Internet Appendix for
Can Corporate Income Tax Cuts Stimulate Innovation?

Table IA.1: Robustness Checks

This table performs various robustness checks. In row 1, only non-moving firms are included in the sample, which are firms with the same time-varying most mentioned state during the entire sample period. In row 2, firms with non-positive total state taxes paid are excluded. In row 3, non-innovative firms (i.e., firms with no patent during the entire sample period of 1988 to 2006) are excluded. In row 4, firms with no positive R&D expenditure during the entire sample period are excluded. In row 5, firms with most mentioned states in California or Massachusetts are excluded. In row 6, the sample ends in 2003 instead of 2006. In rows 7 to 9, the standard errors are clustered by different groups as specified. In row 10, the raw unadjusted number of citations per patent is used as the dependent variable. In row 11, the dependent innovation variables are adjusted for truncation using the fixed effects methodology, which purges the citations per patent measure from time fixed effects. In row 12, the dependent innovation variables are adjusted for truncation using the fixed effects methodology, which purges the citations per patent measure from both time and technology class fixed effects. The same set of controls from Table 3 is used in all regressions. All regressions are estimated with time and firm fixed effects and the standard errors reported in the parentheses are corrected for clustering at the firm level (unless otherwise indicated). The sample consists of firm-year observations from 1988 to 2006 except in row 6. ***, ** and * denote significance at 1%, 5% and 10% respectively.

	$\ln(1+\text{CIT/PAT})_{t+3}$	$\ln(1+\text{CIT/PAT})_{t+4}$	$\ln(1+\text{CIT/PAT})_{t+3}$	$\ln(1+\text{CIT/PAT})_{t+4}$
	(1)	(2)	(3)	(4)
TaxVar:	TAXDECR	TAXDECR	TAXINCR	TAXINCR
1.Non-moving firms	0.188***	0.200***	-0.129***	-0.125***
	(0.061)	(0.061)	(0.043)	(0.047)
Obs.	24,216	22,127	24,216	22,127
2.Exclude firms with non-positive state taxes	0.166***	0.151***	-0.104***	-0.108***
	(0.044)	(0.045)	(0.034)	(0.036)
Obs.	39,429	37,130	39,429	37,130
3.Exclude firms with no patent	0.145***	0.157***	-0.112**	-0.120**
	(0.055)	(0.055)	(0.048)	(0.048)
Obs.	36,020	34,093	36,020	34,093
4.Exclude firms with no positive R&D	0.156***	0.166***	-0.093**	-0.120***
	(0.050)	(0.050)	(0.042)	(0.043)
Obs.	42,478	39,803	42,478	39,803
5.Exclude firms in CA or MA	0.087**	0.090**	-0.054**	-0.057**
	(0.035)	(0.036)	(0.028)	(0.029)
Obs.	56,885	53,201	56,885	53,201
6.End sample in 2003	0.111***	0.118***	-0.055**	-0.059**
	(0.031)	(0.032)	(0.024)	(0.025)
Obs.	63,341	59,205	63,341	59,205
7.Cluster standard errors by year	0.141***	0.141***	-0.074**	-0.078**
	(0.030)	(0.030)	(0.028)	(0.037)
Obs.	73,065	68,203	73,065	68,203
8.Cluster standard errors by state	0.141**	0.141**	-0.074**	-0.078**
	(0.060)	(0.062)	(0.029)	(0.032)
Obs.	73,065	68,203	73,065	68,203
9.Cluster standard errors by state and year	0.141**	0.141**	-0.074**	-0.078**
	(0.060)	(0.062)	(0.030)	(0.039)
Obs.	73,065	68,203	73,065	68,203
10.Raw citations/patent	0.099***	0.089***	-0.066***	-0.059***
	(0.026)	(0.025)	(0.023)	(0.022)
Obs.	73,065	68,203	73,065	68,203
11.Time-adjusted citations/patent	0.041***	0.045***	-0.018**	-0.020***
	(0.010)	(0.010)	(0.008)	(0.008)
Obs.	73,065	68,203	73,065	68,203
12.Time and tech class-adjusted citations/patent	0.042***	0.045***	-0.018**	-0.019**
	(0.010)	(0.011)	(0.008)	(0.008)
Obs.	73,065	68,203	73,065	68,203

Table IA.2
Predicting Tax Changes

This table predicts tax changes in state s at year t based on economic variables and tax changes in neighboring states. The dependent variable, Tax Decrease Enacted in t, is an indicator variable that equals to 1 if state s enacted a significant tax decrease in year t and 0 otherwise. The dependent variable, Tax Increase Enacted in t, is an indicator variable that equals to 1 if state s enacted a significant tax increase in year t and 0 otherwise. The dependent variable, Tax Change Enacted in t, is an indicator variable that equals to 1 if state s enacted a significant tax change in year t and 0 otherwise. Economic variables include ln(Real GSP) (Log of state level real GSP per capita) in year *t-1*, Unemployment Rate (State level unemployment rate) in year *t-1*, and GSP Growth Rate (Rate of change in state GSP) in years *t-1* and *t*. Tax Decrease Enacted in Neighboring States is an indicator variable equal to 1 if any of the neighboring states of state s enacted a significant tax decrease in year t and 0 otherwise. Tax Increase Enacted in Neighboring States is an indicator variable equal to 1 if any of the neighboring states of state s enacted a significant tax increase in year t and 0 otherwise. All regressions are estimated with time and state fixed effects and the standard errors reported in the parentheses are corrected for the panel in all the models and are clustered at the state level. The sample consists of state-year observations from 1988 to 2006. ***, ** and * denote significance at 1%, 5% and 10% respectively.

	Tax Decrease Enacted in t	Tax Increase Enacted in t	Tax Change Enacted in t
	(1)	(2)	(3)
$\ln(\text{Real GSP})_{t-1}$	-0.020	0.036	0.057
	(0.030)	(0.037)	(0.043)
$\text{Unemployment Rate}_{t-1}$	0.002	-0.003	-0.005
	(0.003)	(0.005)	(0.005)
$\text{GSP Growth Rate}_{t-1}$	-0.003	-0.010	-0.007
	(0.114)	(0.151)	(0.186)
$\text{GSP Growth Rate}_{t}$	0.092	-0.038	-0.130
	(0.087)	(0.096)	(0.130)
$\text{Tax Decrease Enacted in Neighboring States}_{t-1}$	0.021	-0.002	-0.024
	(0.025)	(0.005)	(0.024)
$\text{Tax Increase Enacted in Neighboring States}_{t-1}$	-0.001	-0.002	-0.001
	(0.007)	(0.022)	(0.024)
State FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Obs.	950	950	950
R-squared	0.069	0.077	0.067

