Corporate tax changes and bank lending

Yota Deli
University College Dublin

Manthos D. Delis
Montpellier Business School

Panagiotis N. Politsidis
Audencia Business School
European Banking Institute

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Introduction

What this paper does

- Identifies the effect of US state corporate income tax changes on the firm cost of credit by considering more than 37,000 syndicated loan deals during 1988-2015

- Compares the differential (asymmetric) effect of corporate tax changes by distinguishing between the direction of the tax change (cuts vs rises)

- Investigates the drivers of this asymmetric effect
  - ➢ concurrent federal corporate tax changes; firm size

- Examines the (demand-side) pricing of loans by considering relevant firm-side explanations
  - ➢ reveals the favourable effect of tax cuts (in the form of lower loan rates) for firms with greater reliance on leverage and own funds and also access to alternative financing sources

US state corporate income taxes I

- Staggered corporate income tax changes as a natural experiment
  - ➢ enable to overcome identification challenges

State corporate tax changes during 1988-2015

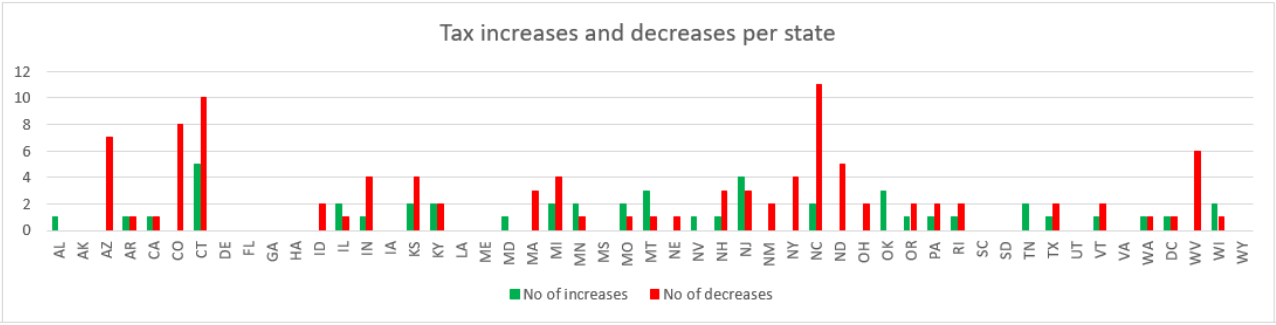
- 47 tax increases in 27 states
  - ➢ associated with 770 firms receiving 1,393 loans from 245 lead banks
- 100 tax decreases in 32 states
  - ➢ associated with 1,311 firms receiving 3,104 loans from 184 lead banks

