Corporate Finance of Industry in a Developing Economy: Panel Evidence from Imperial Russia

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Introduction

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- Lots of empirical evidence connecting external finance to growth (e.g. Levine and Zervos 2008, Rajan and Zingales 1998)
- But firm-level evidence (esp. on non-listed firms) outside a few contexts is limited. Such studies ideally involve:
  - Richly detailed data about economically important firms
  - Interesting variation over time and across firms

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  - **But how did corporations finance expansion/operations?**
  - **How and why did corporate financial strategies vary?**

Key Features of the Environment

- Concession system of incorporation: potentially costly access
  - Did this distortion matter? (Owen 1989; Cheremukhin et al., 2017; Gregg 2020)
  - Closely-held vs. widely-held corporation "types"
  - Corporate income tax from 1885

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- Financial system:
  - Stock markets with "high" listing rate of corporations; importance of IPOs (?)
  - Banks were well-integrated with industrial sectors (Salomatina); less about state substituting for non-functioning banking sector (Gerschenkron)

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- Foreign investment and capital inflows: important but not observable
- Vast, diverse territory ruled by autocracy $\Rightarrow$ Imperfect legal, regulatory, and information environments

Background: Types of Russian Corporations

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- In practice, we observe two broad types:
  1. A-corporations
     - New firms; issued small-denomination shares to a large circle of investors; had larger total share capital
  2. Share partnerships
     - More incorporated from existing firms; issued large-denomination shares to a small circle of investors; had smaller total share capital

Questions

Given the economic importance of Russian corporations, but the many potential distortions, we want to know...

1. **Did these entities "behave" like modern corporations?**
   - Possible to reconcile with external indicators?
   - Did Imperial Russian corporate financial strategies follow modern capital structure and payout theories? If so, which ones? (e.g. pecking order vs. static trade-off)
2. **How were they financed? Debt vs. equity?**
   - Did corporation type and founder connections matter?
   - Did listing make a difference for industrial corporations?
3. **Which corporations "performed" best (in a financial sense)?**
   - Did dividends add value; did they compensate for poor investor protections?
   - Did observables predict ROE or market-to-book ratios?

Preview of Answers

1. **Russian corporations behaved (mostly) like modern corporations**
   - Indicators followed the business cycle
   - Capital structures and dividend policies can at least partially be rationalized by reference to modern theories
2. **Corporations traded off equity vs. debt**
   - Closely-held corporations and those with gentry connections used more debt
   - Listed corporations were less levered
3. **Which performed best?**
   - Widely-held corporations had lower ROE but greater M-to-B ratios
   - Dividends were valued: possibly compensated for poor protections

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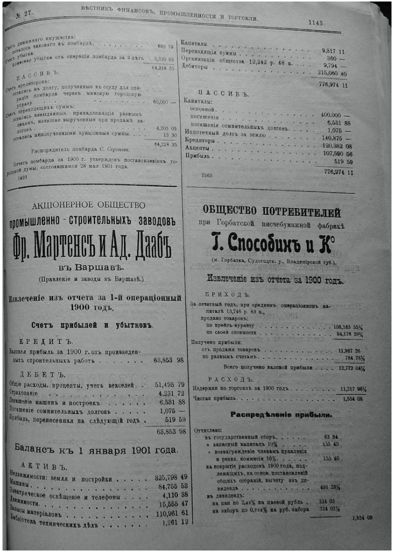
Overall: Russian corporations made wide-ranging use of financial markets, but the concession system and emerging banking sector implied several distortions

Data Sources

- Key source: Imperial Russian Ministry of Finance Yearbooks
  - Balance sheet information, roughly 1899 to 1914 accounting years for all active corporations
- Plus, two supplemental sources:
  - RUSCORP (Owen 1989): Charter information at founding, including founder ethnicity, gender, and status
  - St. Petersburg Stock Exchange Project (Available at Yale ICF): monthly stock prices from St. Petersburg Stock Exchange, which we convert to annual averages

Public Balance Sheets: Martens and Daab (1900)



Счетъ движимаго имущества:	
осталось таковаго въ ломбардѣ	690 79
Счетъ убытка:	
понесено убытка отъ операціи ломбарда за 9 лѣтъ	3,320 03
	64,218 35

П А С С И В Ъ.