Table IA.3
Executives' Incentive Compensation and After-Tax Cashflow

This table estimates the OLS model of ln(AVG_STOCKOPTION) and AFTERTAX_CF on TAXDECR, which is an indicator variable equal to 1 (0 otherwise) if there has been a significant tax decrease in the largest state of business of firm i, or TAXINCR, which is an indicator variable equal to 1 (0 otherwise) if there has been a significant tax increase in the largest state of business of firm i. ln(AVG_STOCKOPTION) is calculated as the natural log of the average options grant value ($option\_awards\_blk\_value$) across all top-level executives reported in Execucomp (starting in 1992) in a given firm-year. AFTERTAX_CF is calculated as the sum of net income before extraordinary items (IB) and depreciation (DP) divided by total assets at the beginning of the year. Variable definitions are in Appendix B. All regressions are estimated with time and firm fixed effects and the standard errors reported in the parentheses are corrected for the panel in all the models and are clustered at the firm level. The sample consists of firm-year observations from (1992) 1988 to 2006 ***, ** and * denote significance at 1%, 5% and 10%, respectively.

	ln(AVG_STOCKOPTION)	ln(AVG_STOCKOPTION)	AFTERTAX_CF	AFTERTAX_CF
	(1)	(2)	(3)	(4)
TAXDECR	0.122**		0.048***	
	(0.061)		(0.015)	
TAXINCR		-0.218***		-0.016*
		(0.072)		(0.009)
ln(SALES)	0.430***	0.429***	0.089***	0.089***
	(0.033)	(0.033)	(0.006)	(0.006)
RD/SALES	0.276***	0.276***	-0.078***	-0.078***
	(0.037)	(0.037)	(0.011)	(0.011)
LEVERAGE	-0.547***	-0.541***	-0.116***	-0.115***
	(0.093)	(0.093)	(0.019)	(0.019)
PROFITABILITY	0.516***	0.521***	0.573***	0.573***
	(0.146)	(0.146)	(0.028)	(0.028)
TANGIBILITY	-0.684***	-0.687***	0.201***	0.201***
	(0.188)	(0.188)	(0.039)	(0.039)
ln(K/L)	0.081***	0.081***	0.009**	0.009**
	(0.029)	(0.029)	(0.004)	(0.004)
RATING	-0.030	-0.030	-0.050***	-0.050***
	(0.044)	(0.044)	(0.007)	(0.007)
ln(AGE)	-0.002	-0.002	-0.004*	-0.004*
	(0.009)	(0.009)	(0.002)	(0.002)
HERFINDAHL	-0.161	-0.126	-0.170**	-0.170**
	(0.426)	(0.427)	(0.069)	(0.069)
HERFINDAHL^2	0.375	0.343	0.156**	0.156**
	(0.399)	(0.400)	(0.070)	(0.070)
ln(REALGSP)	0.810*	0.862*	0.130*	0.113
	(0.437)	(0.441)	(0.076)	(0.077)
UNEMPRATE	0.031	0.026	-0.008***	-0.009***
	(0.023)	(0.022)	(0.003)	(0.003)
GSPGROW	0.220	0.141	-0.359***	-0.345***
	(0.538)	(0.538)	(0.113)	(0.113)
GSPGROWLAG	2.377***	2.210***	-0.227**	-0.216*
	(0.555)	(0.560)	(0.110)	(0.111)
TAXES/GSP	1.661	4.038	-0.956	-1.254
	(4.883)	(5.097)	(0.819)	(0.816)
ln(POP)	0.017	0.186	-0.227***	-0.266***
	(0.561)	(0.574)	(0.075)	(0.075)
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Obs.	15,794	15,794	82,330	82,330
R-squared	0.641	0.641	0.559	0.559

Table IA.4
Additional Analysis of Tax Changes, Financial Constraints, and Innovation

This table conducts additional tests examining the role of financial constraints. In Panel A, we use alternative measures of financial constraints, where KZFINCON is an indicator variable equal to 1 (0 otherwise) if the firm is in the highest tercile of the Kaplan and Zingales (1997) financial constraint index and HPFINCON is an indicator variable equal to 1 (0 otherwise) if the firm is in the highest tercile of the Hadlock and Pierce (2010) financial constraint index. In Panel B, we interact TAXDECR or TAXINCR with EXCESS_CASH, which is calculated as the actual cash level minus the predicted cash level from the first stage regression. In Panel C, we examine the role of financial constraints in the context of external financing. EXT_FINANCING is calculated as the sum of net debt (*DLCCH+DLTIS-DLTR*) and net equity (*SSTK-PRSTKC*), divided by total assets. We interact TAXDECR or TAXINCR with WWFINCON, which is an indicator variable equal to 1 if the firm is in the highest tercile of the yearly Whited and Wu (2006) financial constraint index, and 0 otherwise. The same set of controls from Table 3 is used in all regressions, which includes ln(SALES), RD/SALES, LEVERAGE, PROFITABILITY, TANGIBILITY, ln(K/L), RATING, ln(AGE), HERFINDAHL, HERFINDAHL^2, ln(REALGSP), UNEMPRATE, GSPGROW, GSPGROWLAG, TAXES/GSP, and ln(POP). All regressions are estimated with time and firm fixed effects and the standard errors reported in the parentheses are corrected for the panel in all the models and are clustered at the firm level. The sample consists of firm-year observations from 1988 to 2006. ***, ** and * denote significance at 1%, 5% and 10% respectively.

Panel A: Using Alternative Measures of Financial Constraints

	ln(1+CIT/PAT)$_{t+3}$	ln(1+CIT/PAT)$_{t+4}$	ln(1+CIT/PAT)$_{t+3}$	ln(1+CIT/PAT)$_{t+4}$
	(1)	(2)	(3)	(4)
Using the Kaplan and Zingales (1997) Measure of Financial Constraints				
TAXDECR	0.110***	0.105***		
	(0.039)	(0.039)		
TAXDECR×KZFINCON	0.095***	0.100***		
	(0.035)	(0.034)		
TAXINCR			-0.071**	-0.058*
			(0.033)	(0.035)
TAXINCR×KZFINCON			-0.038	-0.066*
			(0.033)	(0.035)
KZFINCON	-0.039***	-0.037***	-0.029***	-0.025**
	(0.011)	(0.012)	(0.011)	(0.012)
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Obs.	61,973	57,960	61,973	57,960
R-squared	0.577	0.572	0.577	0.572
Using the Hadlock and Pierce (2010) Measure of Financial Constraint				
TAXDECR	0.105***	0.107***		
	(0.039)	(0.040)		
TAXDECR×HPFINCON	0.145***	0.141***		
	(0.048)	(0.050)		
TAXINCR			-0.051	-0.043
			(0.032)	(0.032)
TAXINCR×HPFINCON			-0.077*	-0.119***
			(0.041)	(0.042)
HPFINCON	-0.039**	-0.047**	-0.024	-0.029
	(0.019)	(0.019)	(0.019)	(0.019)
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Obs.	73,065	68,203	73,065	68,203
R-squared	0.567	0.560	0.567	0.560

