08651 (.01523)***
$\Delta \ln Sales_{t-1}$	.01477 (.00016)***	.01497 (.00016)***	.00140 (.00120)	.01231 (.00020)***	.01841 (.00024)***	.00038 (.00122)
<i>Tangibility_{t-1}</i>	.02702 (.00056)***	.02703 (.00056)***	.02809 (.00861)***	.02324 (.00071)***	.02947 (.00092)***	.03353 (.00820)***
Interactions						
<i>Size_{t-1}</i>						.00152 (.00064)**
<i>Profitability_{t-1}</i>						-.01471 (.01526)
$\Delta \ln Sales_{t-1}$						.01459 (.00123)***
<i>Tangibility_{t-1}</i>						-.00653 (.00822)
Const.	.34322 (.01171)***	.37335 (.00332)***	.31579 (.03662)***	.29891 (.07060)***	.19432 (.01520)***	.36366 (.01139)***
Obs.	3,172,601	3,156,743	15,858	1,586,301	1,586,300	3,172,601
<i>R</i> ²	.06741	.06778	.02577	.04964	.07728	.06751

Table 5: Short and Long-Term Leverage

	Total	Long	Short
<i>Private</i>	.02978 (.01127)***	-.02827 (.00977)***	.05406 (.01012)***
<i>Size</i> _{<i>t</i>-1}	.01168 (.00025)***	.00002 (.00018)	.01150 (.00022)***
<i>Profitability</i> _{<i>t</i>-1}	-.10110 (.00096)***	-.04824 (.00061)***	-.05237 (.00084)***
$\Delta \ln \text{Sales}$ _{<i>t</i>-1}	.01477 (.00016)***	.00074 (.00013)***	.01387 (.00014)***
<i>Tangibility</i> _{<i>t</i>-1}	.02702 (.00056)***	.00339 (.00044)***	.02740 (.00049)***
Const.	.34322 (.01171)***	.21449 (.00999)***	.12877 (.01051)***
Obs.	3,172,601	3,172,601	3,172,601
<i>R</i> ²	.06741	.01796	.03395

Industry Conditions

Capturing industry conditions: Two-stage procedure

- 1 First stage regression: Decomposition of firm sales growth into predicted and idiosyncratic components:

$$\Delta \log(\text{Size}_{it}) = \alpha_i + \beta_1 \log(\text{Size}_{i,t-1}) + \beta_2 \log(\text{Size}_{i,t-2}) + \phi_1 \log \text{Age}_{it} (2) \\ + \gamma d1984_{it} + \phi_2 [d1984_{it} \times \log \text{Age}_{it}] + \mu_{it}$$

where μ_{it} captures the idiosyncratic component to firm growth.

- 2 Second stage regressions: Capturing unexpected industry sales growth and growth volatility.

$$\hat{\mu}_{it} = \sum_{i \in j} \sum_t \delta_{jt} + \varepsilon_{it}. \quad (3)$$

and

$$\hat{\mu}_{it}^2 = \sum_{i \in j} \sum_t \gamma_{jt} + \varepsilon_{it}. \quad (4)$$

for firm i in industry j at time t . δ and γ are a full set of industry specific-time dummy variables.

Industry Conditions

We have:

- $\hat{\delta}$ capture average unexpected sales growth within an industry during a given year
- $\hat{\gamma}$ capture variance of sales growth within an industry during a given year

Include these measures of industry conditions in leverage regressions.

Interact with private/public dummy variable

Table 6: Macroeconomic Conditions: Unexpected Industry Growth and Volatility

	Total	Long	Short	Total	Long	Short
<i>Private</i>	.03417 (.01128)***	-.02577 (.00977)***	.05597 (.01012)***	.11033 (.01903)***	.01813 (.01640)	.09081 (.01637)***
<i>Size</i> _{t-1}	.01169 (.00025)***	.00004 (.00018)	.01149 (.00022)***	.01167 (.00025)***	-6.00e-06 (.00018)	.01152 (.00022)***
<i>Profitability</i> _{t-1}	-.10109 (.00096)***	-.04823 (.00061)***	-.05237 (.00084)***	-.10108 (.00096)***	-.04816 (.00061)***	-0.05243 (.00084)***
$\Delta \ln Sales$ _{t-1}	.01476 (.00016)***	.00071 (.00013)***	.01389 (.00014)***	.01478 (.00016)***	.00074 (.00013)***	.01388 (.00014)***
<i>Tangibility</i> _{t-1}	.02701 (.00056)***	.00338 (.00044)***	.02740 (.00049)***	.02702 (.00056)***	.00339 (.00044)***	0.0274 (.00049)***
$\hat{\delta}$	-.19183 (.03330)***	-.08664 (.02769)***	-.10999 (.02788)***			
$\hat{\delta} \times Private$	.21843 (.03352)***	.12287 (.02785)***	.09685 (.02810)***			
$\hat{\gamma}$				.16221 (.03216)***	.06103 (.02590)**	.10500 (.02904)***
$\hat{\gamma} \times Private$				-.17418 (.03225)***	-.10038 (.02598)***	-0.07945 (.02913)***
Const.	.33895 (.01171)***	.21206 (.00999)***	.12691 (.01051)***	.26782 (.01922)***	.18480 (.01648)***	.08123 (.01655)***
Observations.	3172601	3172601	3172601	3172601	3172601	3172601
R^2	.06744	.018	.03396	.06745	.01806	.03399

Conclusions

- 1 Leverage is higher for private firms
- 2 Exclusively: Higher leverage is the result of higher short-term leverage for private firms
- 3 Industry Conditions:
 - High Growth
 - 1 Lowers leverage ratios for public firms
 - 2 Raises long-term leverage ratio for private firms
 - High Growth Volatility
 - 1 Raises leverage ratios for public firms
 - 2 Raises short-term leverage ratios for private firms
 - 3 Lowers long-term leverage ratio for private firms

→ Firms facing larger asymmetric information problems rely more heavily on debt financing, specifically short-term debt financing.