Счетъ кредиторовъ:	
остались въ долгу, полученные въ ссуду для операція ломбарда черезъ минскую городскую управу	60,000 —
Счетъ переходящихъ суммъ:	
остались невыданныя, принадлежащія разнымъ лицамъ, излишне вырученныя при продажѣ залоговъ	4,205 05
остались неполученными аукціонныя суммы	13 30
	64,218 35

Распорядитель ломбарда *С. Сергѣевъ.*

Отчетъ ломбарда за 1900 г. утвержденъ постановленіемъ городской думы, состоявшимся 28 мая 1901 года.

1493

АКЦІОНЕРНОЕ ОБЩЕСТВО

промышленно - строительныхъ заводовъ

Фр. Мартенсъ и Ад. Даабъ

въ Варшавѣ.

(Правленіе и заводы въ Варшавѣ.)

Извлеченіе изъ отчета за 1-й операціонный 1900 годъ.

Счетъ прибылей и убытковъ.

К Р Е Д И Т Ъ.

Валовая прибыль за 1900 г. отъ произведенныхъ строительныхъ работъ	63,853 98

Д Е Б Е Т Ъ.

Общіе расходы, проценты, учетъ векселей	51,495 79
Страхованіе	4,231 72
Погашеніе машинъ и построекъ	6,531 88
Погашеніе сомнительныхъ долговъ	1,075 —
Прибыль, перенесенная на слѣдующій годъ	519 59
	63,853 98

Балансъ къ 1 января 1901 года.

А К Т И В Ъ.

Недвижимости: земля и постройки	325,798 49
Машины	84,755 53
Электрическое освѣщеніе и телефоны	4,110 38
Движимости	15,555 47
Запасы матеріаловъ	110,961 61
Библіотека техническихъ дѣлъ	1,261 12
Капиталы	9,317 11
Переходящія суммы	360 —
Организація общества 12,242 р. 48 к.	9,794 —
Дебиторы	215,060 40
	776,974 11

П А С С И В Ъ.

Капиталы:	
основной	400,000 —
погашенія	6,531 88
погашенія сомнительныхъ долговъ	1,075 —
Ипотечный долгъ за землю	140,875 —
Кредиторы	120,382 08
Акцепты	107,590 56
Прибыль	519 59
	776,974 11

1563

ОБЩЕСТВО ПОТРЕБИТЕЛЕЙ

при Горбатской писчебумажной фабрикѣ

Т. Способинъ и К°

(м. Горбатка, Судогодск. у., Владимірской губ.).

Извлеченіе изъ отчета за 1900 годъ.

П Р И Х О Д Ъ.

За отчетный годъ, при среднемъ операціонномъ капиталѣ 13,746 р. 83 к.,	
продано товаровъ:	
по прейсъ-куранту	106,163 55½
по своей стоимости	94,176 29½
Получено прибыли:	
отъ продажи товаровъ	11,987 26
по разнымъ счетамъ	784 78½
Всего получено валовой прибыли	12,772 04½

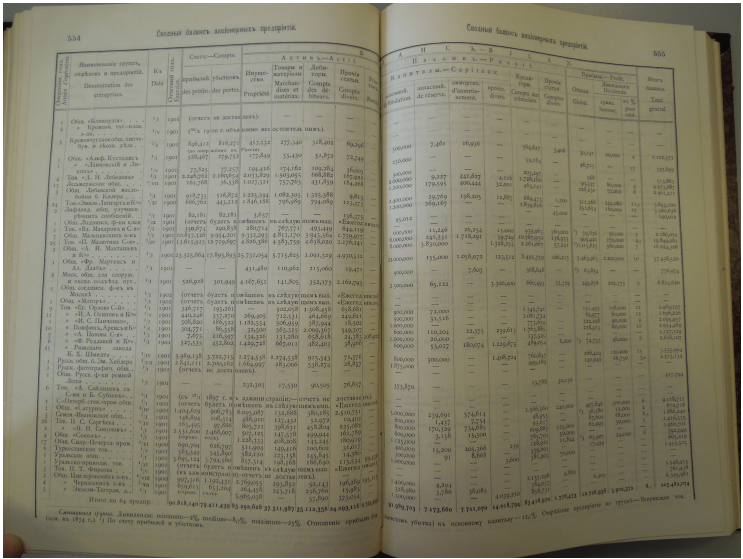
Р А С Х О Д Ъ.