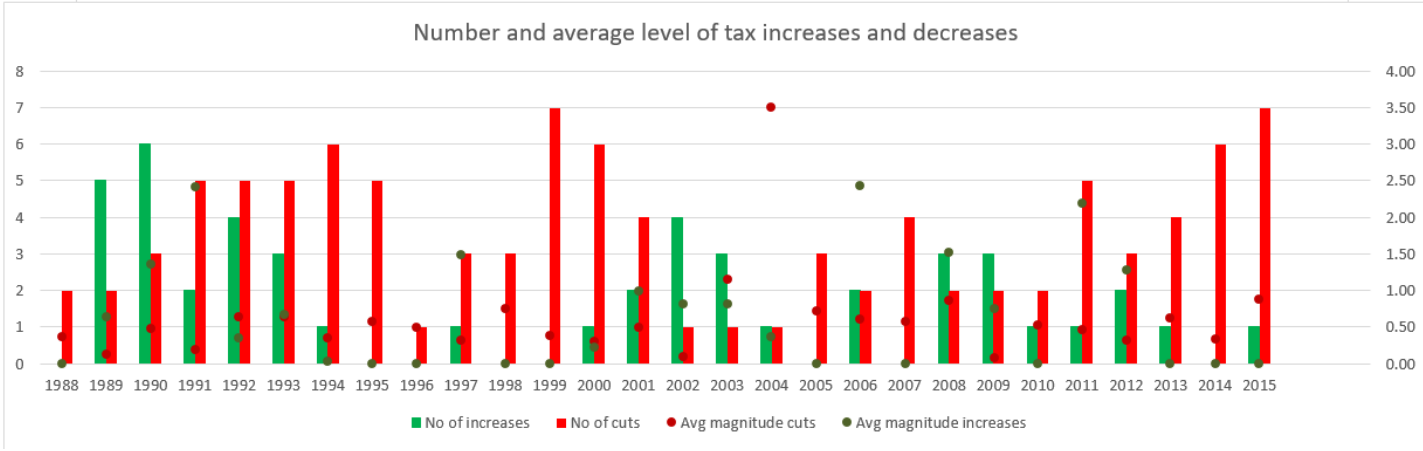
Economic importance

- Integral part of US firms' overall tax burden
  - ➢ more than a fifth of total income taxes paid for the average firm in our sample
- Considerable variation over time
  - ➢ top marginal tax rates in 1990: 5.3% in Colorado vs 13.8% in Connecticut

- Syndicated loan process

US state corporate income taxes II





Mechanisms – Supply-side

Supply-side

- Change in corporate tax affects the banks' profit maximizing behavior
  - decrease in corporate taxation (including taxes on banks) ⟹ increase in bank profitability ⟹ increase in funding at lower cost
  - the *credit supply effect*

Mechanisms – Demand-side

Demand-side

- Traditional Keynesian effect: a decrease in corporate tax rates causes firms to increase investment, potentially expanding their credit demand
  - rightward shift in the loan demand curve
  - no shift in the loan supply curve ⟹ increase in lending rates
  - the *investment demand effect*

- Corporate tax change affects firm profitability, liquidity and capital structure
  - decrease in corporate tax rates ⟹ increases profits and reduces default probability
  - ⟹ fall in the risk premium and loan spreads
  - ⟹ no benefit from tax shield of debt
  - ⟹ use of retained earnings; other financing sources
  - the *profitability demand effect*

Findings

- A corporate tax cut in the borrower's state decreases loan spreads by approximately 6 basis points; corporate tax rises are immaterial for loan pricing

- Economic significance: 2.7% lower AISD (all-in spread drawn) compared to the average loan in our sample

- Interest savings: USD 0.73 million for loans of average size and duration; USD 1.26 million for the firm's total borrowing operations
  - real benefit to borrowing firms in states implementing tax cuts relative to firms in states implementing tax rises

- Tax cuts affect loan demand and consequently loan spreads
  - tax sensitivity (and loan demand) is contingent on firm profitability, capital structure policy and reliance on own funds

Related studies I

- Bank- and firm-level corporate income tax changes

1) US state corporate income tax changes and firm leverage

➢ Heider and Ljunqvist (2015 JFE)

- Taxes are first-order determinants of firms' capital structure choices
- Firms increase leverage by around 40 basis points for every percentage-point tax increase
- Asymmetric effect: leverage does not respond to tax cuts

➢ dynamic trade-off models better describe how leverage is chosen

2) Validity of financial constraints measures

➢ Farre-Mensa and Ljungqvist (2016 RFS)

- Exploitation of tax increases (but not cuts) in state corporate income tax rates as plausibly exogenous shocks to the demand for debt
- Exploitation of bank tax changes as shocks to the supply of debt

➢ none of the measures identify firms behaving as if they were in fact constrained

Related studies II

- Statutory (rather than firm-level) tax rates (cross-country comparisons)
  - ➢ firms in countries with higher corporate tax rates use more debt (Rajan and Zingales, 1995 JF)
  - ➢ positive relation between country-level tax rates and country averages of leverage (Booth, Aivazian, Demirguc-Kunt, Maksimovic, 2001 JF)
  - ➢ variation in tax rates across and within 29 OECD countries shows that leverage responds to tax changes, but only in countries with low tax evasion (Faccio and Xu, 2015 JFQA)

- US Tax Reforms
- Tax Reform Act of 1986 (popular exogenous shock)
  - ➢ Gordon and MacKie-Mason (1991 NBER WP); Givoly, Hahn, Ofer, Sarig (1992 RFS); van Binsbergen, Graham, Yang (2010 JF)
- 2003 Bush cuts in personal taxes
  - ➢ Lin and Flannery (2013 JFE)