Panel B: Tax Changes, Excess Cash and Innovation

	$\ln(1+\text{CIT/PAT})_{t+3}$	$\ln(1+\text{CIT/PAT})_{t+4}$	$\ln(1+\text{CIT/PAT})_{t+3}$	$\ln(1+\text{CIT/PAT})_{t+4}$
	(1)	(2)	(3)	(4)
TAXDECR	0.110***	0.105***		
	(0.040)	(0.040)		
TAXDECR×EXCESS_CASH	-0.044***	-0.033**		
	(0.015)	(0.016)		
TAXINCR			-0.056*	-0.058*
			(0.032)	(0.033)
TAXINCR×EXCESS_CASH			0.038***	0.040***
			(0.013)	(0.014)
EXCESS_CASH	-0.022***	-0.026***	-0.016***	-0.020***
	(0.005)	(0.005)	(0.005)	(0.005)
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Obs.	52,782	49,527	52,782	49,527
R-squared	0.585	0.579	0.585	0.579

Panel C: External Financing

	$\text{EXT\_FINANCING}_{t+1}$	$\text{EXT\_FINANCING}_{t+2}$	$\text{EXT\_FINANCING}_{t+1}$	$\text{EXT\_FINANCING}_{t+2}$
	(1)	(2)	(3)	(4)
TAXDECR	-0.001	0.000		
	(0.005)	(0.004)		
TAXDECR×WWFINCON	0.020**	0.022**		
	(0.008)	(0.009)		
TAXINCR			-0.004	0.001
			(0.004)	(0.004)
TAXINCR×WWFINCON			0.007	-0.008
			(0.006)	(0.008)
WWFINCON	-0.004*	-0.002	-0.003	0.000
	(0.002)	(0.003)	(0.002)	(0.003)
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Obs.	65,275	61,681	65,275	61,681
R-squared	0.344	0.312	0.344	0.312

Table IA.5
Robustness of Tax Changes, Tax Avoidance, and Innovation

This table examines the role of tax avoidance excluding firms that have negative earnings (*PI-SPI*) in all three years (t, t-1, and t-2). Specifically we estimate the OLS model of ln(1+CIT/PAT) on TAXDECR, which is an indicator variable equal to 1 (0 otherwise) if there has been a significant tax decrease in the largest state of business of firm *i*, or TAXINCR, which is an indicator variable equal to 1 (0 otherwise) if there has been a significant tax increase in the largest state of business of firm *i*, and its interaction with TAXAVOID, which is an indicator variable for firms in the lowest tercile of industry and size adjusted cash effective tax rate. The same set of controls from Table 3 is used in all regressions, which includes ln(SALES), RD/SALES, LEVERAGE, PROFITABILITY, TANGIBILITY, ln(K/L), RATING, ln(AGE), HERFINDAHL, HERFINDAHL^2, ln(REALGSP), UNEMPRATE, GSPGROW, GSPGROWLAG, TAXES/GSP, and ln(POP). All regressions are estimated with time and firm fixed effects and the standard errors reported in the parentheses are corrected for the panel in all the models and are clustered at the firm level. The sample consists of firm-year observations from 1988 to 2006. ***, ** and * denote significance at 1%, 5% and 10% respectively.

	ln(1+CIT/PAT)$_{t+3}$	ln(1+CIT/PAT)$_{t+4}$	ln(1+CIT/PAT)$_{t+3}$	ln(1+CIT/PAT)$_{t+4}$
	(1)	(2)	(3)	(4)
TAXDECR	0.142***	0.122**		
	(0.049)	(0.048)		
TAXDECR×TAXAVOID	0.152***	0.182***		
	(0.045)	(0.041)		
TAXINCR			-0.082*	-0.074
			(0.048)	(0.050)
TAXINCR×TAXAVOID			-0.060	-0.130***
			(0.050)	(0.049)
TAXAVOID	-0.051***	-0.046***	-0.034**	-0.020
	(0.015)	(0.015)	(0.015)	(0.015)
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Obs.	37,803	35,374	37,803	35,374
R-squared	0.595	0.584	0.595	0.584

Table IA.6
Controlling for Merger and Acquisition Activities

This table reports the results relating the number of citations per patent to tax changes. Specifically we estimate the OLS model of ln(1+CIT/PAT) on TAXDECR, which is an indicator variable equal to 1, if there has been a significant tax decrease in the largest state of business of firm i, and 0 otherwise, or TAXINCR, which is an indicator variable equal to 1, if there has been a significant tax increase in the largest state of business of firm i, and 0 otherwise. Panel A controls for the number of acquisitions and the value of these acquisitions divided by total assets in year 3 or 4 depending on when innovation is measured. Panel B includes only firm-year observations that do not have any mergers or acquisitions. The same set of controls from Table 3 is used in all regressions, which includes ln(SALES), RD/SALES, LEVERAGE, PROFITABILITY, TANGIBILITY, ln(K/L), RATING, ln(AGE), HERFINDAHL, HERFINDAHL^2, ln(REALGSP), UNEMPRATE, GSPGROW, GSPGROWLAG, TAXES/GSP, and ln(POP). All regressions are estimated with time and firm fixed effects and the standard errors reported in the parentheses are corrected for the panel in all the models and are clustered at the firm level. The sample consists of firm-year observations from 1988 to 2006. ***, ** and * denote significance at 1%, 5% and 10% respectively.

Panel A: Controlling for Merger and Acquisition Activities

	$\ln(1+\text{CIT/PAT})_{t+3}$	$\ln(1+\text{CIT/PAT})_{t+4}$	$\ln(1+\text{CIT/PAT})_{t+3}$	$\ln(1+\text{CIT/PAT})_{t+4}$
	(1)	(2)	(3)	(4)
TAXDECR	0.142***	0.142***		
	(0.034)	(0.035)		
TAXINCR			-0.071***	-0.077***
			(0.027)	(0.028)
N. of ACQUISITIONS$_{t+3}$	-0.011***		-0.011***	
	(0.003)		(0.003)	
ACQUISITION VALUE$_{t+3}$	0.002		0.002	
	(0.003)		(0.003)	
N. of ACQUISITIONS$_{t+4}$		-0.010***		-0.010***
		(0.004)		(0.004)
ACQUISITION VALUE$_{t+4}$		0.003		0.003
		(0.003)		(0.003)
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Obs.	72,670	72,670	72,670	72,670
R-squared	0.568	0.561	0.567	0.561

Panel B: Only Observations with No Mergers or Acquisitions

	$\ln(1+\text{CIT/PAT})_{t+3}$	$\ln(1+\text{CIT/PAT})_{t+4}$	$\ln(1+\text{CIT/PAT})_{t+3}$	$\ln(1+\text{CIT/PAT})_{t+4}$
	(1)	(2)	(3)	(4)
TAXDECR	0.108***	0.096***		
	(0.034)	(0.035)		
TAXINCR			-0.061**	-0.058**
			(0.027)	(0.028)
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Obs.	55,424	52,077	55,424	52,077
R-squared	0.570	0.559	0.569	0.559

Table IA.7
Tax Decreases and the Number of Patents

This table reports the results relating the number of patents to tax decreases. Specifically we estimate the OLS model of ln(1+PATENT) on TAXDECR, which is an indicator variable equal to 1, if there has been a significant tax decrease in the largest state of business of firm i, and 0 otherwise. Due to space limitations, the construction of the control variables is explained in Appendix B. All regressions are estimated with time and firm fixed effects and the standard errors reported in the parentheses are corrected for the panel in all the models and are clustered at the firm level. The sample consists of firm-year observations from 1988 to 2006. ***, ** and * denote significance at 1%, 5% and 10% respectively.

