Product Market Competition and Financing - Part II

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Does Leverage Affect Pricing?

- While capital structure and product market outcomes are jointly determined, it is possible to test theories by examining the effect of exogenous variation in capital structure on product market outcomes, or the converse.
- Such exogenous variations are not easy to find.
- Chevalier (1995a, 1995b) examines the effect of LBOs (leveraged buy-outs) on product prices in the supermarket industry.
- Chevalier uses detailed individual product-level price data from the supermarket industry to examine the effect of leverage increase on prices.

Addressing Reverse Causality

- These LBOs occurred in the U.S. supermarket industry in the 1980s primarily in response to takeover threats and a desire to create concentrated ownership, and not in response to a changing competitive environment in the industry.
- However, it is possible that common factors (e.g., demand and cost shocks) caused both LBOs and changes in product market outcomes.
- Check for pre-trends: there are no pre-trends and the pricing effects occur within 6 months of the LBO.

Contd.

- Supermarket chains operated in many different local metropolitan areas.
- So the empirical setting could examine how cross-sectional variation in competitive characteristics in local markets affects local market prices.
- Prices rise in some markets and fall in others depending on local market characteristics – difficult to argue that common demand/cost shocks could lead to LBOs and at the same time affect prices differently in different markets.

Chevalier, 1995: Main Findings

- Prices rise in local markets following LBOs when rival firms are also highly levered.
- Price decreases are associated with the presence of rivals with low leverage, and a single large competitor with low leverage accounting for a large share of the market.
- The latter price drops are associated with exit of the LBO firm from the local market.
- LBO announcements increase the market values of the LBO firm's local rivals.

How Competition Affects Leverage

- Recently, several papers have looked at the reverse experiment – how a change in the competitive landscape affects leverage choices.
  - Xu (2012) finds that more import competition leads to lower debt ratios.
  - Valta (2012) finds that the threat of import competition is associated with higher cost of debt.
  - Klasa et al. (2015) find that the risk of losing trade secrets causes firms to maintain lower leverage.
  - Ovtchinnikov (2010) finds that deregulations such as the removal of price controls and entry restrictions are associated with lower debt ratios
  - Parise (2015) finds that when airline routes of low-cost carriers change, incumbents threatened with new entry increase debt maturity.

Changing the Competitive Regime

- None of these experiments, however, address what happens when the *competition regime* itself changes.
- More import competition or allowing new entry changes the *strength* or *intensity* of competition, but the nature of the competitive equilibrium does not change.
- An example of the latter type of change occurs, for example, when due to anti-trust enforcement, firms that engaged in price fixing are no longer able to do so.
- Here, a collusive equilibrium is replaced by possibly an Oligopolistic equilibrium where firms compete in prices or quantities.

Two Questions

- Two Questions Arise:
  - Why do we expect the effects on financing to be different from what has been documented in the above types of studies?
  - Why do we care?

Why the Effects Might be Different

- Debt has a strategic role in Oligoplositic industries (Brander-Lewis, 1986) but collusion is more sustainable when there is less debt (Maksimovic, 1988).
- Firms may need to expand production capacity and step up investment when collusion gives way to competition.
  - Firms in a cartel and typically large/profitable firms, and large firms typically issue debt when they have to raise financing (Frank and Goyal, 2003).

How About Trade-off Theory?

- Cartel firms expect lower profits when cartels break up.
- Since the likelihood of distress increases, firms should lower their debt ratios in accordance with trade-off theory.
- Xu (2012) finds that firms reduce debt ratios when import competition increases, and argues that this is consistent with tradeoff theory, since lower future profits imply lower target debt ratio.
  - However, existing evidence shows that over-levered firms mostly readjust debt ratios by buying back debt, not by issuing equity (presumably to avoid wealth transfer to debt holders)
  - Firms that need to raise new financing to increase investment are in no position to do so.
  - However, note that in Xu's setting, firms cut investment as they face competition from new entrants – so they may have enough internal funds to buy back debt.

What Do We Expect?

- Do we expect firms to issue debt to avoid wealth transfer, issue equity to retain their competitive position, or cut investment and buy back debt?
- Unlike Xu (2012) who finds that distressed firms reduce debt ratios when faced with more competition, do we expect cartel members – large profitable firms – to worry about distress and reduce debt?

Why Do We Care? – The Importance of Cartels

- Product market collusion: still one of the biggest impediments to competition (Council of Economic Advisers (2016))
- 1014 price-fixing cartels convicted or under investigation over 1990-2013 with $1.5tr sales affected globally (Connor (2014))
- Recently: LIBOR, shipping, chemicals, autoparts, LCD panels, municipal bonds, vitamins, elevators, e-books, cement...