Издержки по торговлѣ за 1900 годъ	11,217 96½
Чистая прибыль	1,554 08

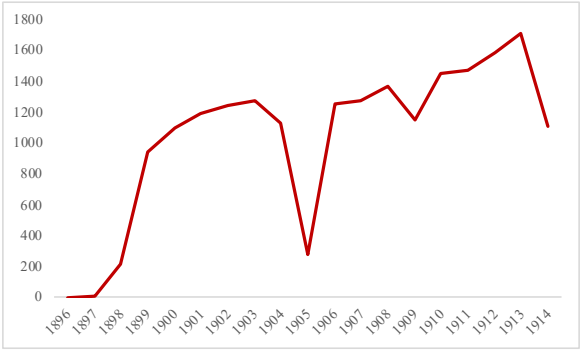
Распредѣленіе прибыли.

Отчислено:		
въ государственный сборъ	83 94	
» запасный капиталъ 10%	155 40	
» вознагражденіе членамъ правленія и ревиз. коммисіи 10%	155 40	
на покрытіе расходовъ 1900 года, подлежащихъ, на основ. постановленій общихъ собраній, вычету изъ дивиденда	491 28½	
въ дивидендъ:		
на паи по 2,42% на паевой рубль	334 03	
на заборъ по 0,753% на руб. забора	334 02½	
		1,554 08

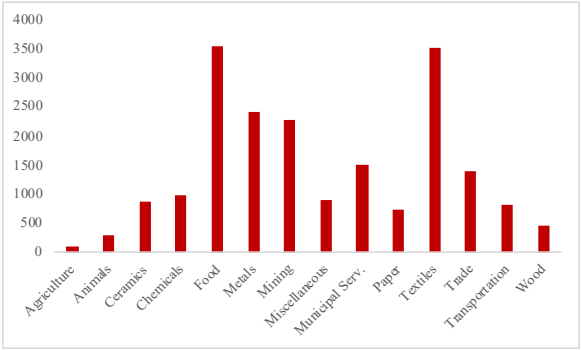
Martens and Daab in the Published Data (1901)



Observations by Industry and Accounting Year



Industrial Composition of the Corporate Sample



Variables Defined over our Panel

Left Hand Page		Right Hand Page	
Счет:	Account (Total)	**Пассив**	Passive (Liabilities)
Прибылей	Revenue	Основной капитал	Share Capital
Убытков	Expenditures	Запасный капитал	Capital Reserves
		Аммортизация (sic)	Amortization (and Depreciation)
Актив	Active (Assets)	Прочие капиталы	Other Capital (Including Bonds)
Имущество	Property		
Товары и материалы	Goods and Materials	Облигации	Bonds
		Кредиторы	Accounts Payable
Дебиторы	Accounts Receivable	Прочие статьи	Other Items
Прочие статьи	Other Items		
Убыток	Loss	**Прибыль**	Profit
Наличность и ценные бумаги	Cash and Commercial Paper	Общая	Net Profit
		Дивиденд: Сумма	Dividend Sum
		Дивиденд: %	Dividend Percentage

Other Characteristics that We Examine

	n	mean	st. dev	med	min	max
A-Corporation	15,954	0.506	0.500	1.000	0.000	1.000
Has Noble Founder	15,619	0.106	0.308	0.000	0.000	1.000
Has Gov't Founder	15,619	0.190	0.392	0.000	0.000	1.000
Has Gentry Founder	15,619	0.176	0.381	0.000	0.000	1.000
Market Share Price	601	381.79	484.68	223.32	15.00	3,112.50

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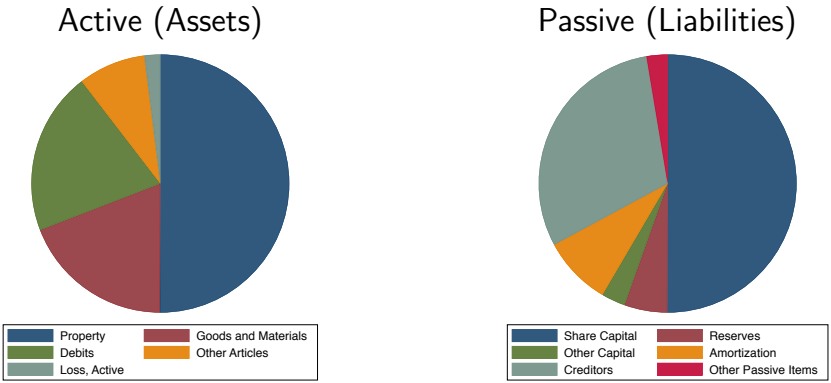
We suspect there should be more "matches" between data sources