	$\ln(1+\text{PATENT})_{t+1}$	$\ln(1+\text{PATENT})_{t+2}$	$\ln(1+\text{PATENT})_{t+3}$	$\ln(1+\text{PATENT})_{t+4}$
	(1)	(2)	(3)	(4)
TAXDECR	0.047**	0.079***	0.098***	0.121***
	(0.019)	(0.025)	(0.032)	(0.039)
ln(SALES)	0.052***	0.042***	0.029***	0.019***
	(0.005)	(0.005)	(0.006)	(0.007)
RD/SALES	0.047***	0.040***	0.026***	0.021***
	(0.005)	(0.005)	(0.006)	(0.007)
LEVERAGE	-0.056***	-0.064***	-0.072***	-0.079***
	(0.011)	(0.012)	(0.013)	(0.015)
PROFITABILITY	-0.025***	-0.013	-0.003	0.000
	(0.008)	(0.009)	(0.010)	(0.011)
TANGIBILITY	0.058**	0.145***	0.220***	0.292***
	(0.027)	(0.031)	(0.037)	(0.043)
ln(K/L)	-0.002	-0.010***	-0.014***	-0.014***
	(0.003)	(0.003)	(0.003)	(0.003)
RATING	0.029	0.007	-0.008	-0.018
	(0.018)	(0.020)	(0.023)	(0.026)
ln(AGE)	0.002	0.002	0.001	0.003
	(0.002)	(0.003)	(0.003)	(0.003)
HERFINDAHL	0.530***	0.639***	0.798***	0.865***
	(0.119)	(0.140)	(0.170)	(0.204)
HERFINDAHL^2	-0.491***	-0.607***	-0.766***	-0.816***
	(0.130)	(0.149)	(0.175)	(0.202)
ln(REALGSP)	-0.371**	-0.633***	-0.836***	-1.000***
	(0.158)	(0.175)	(0.198)	(0.225)
UNEMPRATE	0.013**	0.008	0.002	0.003
	(0.005)	(0.006)	(0.006)	(0.007)
GSPGROW	0.968***	0.911***	0.765***	0.759***
	(0.138)	(0.147)	(0.161)	(0.175)
GSPGROWLAG	0.530***	0.462***	0.508***	0.676***
	(0.136)	(0.146)	(0.155)	(0.162)
TAXES/GSP	6.188***	6.442***	4.836**	2.923
	(1.671)	(1.817)	(1.919)	(1.998)
ln(POP)	0.764***	0.921***	0.989***	1.081***
	(0.109)	(0.128)	(0.153)	(0.181)
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	82,947	77,948	73,065	68,203
R-squared	0.768	0.744	0.720	0.698

Table IA.8
Tax Increases and the Number of Patents

This table reports the results relating the number of patents to tax increases. Specifically we estimate the OLS model of ln(1+PATENT) on TAXINCR, which is an indicator variable equal to 1, if there has been a significant tax increase in the largest state of business of firm i, and 0 otherwise. Due to space limitations, the construction of the control variables is explained in Appendix B. All regressions are estimated with time and firm fixed effects and the standard errors reported in the parentheses are corrected for the panel in all the models and are clustered at the firm level. The sample consists of firm-year observations from 1988 to 2006. ***, ** and * denote significance at 1%, 5% and 10% respectively.

	$\ln(1+\text{PATENT})_{t+1}$	$\ln(1+\text{PATENT})_{t+2}$	$\ln(1+\text{PATENT})_{t+3}$	$\ln(1+\text{PATENT})_{t+4}$
	(1)	(2)	(3)	(4)
TAXINCR	-0.019	-0.035**	-0.041**	-0.051**
	(0.013)	(0.017)	(0.020)	(0.023)
ln(SALES)	0.052***	0.042***	0.029***	0.019***
	(0.005)	(0.005)	(0.006)	(0.007)
RD/SALES	0.047***	0.040***	0.026***	0.021***
	(0.005)	(0.005)	(0.006)	(0.007)
LEVERAGE	-0.056***	-0.063***	-0.071***	-0.078***
	(0.011)	(0.012)	(0.013)	(0.015)
PROFITABILITY	-0.024***	-0.013	-0.002	0.001
	(0.008)	(0.009)	(0.010)	(0.011)
TANGIBILITY	0.057**	0.144***	0.219***	0.290***
	(0.027)	(0.031)	(0.037)	(0.043)
ln(K/L)	-0.002	-0.010***	-0.014***	-0.014***
	(0.003)	(0.003)	(0.003)	(0.004)
RATING	0.029	0.007	-0.008	-0.018
	(0.018)	(0.020)	(0.023)	(0.026)
ln(AGE)	0.002	0.002	0.001	0.003
	(0.002)	(0.003)	(0.003)	(0.003)
HERFINDAHL	0.530***	0.638***	0.795***	0.861***
	(0.119)	(0.140)	(0.170)	(0.204)
HERFINDAHL^2	-0.491***	-0.606***	-0.764***	-0.813***
	(0.129)	(0.149)	(0.176)	(0.202)
ln(REALGSP)	-0.385**	-0.655***	-0.865***	-1.036***
	(0.158)	(0.175)	(0.198)	(0.226)
UNEMPRATE	0.012**	0.006	0.001	0.001
	(0.005)	(0.006)	(0.006)	(0.007)
GSPGROW	0.979***	0.928***	0.787***	0.787***
	(0.140)	(0.149)	(0.162)	(0.177)
GSPGROWLAG	0.533***	0.464***	0.514***	0.686***
	(0.138)	(0.148)	(0.158)	(0.164)
TAXES/GSP	5.960***	6.116***	4.388**	2.379
	(1.690)	(1.839)	(1.948)	(2.040)
ln(POP)	0.729***	0.864***	0.916***	0.990***
	(0.110)	(0.129)	(0.155)	(0.185)
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	82,947	77,948	73,065	68,203
R-squared	0.768	0.744	0.720	0.697

Table IA.9
Tax Changes and the Number of Patents

This table reports the results relating the number of patents to tax changes. Specifically we estimate the OLS model of ln(1+PATENT) on TAXCHG, which is an indicator variable equal to 1 if there has been a significant tax increase in the largest state of business of firm i, equal to -1 if there has been a significant tax decrease in the largest state of business of firm i, and 0 otherwise. Due to space limitations, the construction of the control variables is explained in Appendix B. All regressions are estimated with time and firm fixed effects and the standard errors reported in the parentheses are corrected for the panel in all the models and are clustered at the firm level. The sample consists of firm-year observations from 1988 to 2006. ***, ** and * denote significance at 1%, 5% and 10% respectively.

