



Capital Structure & Taxes: What Happens When You (Also) Subsidize Equity?

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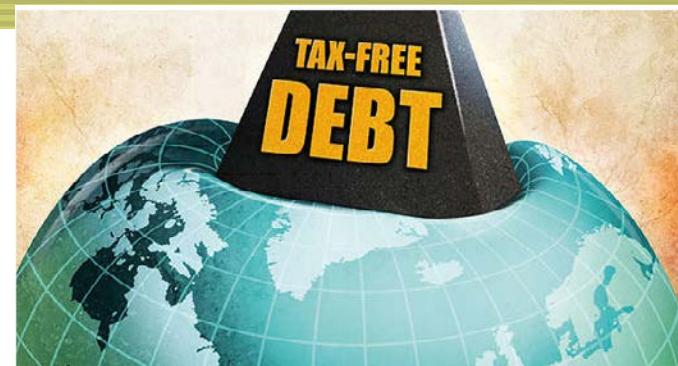
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Big Picture

- **Main objective:** Examine the effect of **changing tax provisions** on **capital structure** policies
 - **Classic** and **central question** in corporate finance
 - How **large** are the responses? What are the **frictions**?
 - Surprisingly **challenging** to identify empirically

Media



The
Economist

Tax-free debt

The great distortion

Subsidies that make borrowing irresistible need to be phased out

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In the corporate sector, the Miller-Modigliani theory implied the markets should be indifferent as to whether companies should finance themselves with equity or debt. But interest payments on debt are tax-deductible, giving debt finance an advantage. Furthermore, companies with cash on their balance sheets were encouraged by activist shareholders to return money to investors. Steadily, the corporate sector (and in particular the banks) became more leveraged. However if a company has a lot of its debt on its balance-sheet, it is highly sensitive to a small adverse change in market conditions since these can wipe out the value of its equity and cause it to go bust. A more levered economy will be more volatile.

Debt Bias and Capital Structure

- The tax code **encourages** corporations to use **debt**:
 - U.S. Treasury effective marginal tax rate on equipment investment is 37% (-60%) if equity (debt) financed (President's Framework for Business Tax Reform, 2012)
- Standard **analysis**:
 - **Modigliani and Miller'1958**: Given that **debt is senior** (low risk vs. equity), firms should not compare the expected return of debt vs. expected return of equity:
 - Focus on **net cash-flows generation** not on funding structures
 - **Tradeoff theory**: with corporate taxes, **tradeoff** tax savings and the expected costs of financial distress (including personal taxes)
 - **Prediction**: capital structure should **respond to changing** corporate **tax incentives**

Do Corporate Taxes Really Matter?

SKEPTICAL VIEW

1. **Time-series.** Leverage ratios **change little with tax incentives.** Example: 1986 Tax Reform Act:

- Large corporate tax rate declines
- Unobservable effects on the aggregate leverage or firm debt ratios

- **Pre-Tax (19thC) Regime.** Firms **used substantial leverage** even in the absence of tax incentives
- Non-tax drivers are at work

These concerns likely limit the **importance** of tax incentives for capital structure