Data and Methodology

Data

- Loan-level data (loan facilities) from Dealscan

- Data on US state corporate tax changes
  - ➢ also employed in Heider and Ljunqvist (2015 JFE) and Farre-Mensa and Ljungqvist (2016 RFS)

- Coverage period: 1988-2015

- Baseline specification: 37,234 loan facilities
  - ➢ granted from 726 lead banks headquartered in 24 states to 6,352 firms from 51 states

- Matching of loans with bank- and firm-specific accounting information from Compustat
  - ➢ fiscal and macroeconomic data at the state- and federal-level

Methodology

$$Cost\ of\ credit_{lbft} = a_0 + a_1 Tax\ increase_{st} + a_2 Tax\ decrease_{st} +$$

$$+ a_3 Controls_{lbft} + u_{lbft} \qquad (1)$$

- ***Cost of credit: all-in spread drawn (AISD)***
- ***Tax increase***: binary variable equal to 1 for a corporate tax increase in the borrower's state in the current fiscal year, and zero otherwise
- ***Tax decrease***: binary variable equal to 1 for a corporate tax decrease in the borrower's state in the current fiscal year, and zero otherwise
- ***Controls***: vector of control variables (loan- and firm-level characteristics)
- ***α0***: different type of fixed effects: loan type, loan purpose, firm, borrower's state, bank × year effects

Empirical Results

Baseline results I

	(1)	(2)	(3)	(4)
Tax increase	-0.950	1.204	1.314	2.995
	[-0.288]	[0.299]	[0.319]	[0.846]
Tax decrease	-5.849**	-5.866***	-6.060***	-5.036**
	[-2.317]	[-3.209]	[-3.141]	[-2.520]
Loan amount	-10.251***	-11.235***	-11.163***	-10.538***
	[-10.318]	[-16.440]	[-16.808]	[-16.865]
Maturity	-0.227***	-0.243***	-0.239***	-0.187***
	[-3.442]	[-4.972]	[-4.885]	[-3.534]
Collateral	32.481***	32.671***	31.975***	32.413***
	[11.048]	[15.421]	[14.365]	[18.306]
Number of lenders	-0.122	-0.009	-0.022	-0.059
	[-0.925]	[-0.083]	[-0.223]	[-0.629]
Performance provisions	-22.493***	-24.141***	-23.575***	-23.548***
	[-8.768]	[-11.509]	[-11.921]	[-11.505]
General covenants	3.049***	2.436***	2.574***	2.835***
	[3.111]	[3.184]	[3.382]	[3.426]
Firm size	-12.465***	-14.844***	-15.367***	-14.281***
	[-4.506]	[-7.400]	[-7.583]	[-6.498]
Firm return on assets	-168.552***	-128.873***	-1.297***	-1.298***
	[-10.140]	[-12.716]	[-14.783]	[-11.146]
Firm leverage	64.379***	69.134***	0.694***	0.706***
	[5.619]	[9.176]	[9.473]	[9.196]
Firm Tobin's Q	-26.727***	-31.245***	-31.951***	-32.867***
	[-6.803]	[-8.350]	[-8.014]	[-8.810]
Effective corporate tax rate	13.853	28.506	7.499	
	[0.118]	[0.394]	[0.104]	
Observations	20,362	37,234	37,061	35,178
Adj. R-squared	0.718	0.731	0.732	0.750
Fixed effects	B	BY	IY	BQ

Baseline results II

- Coefficients on variables of interest

- **Tax increase**: −(0.95 - 3.00) basis points (insignificant)

- **Tax decrease**: −(5.0 - 6.1) basis points
  - −5.9 basis points (specification 3)

- Economic significance of **Tax decrease**
  - 2.7% decrease for the average loan in our sample (=5.9 bps ÷ 216.6 bps)
  - interest savings:
    USD 0.19 million per year (=$314 million × 5.9 basis points)
    USD 0.74 million over the average loan's duration (=$0.19 million × 3.9 years)
  - interest savings from firm's total borrowing operations:
    USD 1.26 million (=$0.74 million × 1.7 loans)