	$\ln(1+\text{PATENT})_{t+1}$	$\ln(1+\text{PATENT})_{t+2}$	$\ln(1+\text{PATENT})_{t+3}$	$\ln(1+\text{PATENT})_{t+4}$
	(1)	(2)	(3)	(4)
TAXCHG	-0.023**	-0.039***	-0.048***	-0.059***
	(0.010)	(0.013)	(0.016)	(0.020)
ln(SALES)	0.052***	0.042***	0.029***	0.019***
	(0.005)	(0.005)	(0.006)	(0.007)
RD/SALES	0.047***	0.040***	0.026***	0.021***
	(0.005)	(0.005)	(0.006)	(0.007)
LEVERAGE	-0.056***	-0.063***	-0.071***	-0.078***
	(0.011)	(0.012)	(0.013)	(0.015)
PROFITABILITY	-0.024***	-0.013	-0.002	0.001
	(0.008)	(0.009)	(0.010)	(0.011)
TANGIBILITY	0.058**	0.145***	0.220***	0.291***
	(0.027)	(0.031)	(0.037)	(0.043)
ln(K/L)	-0.002	-0.010***	-0.014***	-0.014***
	(0.003)	(0.003)	(0.003)	(0.003)
RATING	0.029	0.007	-0.008	-0.018
	(0.018)	(0.020)	(0.023)	(0.026)
ln(AGE)	0.002	0.002	0.001	0.003
	(0.002)	(0.003)	(0.003)	(0.003)
HERFINDAHL	0.531***	0.639***	0.797***	0.864***
	(0.119)	(0.140)	(0.170)	(0.204)
HERFINDAHL^2	-0.491***	-0.607***	-0.765***	-0.815***
	(0.129)	(0.149)	(0.175)	(0.202)
ln(REALGSP)	-0.370**	-0.631***	-0.835***	-0.999***
	(0.158)	(0.176)	(0.199)	(0.226)
UNEMPRATE	0.012**	0.007	0.002	0.002
	(0.005)	(0.006)	(0.006)	(0.007)
GSPGROW	0.966***	0.907***	0.761***	0.755***
	(0.139)	(0.148)	(0.161)	(0.175)
GSPGROWLAG	0.515***	0.436***	0.478***	0.640***
	(0.137)	(0.148)	(0.157)	(0.161)
TAXES/GSP	6.296***	6.651***	5.060***	3.197
	(1.699)	(1.848)	(1.952)	(2.032)
ln(POP)	0.757***	0.910***	0.973***	1.061***
	(0.110)	(0.128)	(0.154)	(0.183)
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	82,947	77,948	73,065	68,203
R-squared	0.768	0.744	0.720	0.698

Table IA.10
Tax Decreases and the Number of Citations per Patent

This table reports the results relating the number of citations per patent to tax decreases. Specifically we estimate the OLS model of ln(1+CIT/PAT) on TAXDECR, which is an indicator variable equal to 1, if there has been a significant tax decrease in the largest state of business of firm i, and 0 otherwise. Due to space limitations, the construction of the control variables is explained in Appendix B. All regressions are estimated with time and firm fixed effects and the standard errors reported in the parentheses are corrected for the panel in all the models and are clustered at the firm level. The sample consists of firm-year observations from 1988 to 2006. ***, ** and * denote significance at 1%, 5% and 10% respectively.

	$\ln(1+\text{CIT/PAT})_{t+1}$	$\ln(1+\text{CIT/PAT})_{t+2}$	$\ln(1+\text{CIT/PAT})_{t+3}$	$\ln(1+\text{CIT/PAT})_{t+4}$
	(1)	(2)	(3)	(4)
TAXDECR	0.132***	0.156***	0.141***	0.141***
	(0.030)	(0.033)	(0.034)	(0.035)
ln(SALES)	0.020***	0.009	-0.002	-0.006
	(0.007)	(0.007)	(0.008)	(0.008)
RD/SALES	0.061***	0.045***	0.026***	0.022***
	(0.008)	(0.008)	(0.008)	(0.008)
LEVERAGE	-0.075***	-0.070***	-0.067***	-0.079***
	(0.017)	(0.018)	(0.019)	(0.019)
PROFITABILITY	-0.011	0.005	0.000	-0.001
	(0.014)	(0.014)	(0.014)	(0.015)
TANGIBILITY	0.180***	0.244***	0.278***	0.293***
	(0.039)	(0.042)	(0.045)	(0.048)
ln(K/L)	-0.010***	-0.019***	-0.018***	-0.017***
	(0.004)	(0.004)	(0.004)	(0.004)
RATING	0.010	0.000	-0.013	-0.008
	(0.023)	(0.025)	(0.027)	(0.028)
ln(AGE)	-0.001	0.001	-0.001	0.003
	(0.003)	(0.003)	(0.003)	(0.003)
HERFINDAHL	0.936***	0.856***	0.843***	0.771***
	(0.190)	(0.209)	(0.225)	(0.238)
HERFINDAHL^2	-0.924***	-0.928***	-0.894***	-0.826***
	(0.197)	(0.214)	(0.231)	(0.241)
ln(REALGSP)	-1.092***	-1.173***	-1.319***	-1.280***
	(0.202)	(0.214)	(0.225)	(0.234)
UNEMPRATE	0.003	-0.005	-0.013*	-0.014*
	(0.007)	(0.007)	(0.008)	(0.008)
GSPGROW	0.752***	0.695***	0.364*	0.484**
	(0.204)	(0.207)	(0.209)	(0.218)
GSPGROWLAG	0.563***	0.282	0.386**	0.277
	(0.198)	(0.189)	(0.187)	(0.190)
TAXES/GSP	4.801**	3.513*	-2.795	-3.878*
	(1.915)	(2.015)	(2.101)	(2.249)
ln(POP)	1.081***	1.091***	0.950***	1.003***
	(0.191)	(0.206)	(0.233)	(0.255)
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	82,947	77,948	73,065	68,203
R-squared	0.578	0.572	0.567	0.560

Table IA.11
Tax Increases and the Number of Citations per Patent

This table reports the results relating the number of citations per patent to tax increases. Specifically we estimate the OLS model of ln(1+CIT/PAT) on TAXINCR, which is an indicator variable equal to 1, if there has been a significant tax increase in the largest state of business of firm i, and 0 otherwise. Due to space limitations, the construction of the control variables is explained in Appendix B. All regressions are estimated with time and firm fixed effects and the standard errors reported in the parentheses are corrected for the panel in all the models and are clustered at the firm level. The sample consists of firm-year observations from 1988 to 2006. ***, ** and * denote significance at 1%, 5% and 10% respectively.