Empirical Challenges

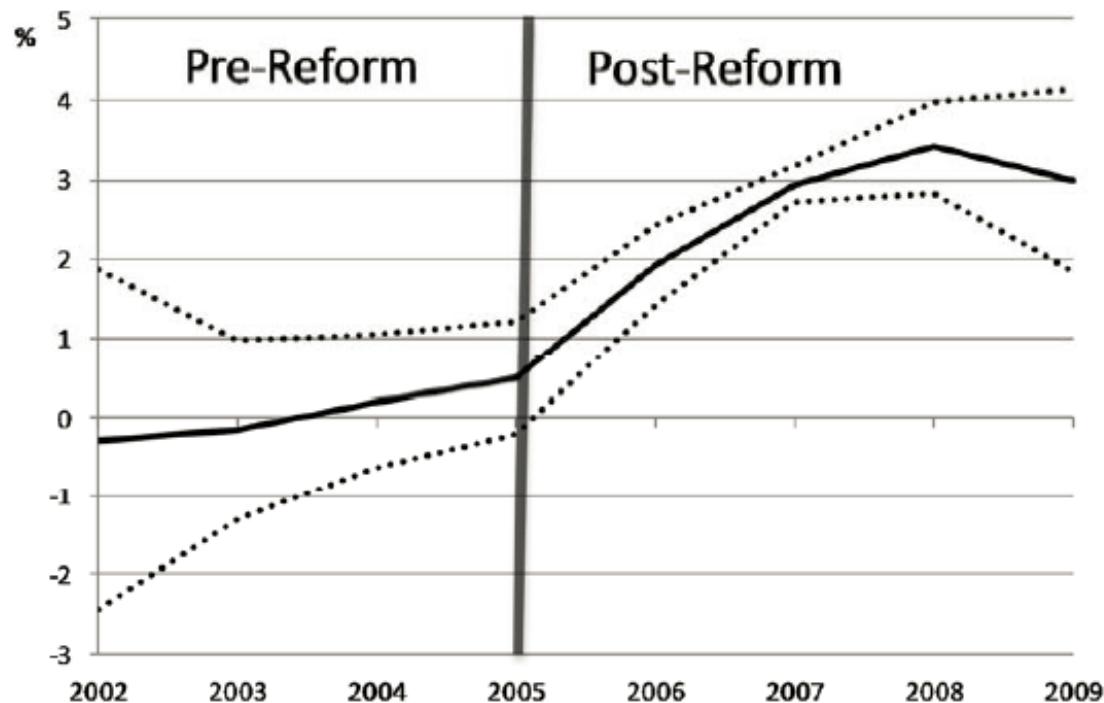
- **Existing evidence.** Relies mostly on **cross-sectional variation** in tax “status”
 - **Omitted variables:** CS variation comes from non-statutory differences in tax rates.
 - **Identification.** Generic identification challenge.
- **Time series:** tax reforms are **difficult to identify**
 - **Macro shocks:** Tax reforms are correlated with changing macroeconomic conditions
 - **Small tax changes.** Most tax reforms are tiny (small tax incentives)
 - **Multiple margins.** Large tax reforms typically affect different incentives at the same time
- **Sum:** difficult to find a clear **empirical counterfactual!**

This Paper

- Introduction of the **Notional Interest Deduction (NID)** in Belgium
 - **Main feature:** **deduction to the cost of equity** similar to the existing interest deduction on debt
 - Objective: level the financing playing field
 - $NID = \text{Equity (book)} * \text{NID rate (10-year government bond)}$ (Tax savings = tax rate * NID)
 - Plausibly **exogenous variation** to the cost of **using equity**
 - We investigate **four related questions:**
 1. Does **capital structure change** with the NID? (time series)
 2. Are these effects likely to be **tax driven?** (identification)
 3. **Which firms** react to the NID? (tradeoff analysis)
 4. What **financing policies** change? (margins)

The paper in one picture

Difference-in-differences test. Equity share (equity/assets) between Belgium firms relative to others in neighboring countries (Figure 3)



Main:

1. No **significant differences** prior to NID (mean equity share = 32%)
2. Significant **equity effects** (bold) after, (3 percentage points)

Main findings

1. **NID effects.** Does **capital structure change around 2006?**
 - **Yes!** Aggregate, median leverage ratios, equity levels.
2. **Tax driven.** Are these effects **tax driven?**
 - **Yes!** Effects are only shown in treated (Belgian) firms
3. **Cross-section.** Which **firms** react to the NID?
 - **Large** and **new firms** irrespective of their ownership structure
4. **Policies.** What **financing policies** change?
 - Total **equity** value increases
 - Equity **issuance** increases