Heckman regressions – 2nd stage

	(1)	(2)	(3)	(4)	(5)
	Loan deal	Loan deal	Loan deal	Tax increase	Tax decrease
Tax increase	-1.429	0.658	0.870	0.433	0.090
	[-0.435]	[0.188]	[0.247]	[0.111]	[0.023]
Tax decrease	-7.804***	-7.520***	-7.482***	-5.820***	-5.547***
	[-3.059]	[-2.872]	[-2.748]	[-3.075]	[-2.930]
Lambda	121.545***	126.572***	38.461*	-1.153	7.954
	[3.529]	[6.386]	[1.759]	[-0.126]	[0.963]
Observations	20,149	19,021	19,021	36,824	36,824
Adj. R-squared	0.789	0.793	0.792	0.797	0.797
Full set of controls	Y	Y	Y	Y	Y

Alternative tax change measures

	(1)	(2)	(3)
Tax increase (all types)	0.923		
	[0.232]		
Tax decrease (all types)	-6.615***		
	[-3.502]		
Tax increase (rate)		-0.224	
		[-0.114]	
Tax decrease (rate)		-4.828**	
		[-2.188]	
Large tax increase			-1.247
			[-0.173]
Small tax increase			1.468
			[0.270]
Large tax decrease			-7.697*
			[-1.945]
Small tax decrease			-5.250*
			[-1.842]
Observations	37,234	37,061	37,061
Adj. R-squared	0.731	0.731	0.730
Full set of controls	Y	Y	Y

Robustness checks

	(1)	(2)	(3)	(4)	(5)
Tax increase	-0.716	2.126	1.207	2.187	-0.988
	[-0.196]	[0.582]	[0.300]	[0.593]	[-0.243]
Tax decrease	-5.387**	-6.262**	-5.868***	-7.495***	-6.623**
	[-2.635]	[-2.321]	[-3.202]	[-2.981]	[-2.587]
Tax increase × Institutional term loan	8.325				
	[1.193]				
Tax decrease × Institutional term loan	-1.938				
	[-0.687]				
Shadow rate		-2.160*			
		[-1.777]			
Taylor residuals			-0.221		
			[-0.114]		
Tax increase × Lender's state tax increase				-25.970	
				[-1.667]	
Tax decrease × Lender's state tax decrease				7.225	
				[1.219]	
Tax increase × Relationship lending					7.050
					[1.382]
Tax decrease × Relationship lending					-0.081
					[-0.018]
Observations	37,234	29,339	37,234	31,258	37,243
Adj. R-squared	0.731	0.731	0.731	0.732	0.719
Full set of controls	Y	Y	Y	Y	Y

Identifying the Mechanisms

Heterogeneity in the response to tax hikes

	(1)	(2)	(3)	(4)
Tax increase	-0.465	29.950**	6.909	-18.370
	[-0.090]	[2.161]	[1.077]	[-0.896]
Tax decrease	-5.003**	-15.670	-8.981**	-3.090
	[-2.612]	[-1.186]	[-2.514]	[-0.193]
Tax increase × Federal tax change	26.111***			
	[3.151]			
Tax decrease × Federal tax change	14.958			
	[1.098]			
Tax increase × Firm size		-3.852**		3.607
		[-2.554]		[1.287]
Tax decrease × Firm size		1.339		0.699
		[0.737]		[0.321]
Tax increase × High firm size			-10.883**	
			[-2.020]	
Tax decrease × High firm size			6.455	
			[1.043]	
Tax increase × Firm leverage				1.524**
				[2.327]
Tax decrease × Firm leverage				-0.323
				[-0.932]
Tax increase × Firm size × Firm leverage				-0.234**
				[-2.541]
Tax decrease × Firm size × Firm leverage				0.014
				[0.304]
Observations	29,011	37,234	37,234	37,208
Adj. R-squared	0.745	0.731	0.731	0.733
Full set of controls	Y	Y	Y	Y