	$\ln(1+\text{CIT/PAT})_{t+1}$	$\ln(1+\text{CIT/PAT})_{t+2}$	$\ln(1+\text{CIT/PAT})_{t+3}$	$\ln(1+\text{CIT/PAT})_{t+4}$
	(1)	(2)	(3)	(4)
TAXINCR	-0.054**	-0.071***	-0.074***	-0.078***
	(0.023)	(0.026)	(0.027)	(0.028)
ln(SALES)	0.020***	0.009	-0.002	-0.006
	(0.007)	(0.007)	(0.008)	(0.008)
RD/SALES	0.061***	0.046***	0.027***	0.022***
	(0.008)	(0.008)	(0.008)	(0.008)
LEVERAGE	-0.074***	-0.068***	-0.066***	-0.078***
	(0.017)	(0.018)	(0.019)	(0.019)
PROFITABILITY	-0.010	0.006	0.001	0.000
	(0.014)	(0.014)	(0.014)	(0.015)
TANGIBILITY	0.179***	0.243***	0.277***	0.292***
	(0.039)	(0.043)	(0.045)	(0.049)
ln(K/L)	-0.010***	-0.019***	-0.018***	-0.017***
	(0.004)	(0.004)	(0.004)	(0.004)
RATING	0.009	-0.000	-0.013	-0.008
	(0.023)	(0.025)	(0.027)	(0.028)
ln(AGE)	-0.001	0.001	-0.001	0.003
	(0.003)	(0.003)	(0.003)	(0.003)
HERFINDAHL	0.934***	0.853***	0.839***	0.766***
	(0.191)	(0.209)	(0.226)	(0.238)
HERFINDAHL^2	-0.924***	-0.926***	-0.891***	-0.823***
	(0.198)	(0.215)	(0.232)	(0.241)
ln(REALGSP)	-1.130***	-1.215***	-1.351***	-1.310***
	(0.203)	(0.215)	(0.225)	(0.235)
UNEMPRATE	0.000	-0.007	-0.015**	-0.016**
	(0.007)	(0.007)	(0.008)	(0.008)
GSPGROW	0.781***	0.726***	0.388*	0.507**
	(0.205)	(0.207)	(0.210)	(0.218)
GSPGROWLAG	0.570***	0.282	0.376**	0.264
	(0.199)	(0.189)	(0.187)	(0.189)
TAXES/GSP	4.195**	2.920	-3.173	-4.195*
	(1.933)	(2.036)	(2.130)	(2.282)
ln(POP)	0.986***	0.981***	0.857***	0.911***
	(0.191)	(0.206)	(0.233)	(0.255)
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	82,947	77,948	73,065	68,203
R-squared	0.578	0.572	0.566	0.560

Table IA.12
Tax Changes and the Number of Citations per Patent

This table reports the results relating the number of citations per patents to tax changes. Specifically we estimate the OLS model of ln(1+CIT/PAT) on TAXCHG, which is an indicator variable equal to 1 if there has been a significant tax increase in the largest state of business of firm i, equal to -1 if there has been a significant tax decrease in the largest state of business of firm i, and 0 otherwise. Due to space limitations, the construction of the control variables is explained in Appendix B. All regressions are estimated with time and firm fixed effects and the standard errors reported in the parentheses are corrected for the panel in all the models and are clustered at the firm level. The sample consists of firm-year observations from 1988 to 2006. ***, ** and * denote significance at 1%, 5% and 10% respectively.

	$\ln(1+\text{CIT/PAT})_{t+1}$	$\ln(1+\text{CIT/PAT})_{t+2}$	$\ln(1+\text{CIT/PAT})_{t+3}$	$\ln(1+\text{CIT/PAT})_{t+4}$
	(1)	(2)	(3)	(4)
TAXCHG	-0.064***	-0.079***	-0.075***	-0.076***
	(0.017)	(0.019)	(0.020)	(0.020)
ln(SALES)	0.020***	0.009	-0.002	-0.006
	(0.007)	(0.007)	(0.008)	(0.008)
RD/SALES	0.061***	0.046***	0.026***	0.022***
	(0.008)	(0.008)	(0.008)	(0.008)
LEVERAGE	-0.074***	-0.069***	-0.066***	-0.078***
	(0.017)	(0.018)	(0.019)	(0.019)
PROFITABILITY	-0.011	0.006	0.001	-0.000
	(0.014)	(0.014)	(0.014)	(0.015)
TANGIBILITY	0.180***	0.244***	0.278***	0.293***
	(0.039)	(0.042)	(0.045)	(0.049)
ln(K/L)	-0.010***	-0.019***	-0.018***	-0.017***
	(0.004)	(0.004)	(0.004)	(0.004)
RATING	0.009	-0.000	-0.013	-0.008
	(0.023)	(0.025)	(0.027)	(0.028)
ln(AGE)	-0.001	0.001	-0.001	0.003
	(0.003)	(0.003)	(0.003)	(0.003)
HERFINDAHL	0.936***	0.856***	0.842***	0.770***
	(0.191)	(0.209)	(0.225)	(0.238)
HERFINDAHL^2	-0.925***	-0.928***	-0.893***	-0.826***
	(0.197)	(0.214)	(0.231)	(0.241)
ln(REALGSP)	-1.089***	-1.167***	-1.311***	-1.270***
	(0.202)	(0.215)	(0.225)	(0.234)
UNEMPRATE	0.001	-0.006	-0.014*	-0.015*
	(0.007)	(0.007)	(0.008)	(0.008)
GSPGROW	0.745***	0.686***	0.353*	0.472**
	(0.204)	(0.207)	(0.209)	(0.217)
GSPGROWLAG	0.521***	0.228	0.333*	0.222
	(0.199)	(0.188)	(0.186)	(0.188)
TAXES/GSP	5.128***	3.960*	-2.305	-3.356
	(1.936)	(2.032)	(2.119)	(2.267)
ln(POP)	1.063***	1.072***	0.938***	0.992***
	(0.192)	(0.207)	(0.234)	(0.256)
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	82,947	77,948	73,065	68,203
R-squared	0.578	0.572	0.567	0.560

Table IA.13
Replication of Mukherjee et al. (2017)