Outline

- What triggered the reform?
- Data
- Empirical strategy
- Results
- Conclusions

Reform (Trigger): Coordination Centers

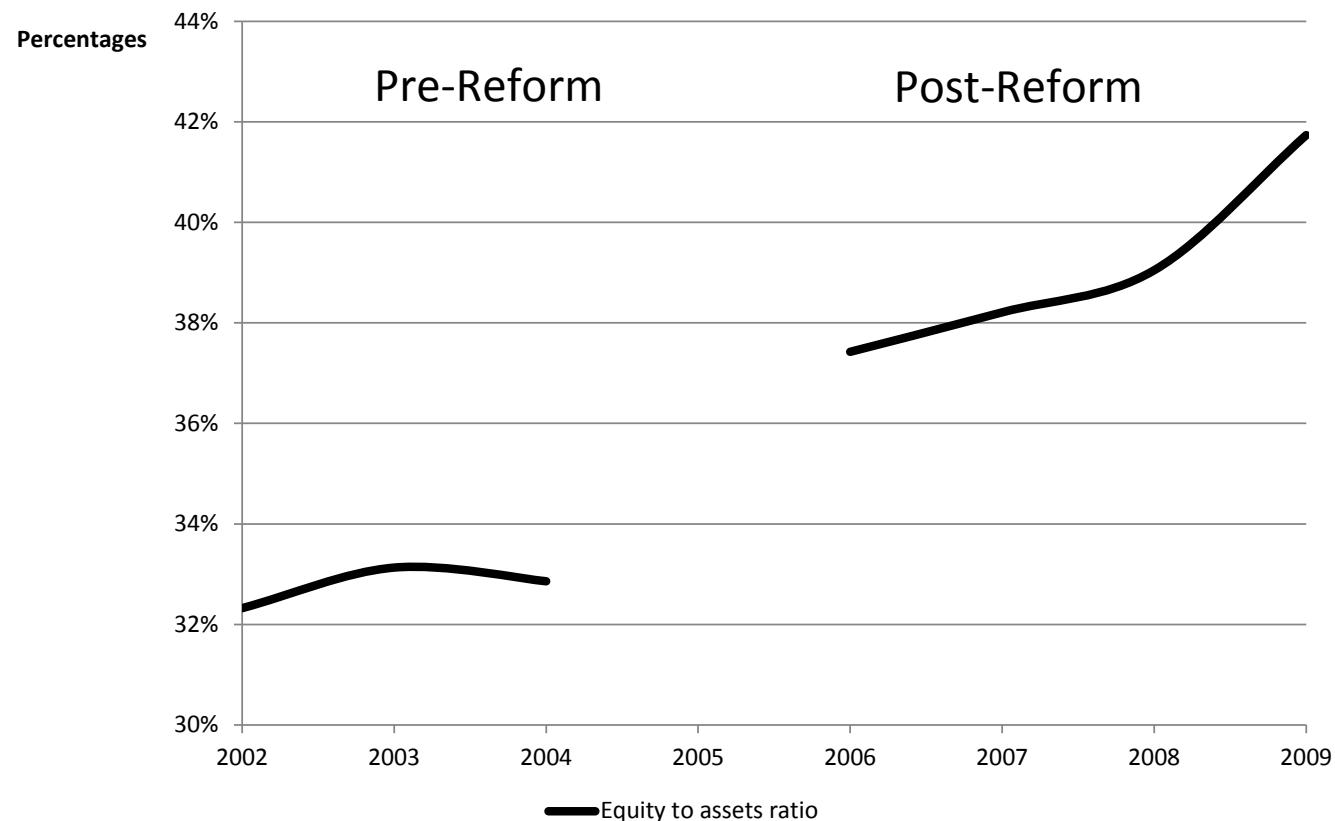
- **1982:** Belgium introduced a favorable “**coordination centers**” (CCs) tax regime for multinationals
- **2003:** EU Commission rules **CCs contrary to EU law**
- **2004:** Concerns that treasury centers might leave
 - The Belgian **business lobby** (FEB) **proposes the NID**
 - **Motivation:** eliminate financing distortions!
- **2005:** NID approved
- **2006:** NID effective