Loan supply channel

	(1)	(2)	(3)
Tax increase	-11.443	8.364	2.879
	[-1.446]	[0.235]	[0.597]
Tax decrease	-14.450**	-18.696*	-11.413***
	[-2.105]	[-1.849]	[-2.757]
Tax increase × Bank liquidity	3.654		
	[1.607]		
Tax decrease × Bank liquidity	2.189		
	[1.660]		
Tax increase × Bank capital		-0.375	
		[-0.132]	
Tax decrease × Bank capital		1.126	
		[0.943]	
Tax increase × Lerner index			-7.108
			[-0.380]
Tax decrease × Lerner index			21.939
			[1.394]
Observations	17,788	24,084	37,234
Adj. R-squared	0.756	0.738	0.731
Full set of controls	Y	Y	Y

Loan demand channel

	(1)	(2)	(3)
Tax increase	2.861	-3.810	-1.024
	[0.663]	[-0.510]	[-0.122]
Tax decrease	2.419	0.074	4.149
	[0.529]	[0.022]	[0.681]
Tax increase × Firm leverage	-3.628		
	[-0.257]		
Tax decrease × Firm leverage	-22.848**		
	[-2.227]		
Tax increase × Firm retained earnings		-0.055	
		[-0.182]	
Tax decrease × Firm retained earnings		-0.309**	
		[-2.549]	
Tax increase × Bond issue			-1.311
			[-0.068]
Tax decrease × Bond issue			-19.375**
			[-2.385]
Observations	37,208	14,709	8,192
Adj. R-squared	0.733	0.747	0.757
Full set of controls	Y	Y	Y

Conclusions

- By using US loan-level data from the syndicated loan market we measure how state corporate tax changes affect lending terms and provide implications for their asymmetries and real effects for firms

- A state corporate tax cut decreases loan spreads by approximately 6 basis points for loans granted to firms in that state
  - ➢ asymmetric effect of corporate tax changes on firm borrowing costs (tax cuts are material whereas rises are not)

- Real benefit for firms in states implementing corporate tax cuts
  - ➢ USD 1.26 million for the firm's total borrowing operations

- Findings attributed to demand-side explanations
  - ➢ tax sensitivity is contingent on firm profitability and debt policy
  - ➢ favourable effect of tax cuts (in the form of lower loan rates) for firms with greater reliance on leverage and own funds and also access to alternative financing sources