This table replicates the main results of Mukherjee et al. (2017) using their tax signals, model specifications (i.e., first differences), and sample exclusions. In Panel A, the dependent variable is the natural log of 1 plus the number of patents. In Panel B, the dependent variable is the unadjusted number of citations per patent. In Panel C, the dependent variable is the number of citations per patent adjusted for truncation using the structural method. In columns (1) to (3) of all panels, the tax increase and decrease variables are defined as in Mukherjee et al. (2017), which equals one (zero otherwise) in the year of corporate tax increase/decrease and are based on historical headquarters state of the firm obtained from Compact Disclosure and 10K filings (parsed 10K location data are obtained from Bill McDonald's website). In columns (4) to (6) in all panels, the tax increase and decrease variables are defined as in Mukherjee et al. (2017), which equals one (zero otherwise) in the year of corporate tax increase/decrease and are based on an alternative definition of state using the most mentioned state from 10K reports collected by Garcia and Norli (2012). The sample period is from 1990 to 2006. Firms in the financial sector (6000s SICs) and the public sector (9000s SICs) are excluded. Observations where the firm's sales or assets are less than 1 million, the firm's reported stock price is negative, or the firm has fewer than four observations are also excluded. Only firms with headquarters in the US are included. All control variables are defined as in Mukherjee et al. (2017), which include changes in natural log of sales, in natural log of PPENT divided by the number of employees, in HHI, in HHI squared, in R&D expenditure divided by sales, in profitability, in tangibility, in the availability of S&P debt rating, in natural log of state's GSP, in tax revenue as a percentage of GSP, in log of state population, and in state unemployment rate. All regressions are with year fixed effects. Standard errors are clustered at state-level and reported in parentheses. *,**, and *** indicate significance at 10%, 5% and 1% respectively.

Panel A: Number of Patents

	$\Delta\ln(1+\text{PATENT})_{t+1}$	$\Delta\ln(1+\text{PATENT})_{t+2}$	$\Delta\ln(1+\text{PATENT})_{t+3}$	$\Delta\ln(1+\text{PATENT})_{t+1}$	$\Delta\ln(1+\text{PATENT})_{t+2}$	$\Delta\ln(1+\text{PATENT})_{t+3}$
	(1)	(2)	(3)	(4)	(5)	(6)
MSZ_TAXINCR	-0.032***	-0.043**	-0.068**	-0.023	-0.023	-0.037
	(0.011)	(0.020)	(0.029)	(0.016)	(0.014)	(0.029)
MSZ_TAXDECR	-0.004	0.001	0.008	-0.004	0.006	0.009
	(0.007)	(0.007)	(0.010)	(0.006)	(0.006)	(0.007)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	52,561	48,313	44,460	62,017	57,933	53,979
	Using Historical Headquarters States			Using Most Mentioned States		

Panel B: Raw Number of Citations per Patent

	$\Delta\ln(1+\text{CIT/PAT})_{t+1}$	$\Delta\ln(1+\text{CIT/PAT})_{t+2}$	$\Delta\ln(1+\text{CIT/PAT})_{t+3}$	$\Delta\ln(1+\text{CIT/PAT})_{t+1}$	$\Delta\ln(1+\text{CIT/PAT})_{t+2}$	$\Delta\ln(1+\text{CIT/PAT})_{t+3}$
	(1)	(2)	(3)	(4)	(5)	(6)
MSZ_TAXINCR	-0.022	-0.025	-0.004	-0.013	-0.022	-0.012
	(0.015)	(0.016)	(0.010)	(0.017)	(0.015)	(0.013)
MSZ_TAXDECR	-0.005	0.015	-0.005	0.004	0.012	-0.008
	(0.013)	(0.014)	(0.012)	(0.013)	(0.008)	(0.011)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	52,561	48,313	44,460	62,017	57,933	53,979
	Using Historical Headquarters States			Using Most Mentioned States		

Panel C: Truncation-adjusted Number of Citations per Patent

	$\Delta\ln(1+\text{CIT/PAT})_{t+1}$	$\Delta\ln(1+\text{CIT/PAT})_{t+2}$	$\Delta\ln(1+\text{CIT/PAT})_{t+3}$	$\Delta\ln(1+\text{CIT/PAT})_{t+1}$	$\Delta\ln(1+\text{CIT/PAT})_{t+2}$	$\Delta\ln(1+\text{CIT/PAT})_{t+3}$
	(1)	(2)	(3)	(4)	(5)	(6)
MSZ_TAXINCR	-0.037*	-0.064*	-0.023	-0.021	-0.054**	-0.028
	(0.021)	(0.032)	(0.023)	(0.025)	(0.025)	(0.026)
MSZ_TAXDECR	-0.005	0.024	0.007	0.010	0.018	-0.000
	(0.013)	(0.016)	(0.017)	(0.015)	(0.012)	(0.016)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	52,561	48,313	44,460	62,017	57,933	53,979
	Using Historical Headquarters States			Using Most Mentioned States		

Table IA.14
Examining the Tax Asymmetry Effect in Mukherjee et al. (2017)

This table examines the tax asymmetry effect in Mukherjee et al. (2017), which shows that tax increase has a significant negative impact on innovation, while tax decrease has no impact. We test their rationale for the asymmetry by interacting tax changes with the passage of wrongful discharge laws in the headquarter state. There are three types of wrongful discharge laws. The good faith exception requires employers to treat workers in a fair manner or in good faith and not take actions that would deprive employees of the benefit of employment without just cause. The public policy exception protects employees from termination for refusing to violate an established public policy or commit an illegal act. The implied contract exception protects workers from termination when an employer has implicitly promised employees that they will not be discharged without good cause. In Panel A, the tax changes are interacted with STRONG_LABOR, which equals to the sum of the three indicators (GOOD_FAITH+PUBLIC_POLICY+IMPLIED_CONTRACT). In Panel B, the tax changes are interacted with GOOD_FAITH, which is an indicator that equals to one (zero otherwise) if the state in which a firm is headquartered has adopted the good faith exception by year t. In Panel C, the tax changes are interacted with PUBLIC_POLICY, which is an indicator that equals to one (zero otherwise) if the state in which a firm is headquartered has adopted the public policy exception by year t. In Panel D, the tax changes are interacted with IMPLIED_CONTRACT, which is an indicator that equals to one (zero otherwise) if the state in which a firm is headquartered has adopted the implied contract exception by year t. The model specifications follow Mukherjee et al. (2017) and are based on first differences. MSZ_TAXINCR and MSZ_TAXDECR are defined as in Mukherjee et al. (2017), which equals one (zero otherwise) in the year of corporate tax increase/decrease and are based on historical headquarters state of the firm obtained from Compact Disclosure and 10K filings (parsed 10K location data are obtained from Bill McDonald's website). The sample period is from 1990 to 2006. Firms in the financial sector (6000s SICs) and the public sector (9000s SICs) are excluded. Observations where the firm's sales or assets are less than 1 million, the firm's reported stock price is negative, or the firm has fewer than four observations are also excluded. Only firms with headquarters in the US are included. The dependent variable is the natural log of 1 plus the number of patents. All control variables are defined as in Mukherjee et al. (2017), which include changes in natural log of sales, in natural log of PPENT divided by the number of employees, in HHI, in HHI squared, in R&D expenditure divided by sales, in profitability, in tangibility, in the availability of S&P debt rating, in natural log of state's GSP, in tax revenue as a percentage of GSP, in log of state population, and in state unemployment rate. All regressions are with year fixed effects. Standard errors are clustered at state-level and reported in parentheses. *,**, and *** indicate significance at 10%, 5% and 1% respectively.