Data and sample selection

- **Data:** Financial statement information
 - **Source:** National Bank of Belgium (universe)
 - **Amadeus:** France, Germany, Luxembourg and the Netherlands
 - **Variables:** equity, cash, total liabilities and assets consistently reported across countries: equity/assets, net leverage ratios
- **Selection:**
 - **Screens:** Corporate, non-financial, non-utility firms
 - Assets > 1m Euro

Q1: Does capital structure change?

Belgium only (Figure 2)



Q2. Empirical Strategy

1. **Exploit the NID.** Plausibly exogenous variation in the cost of relying on equity financing
Time-series variation for Belgian firms

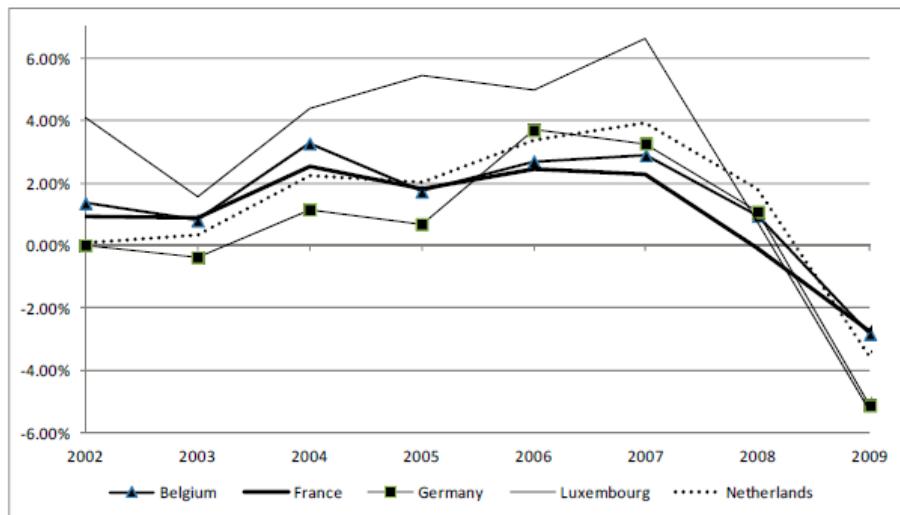
2. **Is it tax-driven?** DiD tests

Counter-factuals:

- **Test 1: Large vs. small firms**
 - Given pre-reform subsidies, NID incentive to increase equity was weaker for smaller firms
 - Concern: small and large firms may differ in their time-series trends
- **Test 2: Similar firms in neighboring countries as controls**
 - Only Belgium introduced the NID
 - Similar firms with potentially different country trends

High correlation in economic activity: treated and control countries (Figures 1A and 1B)

GDP growth



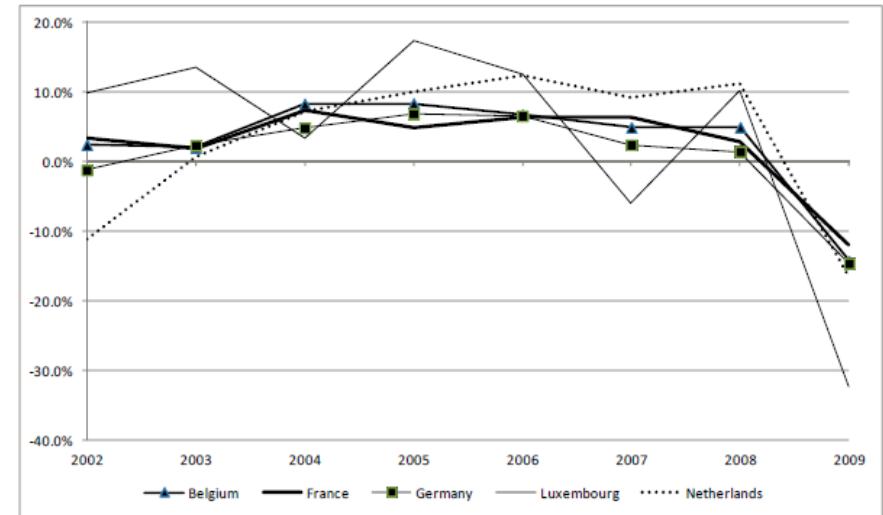
Source: Eurostat

Correlations:

Belgian GDP growth: France (0.94); Germany (0.9); Lux (0.94); Netherlands (0.91)

Belgian sales growth: France (0.98); Germany (0.98); Lux (0.85); Netherlands (0.83)

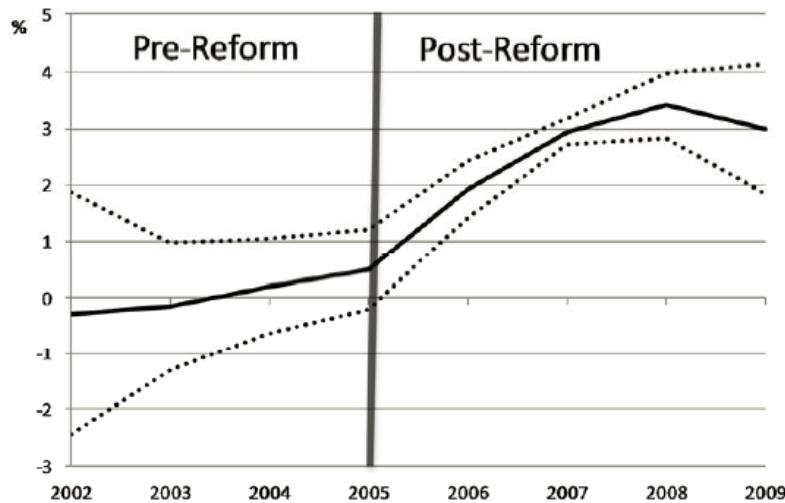
Revenue growth



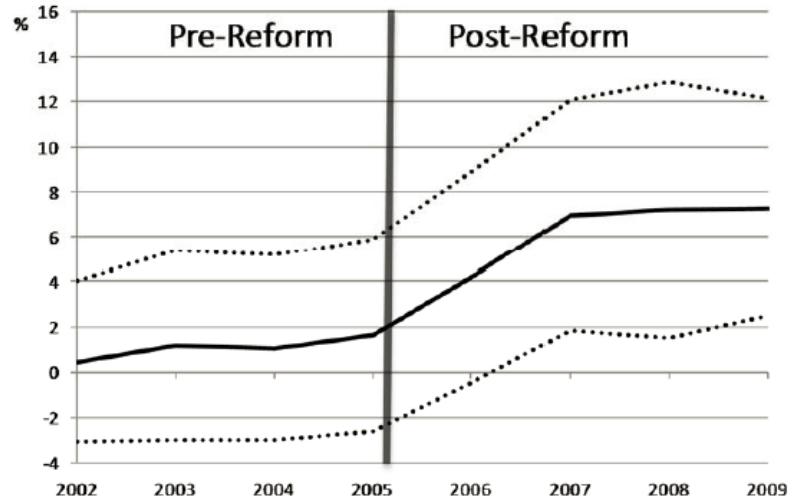
Source: Author's calculations

Firm and industry DD

Firm Level (Figure 3A/Table 3)



Industry Level (Figure 3B/Table 4)



Three-year Impact on Capital Structure

Equity-to-assets ratio (T5)

	2.940 *** (0.301)	2.940 *** (0.596)	2.976 *** (0.238)	2.597 *** (0.175)	2.918 *** (0.371)	2.578 *** (0.169)	2.478 *** (0.259)
Year dummies	Yes						
Country controls	Yes						
Industry-year dummies	No	No	Yes	Yes	Yes	Yes	Yes
Subsample	All	All	All	All	All	All	2002-2008