How Pervasive?

- Collusion is outlawed in most countries
  - Difficult to establish what fraction of the total sales of goods and services is affected by collusive arrangements
  - Some countries (e.g., Austria, Germany, Switzerland, the Netherlands, the Nordic countries, Australia) had cartel registries at the time when they did not consider cartels illegal
  - 105 out of 193 Finnish manufacturing industries had cartels registered over 1950-90; estimates suggest that almost all industries were cartelized (Hyytinen, Steen, and Toivanen (2014))
  - $>$ 1000 cartels registered in Sweden in 1990, affecting 15% of total sales of goods and services (Folster and Peltzman (2010))

Strengthening Antitrust Enforcement

- "Cartel enforcement is a hot topic in boardrooms. Fines and jail terms have shot up in recent years, greatly raising the costs of collusion. Big firms such as GE and Bosch have assembled teams of in-house lawyers that focus solely on the issue" (The Economist (2014))
- Average prison terms in the US rose from 8 months (1990-1999) to 25 months (2010-2014)
- European Commission just fined truck makers $3.2bn for a 14-year long cartel

This Paper

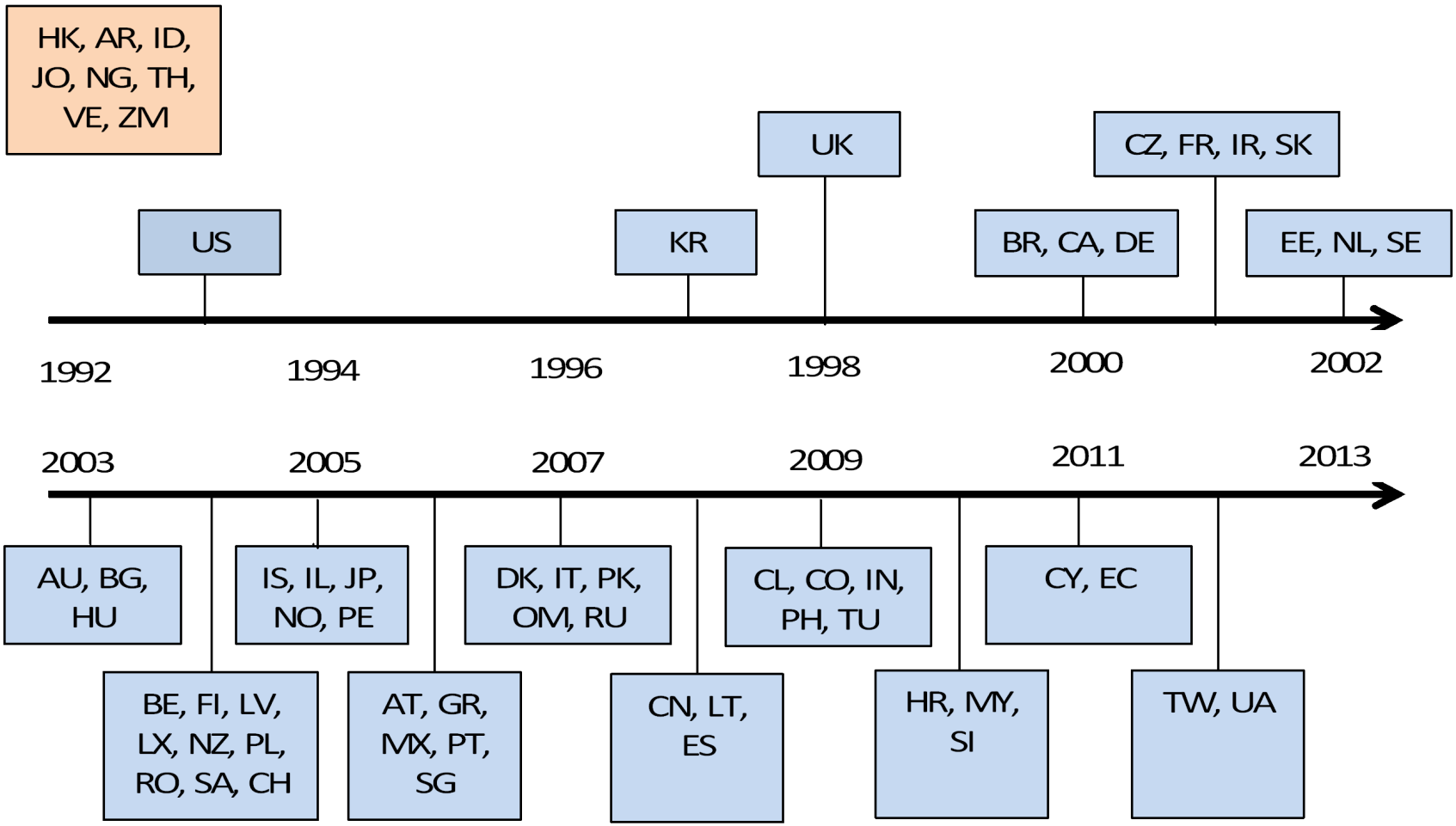
- Higher antitrust enforcement shifts equilibrium from collusion to oligopolistic competition
- We look at how such changes in competition regime alter firms' sources of financing and debt levels:
  - Equity issuances
  - Debt issuances
  - Debt-equity ratio