Σας ευχαριστώ πολύ

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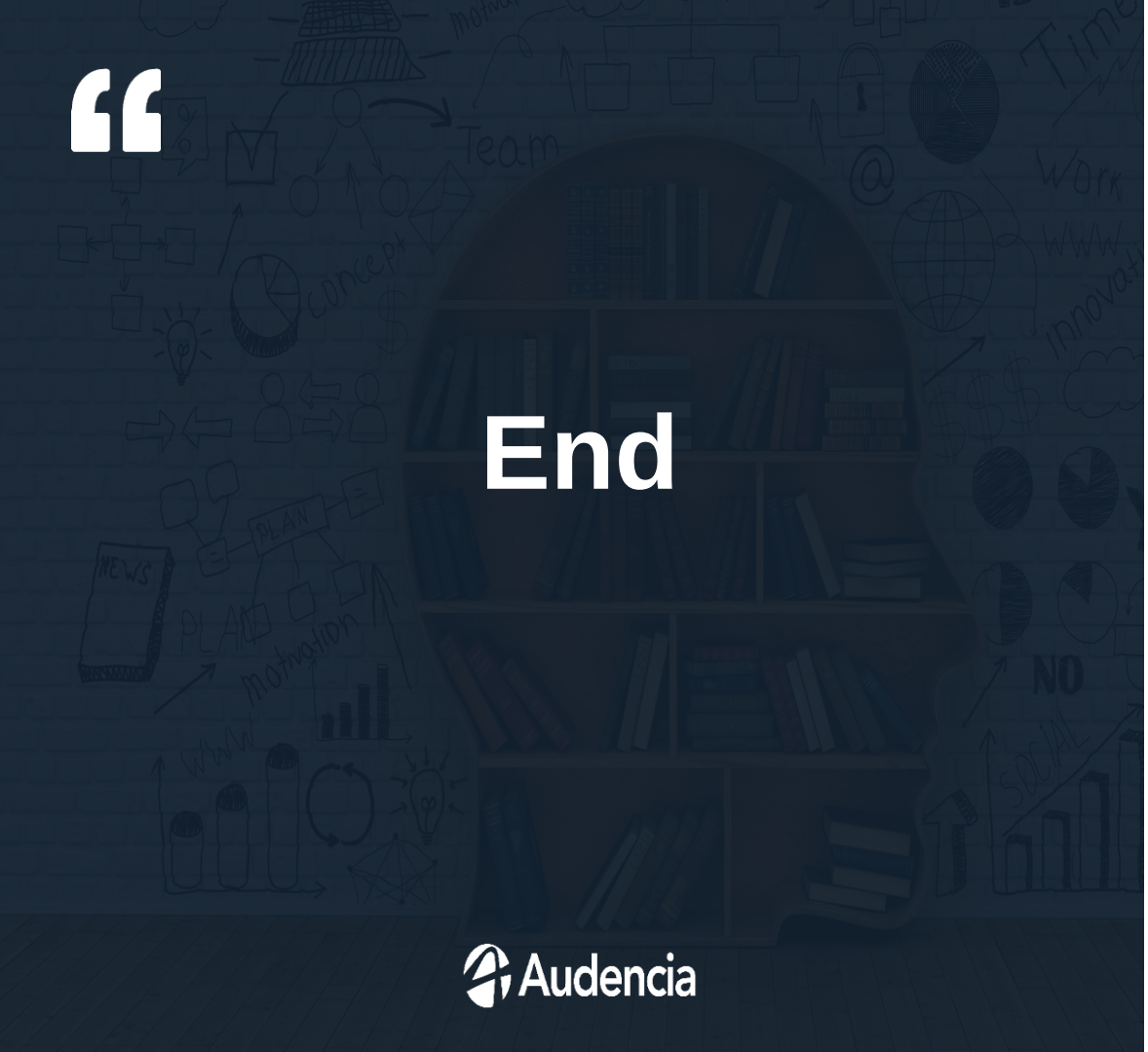
Background Slides

Political conditions

	(1)	(3)	(4)	(5)	(6)	(7)
Tax increase	2.270	0.42	0.766	1.931	5.168	4.487
	[0.669]	[0.104]	[0.168]	[0.417]	[0.868]	[0.808]
Tax decrease	-7.010***	-7.237***	-3.524	-6.130***	-14.048***	-10.064**
	[-3.474]	[-3.783]	[-1.313]	[-2.977]	[-2.709]	[-2.546]
Tax increase × Election year	-2.833					
	[-0.549]					
Tax decrease × Election year	3.628					
	[0.813]					
Tax increase × 1 year to election		4.139				
		[0.615]				
Tax decrease × 1 year to election		5.502				
		[1.360]				
Tax increase × 2 years to election			2.841			
			[0.409]			
Tax decrease × 2 years to election			-10.428*			
			[-1.824]			
Tax increase × 3 years to election				-2.571		
				[-0.488]		
Tax decrease × 3 years to election				1.337		
				[0.271]		
Tax increase × Republican governor					-11.132*	
					[-1.890]	
Tax decrease × Republican governor					11.616**	
					[2.020]	
Tax increase × Republican governor lag						-7.521
						[-1.133]
Tax decrease × Republican governor lag						5.830
						[1.216]
Observations	37,229	37,229	37,229	37,229	36,844	36,785
Adj. R-squared	0.731	0.731	0.731	0.731	0.731	0.731
Full set of controls	Y	Y	Y	Y	Y	Y

Syndicated loan process

- Syndicated loans: **more than 50% of corporate financing in the US**, **90% of largest US firms**, strong growth, very low default rates
- Lead arranger(s) sign(s) preliminary loan agreement (loan amount, covenants, fees, collateral, range for interest rates)
- Leads turn to potential participants with information
- Agreement is signed negotiating the spread and the share of the loan
- Lead(s) conduct monitoring
- Sale of the loan share in the secondary market is possible
- Back to main presentation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