Net leverage-to-assets ratio (T6)

	-3.894 *** (0.538)	-3.656 *** (0.168)	-3.538 *** (0.288)
Year dummies	Yes	Yes	Yes
Country controls	Yes	Yes	Yes
Industry-year dummies	Yes	Yes	Yes
Sub-sample	All	All	2002-2008

Potential Challenges (Robustness T7)

- Standard errors might be understated
- Alternative tax controls
- Differential trends for large firms
- Robustness to excluding specific control countries
- Focus on firms that are geographically close or that have similar culture as Belgian firms
- Add more countries (all Europe) as controls
- Add country-specific trends
- Matching: assure firms are comparable based on observables before the NID was introduced

Q3. Which firms react to these tax incentives?

- **Multinationals.** Is it **only** tax arbitrage by MNCs?
NO!
Large standalone firms irrespective of ownership increase **equity ratios!**
 - Alternative definitions
 - Multinationals do take advantage of the NID but their behavior does not explain the results of the paper

	By ownership status		By group affiliation		By share of financial to total revenue		Stand-alone firms with financial income < 5%	
	No subsidiary	Subsidiary	No group	Group	< 5%	< 1%	All	Large only
	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)	(VIII)
<i>Panel A. Equity-to-Assets Ratio</i>								
Belgium * 2008	2.298 *** (0.256)	7.179 *** (0.334)	3.884 *** (0.558)	4.496 *** (0.307)	2.611 *** (0.255)	2.064 *** (0.350)	1.783 *** (0.316)	2.747 *** (0.282)

- **Large firms.** Firms with 100m in assets or more: respond twice as strong as firms with 25 to 100m in assets (T8, C8)

Q4. Do firms rebalance their capital structure?

Yes.

- **Within firm variation** (T9)
 - Using **fixed effects** specifications we obtain nearly identical estimates: **Firms rebalance their capital structure!**
- **New firms** (T9)
 - Equity ratio increase for **new firms** is **economically larger**: at least 30% increase
 - New firms **have to make** a capital structure decision

T9: Incumbent and New firms

Table IX

	Incumbent firms					New firms				
	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)	(VIII)	(IX)	(X)
Belgium * 2006	2.573 *** (0.189)	1.619 *** (0.321)	1.786 *** (0.229)	1.788 *** (0.085)	3.190 *** (0.162)	9.535 *** (3.194)	11.061 *** (0.808)	10.991 *** (1.121)	10.035 *** (1.254)	7.775 * (2.987)
Belgium * 2007	4.070 *** (0.224)	2.705 *** (0.390)	2.873 *** (0.275)	2.814 *** (0.134)	4.667 *** (0.291)	14.757 *** (2.753)	17.924 *** (1.505)	17.543 *** (1.674)	16.642 *** (1.597)	16.027 *** (2.281)
Belgium * 2008	4.897 *** (0.253)	3.177 *** (0.505)	3.135 *** (0.284)	2.945 *** (0.248)	5.949 *** (0.353)	10.203 *** (3.112)	13.818 *** (2.726)	13.414 *** (2.810)	12.243 ** (2.765)	14.671 *** (2.277)
Belgium * 2009	5.990 *** (0.282)	3.057 *** (0.656)	3.085 *** (0.262)	2.779 *** (0.381)	6.292 *** (0.586)	10.281 *** (3.687)	9.149 ** (2.518)	10.013 ** (2.300)	9.741 *** (1.928)	25.914 *** (4.686)
Firm fixed-effect	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No
Year dummies	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Country controls	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Industry-year dummies	No	No	Yes	Yes	Yes	No	No	Yes	Yes	Yes
Subsample	Belgium	All	All	All	All > 25m	Belgium	All	All	All	All > 25m
Standard errors (cluster)	Firm	Country	Country	Country	Country	Firm	Country	Country	Country	Country
Observations	334,271	1,024,227	1,024,227	1,024,227	80,018	5,818	26,220	26,220	26,220	1,679