Identification strategy: Leniency laws

Identification

- At best, (as with other forms of crime) we can only observe the convicted collusion cases
- Investigations might be endogenous to the expected industry's profits, competitor lobbying, etc.
- Staggered passage of leniency laws around the world to identify shifts from collusive to oligopolistic equilibria:
  - US passed such law in 1973; largely ineffective until 1993 when amnesty has been made clearer and broader: the first self-reporting cartel member gets it automatically
  - Similar laws followed globally
  - Use information on leniency law passage in 63 countries

Timing


HK, AR, ID, JO, NG, TH, VE, ZM
US
KR
UK
BR, CA, DE
CZ, FR, IR, SK
EE, NL, SE
1992
1994
1996
1998
2000
2002
2003
2005
2007
2009
2011
2013
AU, BG, HU
BE, FI, LV, LX, NZ, PL, RO, SA, CH
IS, IL, JP, NO, PE
AT, GR, MX, PT, SG
DK, IT, PK, OM, RU
CN, LT, ES
CL, CO, IN, PH, TU
HR, MY, SI
CY, EC
TW, UA

No Particular Trend; Effective

- No laws are passed in vacuum but, based on our reading of media, no particular trend, e.g.:
  - US, Switzerland, Hungary: laws passed after significant collusion cases
  - Taiwan: concerns about rising consumer prices
  - Mexico: general recommendation of an OECD Peers Review
  - Singapore: US bargained to add it as part of FTA
  - Some EU member states: pressure from EU
  - IMF and World Bank sometimes ask for the overhaul of antitrust laws as part of funding
- Number of convicted cartels increase by 154%
- Gross margins drop by 14.8% (Dong, Massa, and Žaldokas (2015))

Changes in financing sources

Specification

$$Issuance_{it} = \alpha + \beta LeniencyLaw_{kt} + Controls_{ijkt} + FirmFE + YearFE + \epsilon_{it}$$

- Difference-in-difference strategy, where:
  - *Treated:* firms headquartered in countries that have passed the law by year t
  - *Control:* firms headquartered in countries that have not passed the law by year t
- Controls:
  - Firm, industry, country controls (such as firm size, profitability, asset tangibility, changes in other laws, import penetration); industry*year; region*year fixed effects
- Compustat firms, 1990-2012

Asset Growth

	(1)	(2)	(3)	(4)
Leniency law	0.067***	0.082***	0.048***	0.029*
	(3.648)	(4.167)	(4.179)	(1.674)
Controls	N	Y	Y	Y
Firm FE	Y	Y	Y	Y
Year FE	Y	Y	N	N
Industry-Year FE	N	N	Y	N
Region-Year FE	N	N	N	Y
N	418,101	352,968	352,968	352,968

- The passage of the leniency law leads to faster asset growth

Financing Deficit

	(1)	(2)	(3)	(4)
Leniency law	0.080***	0.078***	0.054***	0.035**
	(3.798)	(4.364)	(4.878)	(2.183)
Controls	N	Y	Y	Y
Firm FE	Y	Y	Y	Y
Year FE	Y	Y	N	N
Industry-Year FE	N	N	Y	N
Region-Year FE	N	N	N	Y
N	412,180	348,988	348,988	348,988

- Firms step-up issuance activity, in contrast to trade-off theory

Equity Issuance

	(1)	(2)	(3)	(4)
Leniency law	0.068***	0.069***	0.050***	0.034**
	(3.491)	(4.024)	(5.048)	(2.354)
Controls	N	Y	Y	Y
Firm FE	Y	Y	Y	Y
Year FE	Y	Y	N	N
Industry-Year FE	N	N	Y	N
Region-Year FE	N	N	N	Y
N	461,267	351,753	351,195	349,815