Examining the balance sheets: ratios and the business cycle

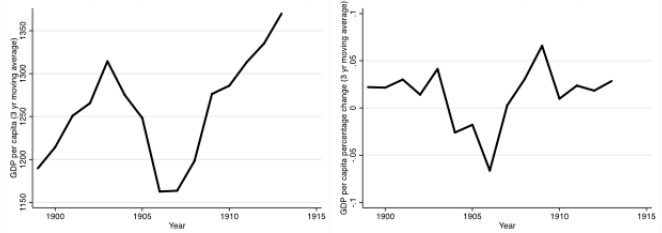
Balance Sheet Composition

Average Nonzero Entries, Scaled by Total Assets

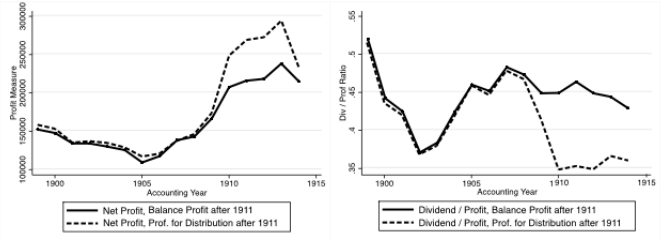


Profits and Div/Prof Ratio over the Business Cycle

Panel A: GDP per Capita and Annual Percentage Changes (Three-Year Moving Averages)



Panel B: Two Measures of Profit / Share Capital and Dividend / Profit Ratios



Capital Structure: Credit and Leverage

Estimated via RE and FE:
y_{it}: Measure of credit usage or leverage

$$y_{it} = \beta_0 + \beta_1 log(Age_{it}) + \beta_2 Asset Tangibility_{it} + \beta_3 Profits/Assets_{it} + \beta_4 log(Assets_{it}) + \beta_5 MB_{it} + Industry'_{ij}\gamma + Region'_{ij}\delta + \mu_i + \zeta_t + \epsilon_{it}$$

Hypotheses:

- Capital structure theories : leverage increases in asset tangibility, age, and size (with caveats) (following e.g., Rajan and Zingales 1995, Deloof and Van Overfelt 2008)
- Leverage decreases in profits according to pecking-order models
- Russia-specific factors: A-Corporations (-), listing (-), political connections (?)

Results: Credit and Leverage

Model Dep. Variable	Probit Bonds	RE Log Creditors/ Assets	RE Log Creditors/ Share Cap.	FE Log Creditors/ Assets	RE, Balanced Log Creditor/ Assets
	(1)	(2)	(3)	(4)	(5)
Share = Aktsiia	0.420***	-0.224***	-0.350***		-0.213*
	(0.133)	(0.0737)	(0.0884)		(0.119)
Log Firm Age	-0.111**	-0.0115	0.0548**	0.0599	-0.107***
	(0.0455)	(0.0202)	(0.0243)	(0.0422)	(0.0403)
Asset Tangibility	1.189***	-0.283**	-0.583***	-0.126	-0.494***
	(0.221)	(0.122)	(0.149)	(0.199)	(0.161)
Net Profit / TA	-1.245	-1.967***	-2.295***	-1.555***	-2.437***
	(0.994)	(0.314)	(0.371)	(0.221)	(0.514)
Log Size	0.334***	0.252***	0.575***	0.211**	0.197***
	(0.0477)	(0.0317)	(0.0404)	(0.0710)	(0.0455)
Listed	-0.0786	-0.179**	-0.269***	-0.156	-0.319**
	(0.179)	(0.0821)	(0.0978)	(0.0918)	(0.127)
Corporation has noble founder		-0.0416	-0.0673		-0.0128
		(0.0810)	(0.0995)		(0.129)
Corporation has gov't founder		-0.146**	-0.132		-0.0383
		(0.0701)	(0.0845)		(0.0912)
Corporation has gentry founder		0.104	0.174**		0.0438
		(0.0659)	(0.0808)		(0.110)
Market-to-Book					
Constant	-16.29***	-4.649***	-8.537***	-4.954***	-3.877***
	(0.860)	(0.553)	(0.713)	(1.049)	(0.728)
Observations	9,827	9,730	9,730	11,906	4,536
R-squared	0.216	0.191	0.269	0.042	0.290
Industry Controls	YES	YES	YES	YES	YES
Year Controls	YES	YES	YES	YES	YES
Region Controls	YES	YES	YES	YES	YES

*** p<0.01, ** p<0.05, * p<0.1

Takeaways from Credit/Leverage Regressions

- Negative relationship between profits and debt; positive link between size and debt $\Rightarrow$ pecking order theories?
- Government-connected founders: less debt; gentry connections: more
- Property: negative relationship with debt is perhaps unexpected...