***, ** and * denote significance at the 1, 5 and 10 percent level, respectively.

T10: Larger equity (and smaller leverage)

Table 10. A

	Equity		Liabilities		Total assets	
	(I)	(II)	(III)	(IV)	(V)	(VI)
Belgium * 2006	0.104 *** (0.0173)	0.102 *** (0.0116)	-0.018 (0.0237)	-0.028 *** (0.0039)	0.041 (0.0216)	0.032 *** (0.0051)
Belgium * 2007	0.132 *** (0.0205)	0.137 *** (0.0176)	-0.046 * (0.0209)	-0.041 *** (0.0046)	0.053 * (0.0203)	0.058 *** (0.0063)
Belgium * 2008	0.173 *** (0.0266)	0.183 *** (0.0297)	-0.062 * (0.0248)	-0.040 ** (0.0094)	0.070 ** (0.0241)	0.090 *** (0.0107)
Belgium * 2009	0.191 *** (0.0202)	0.194 *** (0.0230)	-0.047 ** (0.0136)	-0.029 (0.0167)	0.095 *** (0.0143)	0.107 *** (0.0147)
Firm level controls	No	Yes	No	Yes	No	Yes
Observations	1,366,128	1,366,128	1,467,766	1,467,766	1,467,766	1,467,766

***, ** and * denote significance at the 1, 5 and 10 percent level, respectively.

Increasing Equity

1. Was it only **higher profits**?
 - No
 - Use **alternative equity** taking out accumulated profits
2. Was it only **higher retentions**?
 - No
 - **Outside equity** increased!
- The effect cannot be explained without **new equity issuances**

Increasing Equity

Table X

Panel B. Equity: internal and external sources

	Adjusted equity		Profit-adjusted year over year change in equity (%)		Outside equity (%)
<i>Belgium * 2006</i>	0.152 *** (0.0082)	0.162 *** (0.0207)	0.010 *** (0.0006)	0.011 *** (0.0005)	0.008 *** (0.0008)
<i>Belgium * 2007</i>	0.162 *** (0.0148)	0.165 *** (0.0065)	0.007 *** (0.0005)	0.007 *** (0.0010)	0.004 *** (0.0005)
<i>Belgium * 2008</i>	0.196 *** (0.0080)	0.185 *** (0.0149)	0.011 *** (0.0009)	0.013 *** (0.0013)	0.003 *** (0.0004)
<i>Belgium * 2009</i>	0.214 *** (0.0263)	0.211 *** (0.0224)	0.011 *** (0.0010)	0.013 *** (0.0012)	0.004 *** (0.0004)
Firm level controls	No	Yes	No	Yes	No
Observations	1,285,825	1,285,825	1,268,940	1,268,940	1,268,940

Policy

- Most tax systems exhibit **debt bias**
- The **case for reforming the equity tax discrimination** has arguably increased since the financial crisis
- Potential **solutions:**
 - **Eliminating** the tax deductibility of interest expenses: challenging
 - **Introducing** similar deductions for **equity:**
 - Notional interest deduction: for **highly levered firms**, the tax cost is not high. Why? They already get the tax subsidy!

Summary. Attractiveness of Setting

1. Start tax incentives after the NID reform
2. Reform did not coincide with significant macro shocks
3. Compelling control groups: both domestically and abroad
4. Sample that is representative of an entire country
5. Setting allows us to relax the assumption that within country observations are independent as most event studies

Summary of Results

- **Taxes matter** for capital structure decisions
- Firms that face relatively **lower transaction costs** of **rebalancing** their capital structures, exhibit the largest behavioral responses
- Evidence stresses the potential role of **fiscal policy** in changing the **allocation of risk across the firms' stakeholders**