- The passage of the law increases equity issuances by 7%

Graph

Debt Issuance

	(1)	(2)	(3)	(4)
Leniency law	0.007***	0.005**	0.003	0.002
	(3.461)	(2.186)	(1.252)	(0.686)
Controls	N	Y	Y	Y
Firm FE	Y	Y	Y	Y
Year FE	Y	Y	N	N
Industry-Year FE	N	N	Y	N
Region-Year FE	N	N	N	Y
N	416,110	351,952	351,952	351,952

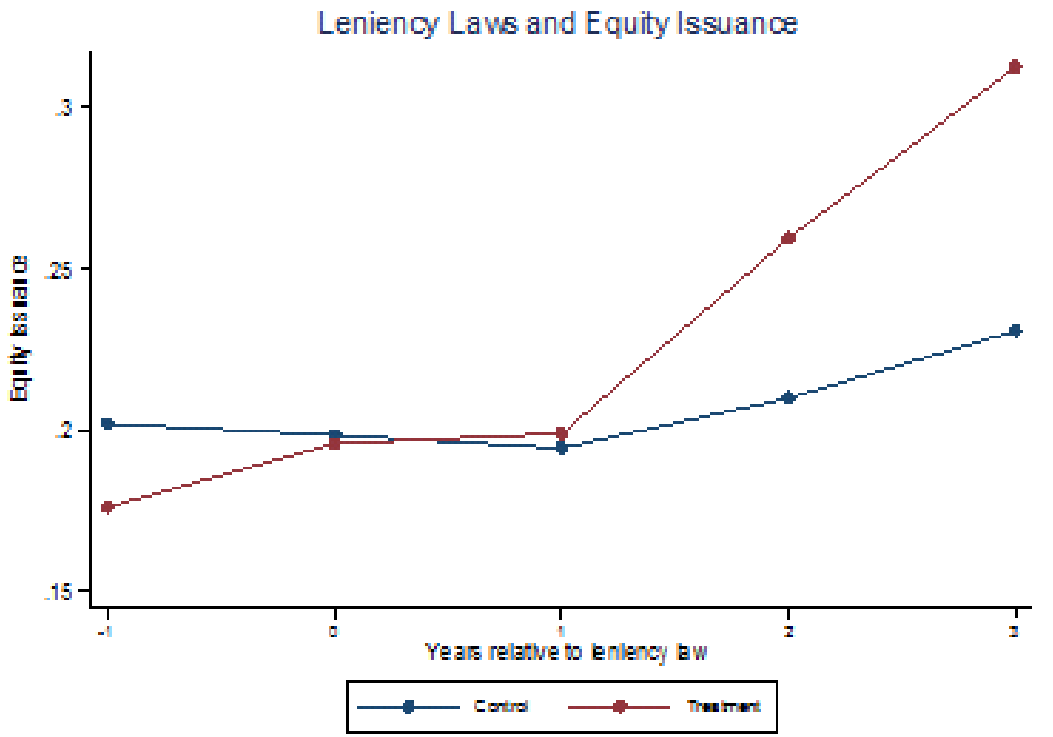
- Economic effects smaller than those for equity issuances

Debt Equity Ratio

	(1)	(2)	(3)	(4)
Leniency law	-0.030***	-0.046***	-0.027**	-0.039***
	(-2.735)	(-3.669)	(-2.307)	(-3.268)
Controls	N	Y	Y	Y
Firm FE	Y	Y	Y	Y
Year FE	Y	Y	N	N
Industry-Year FE	N	N	Y	N
Region-Year FE	N	N	N	Y
N	427,199	325,959	351,753	351,753

- The passage of the law reduces debt-equity ratio by 0.046 from an average of 0.77, a 5.8% effect

Trends


Leniency Laws and Equity Issuance
Equity Issuance
.15
.2
.25
.3
-1
0
1
2
3
Years relative to leniency law
Control
Treatment

Dynamics

	Asset Growth	Financing Deficit	Equity Issuance	Debt Issuance	Debt-Equity Ratio
Leniency law (1-2)	0.036**	0.035**	0.032**	0.003	-0.042***
	(2.255)	(2.253)	(2.209)	(1.331)	(-3.435)
Leniency law (3-4)	0.058**	0.061***	0.055***	0.004*	-0.039**
	(2.512)	(2.857)	(2.686)	(1.686)	(-2.419)
Leniency law (5-6)	-0.021	-0.019	-0.023	0.011***	-0.036*
	(-1.001)	(-0.995)	(-1.331)	(3.507)	(-1.827)
Leniency law (7+)	-0.161***	-0.144***	-0.128***	0.003	-0.015
	(-6.58)	(-5.947)	(-5.85)	(0.829)	(-0.603)
Controls	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y
N	352,968	348,988	349,815	351,952	325,959

Robustness

1. Non-US sample ...
2. EU as one country ...
3. Control for macroeconomic conditions, import penetration at the country or country/industry level, financial development, changes in other laws, including other ways of strengthening antitrust enforcement, HHI in firm's SIC3 industry
4. Probits on the large issuances of debt and equity
5. Clustering at firm, country/industry, or country level
6. Replacing leniency law with actual convictions ...