Takeaways from Credit/Leverage Regressions

- Negative relationship between profits and debt; positive link between size and debt $\Rightarrow$ pecking order theories?
- Government-connected founders: less debt; gentry connections: more
- Property: negative relationship with debt is perhaps unexpected...
  - Tangible assets positively related to debt *if* such assets make debt cheaper
  - May not be the case if debt is short-term (or if collateral is irrelevant)
  - Governance hypothesis: issue more debt when assets are intangible to discipline managers (Grossman and Hart 1982)
  - Both likely relevant in the Russian case

Inventories, Not Property, Increase with Credit

Model	RE	FE	RE
Dep. Variable	Log Creditors/ Assets	Log Creditors/ Assets	Log Creditors/ Assets
	(1)	(2)	(3)
Share = Aktsiia	-0.224***	-0.246***	-0.189**
	(0.0737)	(0.0747)	(0.0739)
Log Firm Age	-0.0115	-0.0118	-0.00925
	(0.0202)	(0.0204)	(0.0201)
Property / Assets	-0.283**		
	(0.122)		
Property + Goods / Assets		0.215*	
		(0.119)	
Goods/ Assets			0.885***
			(0.122)
Net Profit / TA	-1.967***	-1.875***	-1.982***
	(0.314)	(0.310)	(0.312)
Log Assets	0.252***	0.261***	0.247***
	(0.0317)	(0.0322)	(0.0307)
Listed	-0.179**	-0.183**	-0.183**
	(0.0821)	(0.0827)	(0.0820)
Corporation has noble founder	-0.0416	-0.0532	-0.0439
	(0.0810)	(0.0817)	(0.0803)
Corporation has gov't founder	-0.146**	-0.157**	-0.133*
	(0.0701)	(0.0710)	(0.0695)
Corporation has gentry founder	0.104	0.0912	0.110*
	(0.0659)	(0.0669)	(0.0658)
Constant	-4.649***	-5.030***	-4.949***
	(0.553)	(0.576)	(0.548)
Observations	9,730	9,730	9,730
R-squared	0.191	0.173	0.196
Industry Controls	1,430	1,430	1,430
Year Controls	YES	YES	YES
Region Controls	YES	YES	YES

*** p<0.01, ** p<0.05, * p<0.1

Performance: Return on Equity (Net Profits / Share Capital)

$$ROE_{it} = \beta_0 + \beta_1 ProfitMargin_{it} + \beta_2 AssetTurnover_{it} + \beta_3 FinancialLeverage_{it} + \beta_4 ACorp_i + Industry'_{ij}\boldsymbol{\gamma} + Region'_{ij}\boldsymbol{\delta} + \mu_i + \zeta_t + \epsilon_{it}$$

- Dupont Analysis
  - Net profit market (profit / revenue)
  - Asset turnover (revenue / assets)
  - Financial leverage (assets / share capital)
- Russia-specific factors: A-corporations (?), listing(+), political connections (?)

ROE: Corporation Type and Listing Matter

Model	RE	RE
Dep. Variable	ROE	ROE
	(1)	(2)
Share = Aktsiia	-0.260***	-0.223***
	(0.0453)	(0.0751)
Log Firm Age		0.0865***
		(0.0231)
Net profit margin, profits / revenue		0.556
		(0.391)
Revenue / Total Assets		0.478***
		(0.134)
Total Assets / Share Capital		0.0936***
		(0.0137)
Listed		0.275***
		(0.0776)
Corporation has noble founder		0.00346
		(0.0830)
Corporation has gov't founder		-0.0924
		(0.0742)
Corporation has gentry founder		-0.0480
		(0.0750)
Constant	-2.479***	-3.586***
	(0.0317)	(0.753)
Observations	12,777	6,818
R-squared	0.0108	0.181
Unique Firms	1,705	1,247
Industry Controls	NO	YES
Year Controls	NO	YES
Region Controls	NO	YES

*** p<0.01, ** p<0.05, * p<0.1

Performance: Market-to-Book Ratio

$$MB_{it} = \beta_0 + \beta_1 ACorp_i + \beta_2 DivProfRatio_{it} + \beta_3 Age_{it} + \beta_4 Size_{it} + Industry'_{ij}\boldsymbol{\gamma} + Region'_{ij}\boldsymbol{\delta} + \mu_i + \zeta_t + \epsilon_{it}$$

- Outcome: Market-to-book ratio (Valuation/Capital or price/par value)
  - Cannot calculate Tobin's Q (no market value of debt)
  - Requires listing (endogenous)

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- Outcome: Market-to-book ratio (Valuation/Capital or price/par value)
  - Cannot calculate Tobin's Q (no market value of debt)
  - Requires listing (endogenous)
- Dividends: irrelevant vs. compensating? (Campbell and Turner 2011)
- Age and size to proxy for survivorship bias
- Market value of connections?

Market-to-Book: Pos. Corr. with A-Corp, Dividends

Model	RE	RE	RE	RE
Dep. Variable	logMB	logMB	logMB	log (p/par)
	(1)	(2)	(3)	(4)
Share = Aktsiia			1.160***	0.868***
			(0.369)	(0.263)
Log Firm Age		0.0352	0.0154	0.101
		(0.127)	(0.128)	(0.0949)
Corporation has noble founder			0.558	0.399
			(0.349)	(0.260)
Corporation has gov't founder			0.0131	0.105
			(0.244)	(0.158)
Corporation has gentry founder			-0.146	0.101
			(0.443)	(0.278)
Div/Profit Ratio, trimmed	0.426***	0.435***	0.444***	0.501***
	(0.157)	(0.148)	(0.147)	(0.117)
Log Size		-0.378**	-0.373**	-0.0771
		(0.184)	(0.170)	(0.107)
Constant	-1.792***	3.904	2.705	-0.908
	(0.147)	(2.695)	(2.450)	(1.586)
Observations	520	520	520	520
R-squared	0.0641	0.115	0.284	0.248
Unique Firms	111	111	111	111
Industry Controls	YES	YES	YES	YES
Year Controls	YES	YES	YES	YES
Region Controls	NO	NO	NO	NO

*** p<0.01, ** p<0.05, * p<0.1

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- Match to Gregg's manufacturing panel data (done) $\Rightarrow$ How did finance and governance show up in terms of firm productivity and growth?

Undergraduate Research Contributors

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Correlates of Div/Prof Ratios

Model Dep. Variable	OLS Log (Div/Prof)	OLS Log (Div/Prof)	F.E. Log (Div/Prof)	OLS Log (Div/Prof), Trimmed	F.E. Log (Div/Prof), Trimmed
	(1)	(2)	(3)	(4)	(5)
Share = Aktsiia	0.0191	-0.00584		-0.0150	
	(0.0227)	(0.0321)		(0.0132)	
Log (Total Assets)		-0.00197	0.0240	-0.00156	0.0314
		(0.0176)	(0.0432)	(0.00919)	(0.0271)
Log (Creditors)		-0.0241**	-0.0101	-0.0272***	-0.0220*
		(0.00957)	(0.00986)	(0.00614)	(0.0121)
Log (Age)		0.0463***	0.00427	0.0385***	0.0180
		(0.0117)	(0.0277)	(0.00786)	(0.0163)
Constant	-0.506***	-0.0922	-0.755	-0.204	-0.789**
	(0.0150)	(0.223)	(0.542)	(0.161)	(0.355)
Observations	5,830	5,768	5,768	5,693	5,693
R-squared	0.000	0.062	0.050	0.086	0.076
R-squared	0.000	0.062	0.0304	0.086	0.0297
Industry Controls	NO	YES	N/A	YES	N/A
Year Controls	NO	YES	YES	YES	YES
Region Controls	NO	YES	YES	YES	YES
Unique Firms	X	X	1,072	X	1,071

*** p<0.01, ** p<0.05, * p<0.1

Standard errors clustered by firm ID in parentheses in columns 1, 2, and 4. Standard errors clustered by industry in parentheses in columns 3 and 5.

Major Balance Sheet Items Over Time