Targeted Treatment

- Not all firms are cartelized
- All of the effects above are stronger for:
  - Firms with higher predicted probability to be in the cartel
    - Prediction model based on the data before the leniency law passage, estimated on time-varying firm and country characteristics as well country and industry fixed effects
  - More profitable firms within country/industry
  - Top 10% largest firms within country/industry

Alternative Identification

- Passage of laws in other countries that are likely to be firm's export markets
  - The passage of more leniency laws makes the coordination between the antitrust authorities easier
  - Firms that could consider colluding in multiple foreign markets might find it more difficult to form international cartels with industry peers
  - More exogenous to the firm's economic conditions

Industry Exports

- Proxy firm's exposure to the passage of foreign leniency laws by where firm's industry sends its exports
  - CEPII TradeProd Database
- Estimate a weighted average of foreign laws:
  - $\textit{Export Market Leniency Law}_{tlkj} = \sum_{l} w_{ljk} L_{lt}$, where w_{kj} is equal to the share of 3-digit SIC industry j's exports from country k to any other country l
  - e.g. if 20% of German car manufacturers' exports go to Australia, the passage of a leniency law in Australia increases $\textit{Export Market Leniency Law}_{tlkj}$ for all German car manufacturers by 0.2
- Variation at a country/industry/year level

Industry Exports

	Asset Growth	Equity Issuance	Debt Issuance	Debt-Equity Ratio
Export market leniency law	0.142***	0.110***	0.006*	-0.089***
	(5.139)	(4.992)	(1.955)	(-3.367)
Controls	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
N	154,584	153,829	154,250	143,647

Subsidiaries

- Collect subsidiary location data for a subset of firms
  - Lexis Nexis Corporate Affiliations
- Estimate a weighted average of foreign laws, based on subsidiary location:
  - $Subsidiary\ Leniency\ Law_{tli} = \sum_{l} w_{li} L_{lt}$, where w_{kit} is equal to the share of firm i's operations in foreign country l
- Variation at a firm/year level

Subsidiaries

	Asset Growth	Equity Issuance	Debt Issuance	Debt-Equity Ratio
Subsidiary leniency law	0.139***	0.112***	0.012**	-0.084***
	(5.521)	(4.837)	(2.484)	(-2.584)
Controls	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
N	73,055	72,606	72,794	69,324

Takeaways

- These findings contrast those on import penetration, where:
  - Drop in the leverage comes from the drop in future profitability
  - Weaker firms, more likely to be exposed to default, adjust by reducing debt issuances
- Our results are stronger for larger firms (most likely affected by antitrust policies) and the adjustment is mainly from an increase in equity financing
  - Typically equity issuance is associated with smaller firms
- The shift in product market equilibrium and the way competition increases are important if drawing any conclusions on how leverage gets affected by competition

Appendix

Non-US Sample

	Asset Growth	Financing Deficit	Equity Issuance	Debt Issuance	Debt-Equity Ratio
Leniency law	0.027	0.042**	0.037***	0.003	-0.024*
	(1.533)	(2.566)	(2.625)	(1.416)	(-1.941)
Controls	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y
N	229,190	228,423	228,451	228,733	219,001

Back

EU as One Country

	Asset Growth	Financing Deficit	Equity Issuance	Debt Issuance	Debt-Equity Ratio
Leniency law	0.063***	0.049**	0.043**	0.004	-0.032**
	(2.92)	(2.433)	(2.172)	(1.616)	(-2.459)
Controls	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y
N	352,968	348,988	349,815	351,952	325,959

Back

Convictions

	Asset Growth	Financing Deficit	Equity Issuance	Debt Issuance	Debt-Equity Ratio
Conviction	0.034**	0.039***	0.043***	-0.005	-0.024
	(2.097)	(2.981)	(3.888)	(-1.451)	(-1.044)
Controls	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y
N	352,968	348,988	349,815	351,952	315,473

Back

Cash

	(1)	(2)	(4)	(5)
Leniency law	0.001	-0.002	-0.003**	-0.002
	(0.464)	(-0.997)	(-2.245)	(-1.052)
Controls	N	Y	Y	Y
Firm FE	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
Industry-Year FE	N	N	Y	N
Region-Year FE	N	N	N	Y
N	454,993	347,228	347,228	347,228