Panel A: Interaction with the Strong Labor Index

	$\Delta\ln(1+\text{PATENT})_{t+1}$	$\Delta\ln(1+\text{PATENT})_{t+2}$	$\Delta\ln(1+\text{PATENT})_{t+3}$
	(1)	(2)	(3)
MSZ_TAXINCR	0.005	0.026	0.078*
	(0.022)	(0.056)	(0.041)
MSZ_TAXINCR×STRONG_LABOR	-0.014	-0.027	-0.061***
	(0.009)	(0.020)	(0.019)
MSZ_TAXDECR	-0.002	-0.016	0.010
	(0.011)	(0.011)	(0.014)
MSZ_TAXDECR×STRONG_LABOR	-0.001	0.009	-0.001
	(0.006)	(0.006)	(0.008)
STRONG_LABOR	-0.010***	-0.011***	-0.011***
	(0.003)	(0.002)	(0.002)
Controls	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Obs.	52,561	48,313	44,460

Panel B: Interaction with the Good Faith Exception

	$\Delta\ln(1+\text{PATENT})_{t+1}$	$\Delta\ln(1+\text{PATENT})_{t+2}$	$\Delta\ln(1+\text{PATENT})_{t+3}$
	(1)	(2)	(3)
MSZ_TAXINCR	-0.016	-0.007	-0.013
	(0.014)	(0.018)	(0.015)
MSZ_TAXINCR×GOOD_FAITH	-0.021	-0.064***	-0.103***
	(0.017)	(0.022)	(0.025)
MSZ_TAXDECR	-0.003	0.003	0.010
	(0.007)	(0.008)	(0.008)
MSZ_TAXDECR×GOOD_FAITH	0.004	-0.000	-0.000
	(0.014)	(0.011)	(0.018)
GOOD_FAITH	-0.018***	-0.015**	-0.016***
	(0.006)	(0.006)	(0.005)
Controls	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Obs.	52,561	48,313	44,460

Panel C: Interaction with the Public Policy Exception

	$\Delta\ln(1+\text{PATENT})_{t+1}$	$\Delta\ln(1+\text{PATENT})_{t+2}$	$\Delta\ln(1+\text{PATENT})_{t+3}$
	(1)	(2)	(3)
MSZ_TAXINCR	-0.002	-0.086	0.075*
	(0.020)	(0.064)	(0.041)
MSZ_TAXINCR×PUBLIC_POLICY	-0.028	0.047	-0.144***
	(0.022)	(0.066)	(0.049)
MSZ_TAXDECR	-0.007	-0.010	0.011
	(0.006)	(0.008)	(0.013)
MSZ_TAXDECR×PUBLIC_POLICY	0.003	0.013	-0.005
	(0.009)	(0.011)	(0.015)
PUBLIC_POLICY	-0.015**	-0.019***	-0.016*
	(0.006)	(0.007)	(0.008)
Controls	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Obs.	52,561	48,313	44,460

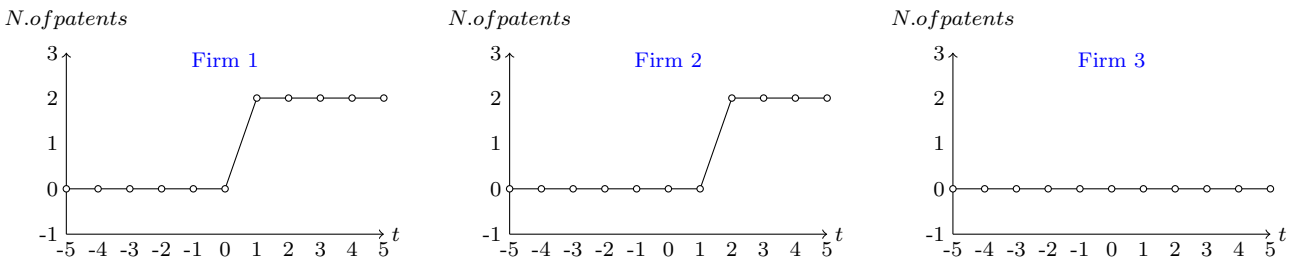
Panel D: Interaction with the Implied Contract Exception

	$\Delta\ln(1+\text{PATENT})_{t+1}$	$\Delta\ln(1+\text{PATENT})_{t+2}$	$\Delta\ln(1+\text{PATENT})_{t+3}$
	(1)	(2)	(3)
MSZ_TAXINCR	-0.027*	-0.044	-0.039
	(0.016)	(0.039)	(0.026)
MSZ_TAXINCR×IMPLIED_CONTRACT	-0.006	0.002	-0.034
	(0.016)	(0.045)	(0.036)
MSZ_TAXDECR	0.002	-0.033***	0.000
	(0.009)	(0.008)	(0.012)
MSZ_TAXDECR×IMPLIED_CONTRACT	-0.007	0.041***	0.009
	(0.013)	(0.011)	(0.017)
IMPLIED_CONTRACT	-0.011	-0.021***	-0.018**
	(0.008)	(0.007)	(0.008)
Controls	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Obs.	52,561	48,313	44,460

TableIA.15
Regressions based on Sample Data using Different Model Specifications

This table reports the results based on sample data. The data consist of three firms for the same sample period. Firms 1 and 2 experience a tax decrease in year 0 and firm 3 does not experience any tax changes. Panel A plots the number of patents for each firm during the sample period, where firm 1's patent count starts to increase in year 1 (one year after the tax decrease) and firm 2's patent count starts to increase in year 2 (two years after the tax decrease). In Panel B, the regression results are reported. In columns (1) to (3), we use the first difference specification of Mukherjee et al. (2017), where the dependent variable is the change in the number of patents (ΔPAT) and the key independent variable, MSZ_TAXDECR, is one in year 0 and zero in other years. In columns (4) to (6), we use our fixed effects model, where the dependent variable is the number of patents (PAT) and the key independent variable, OUR_TAXDECR, is zero before year 0 and one from year 0 onward. Year and firm fixed effects are included as specified. Standard errors are clustered at firm-level and reported in parentheses. *,**, and *** indicate significance at 10%, 5% and 1% respectively. Panel C presents the data used for the regressions.

Panel A: Graphs of Patent Count Across Time



Panel B: Regression Results

	ΔPAT_{t+1}	ΔPAT_{t+2}	ΔPAT_{t+3}	PAT_{t+1}	PAT_{t+2}	PAT_{t+3}
	(1)	(2)	(3)	(4)	(5)	(6)
MSZ_TAXDECR	1.000	1.000	-0.000			
	(1.070)	(1.071)	(0.000)			
OUR_TAXDECR				1.800**	1.800**	1.400**
				(0.226)	(0.228)	(0.230)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	No	No	No	Yes	Yes	Yes
Obs.	30	27	24	30	27	24
R-squared	0.375	0.370	0.273	0.907	0.904	0.827
Method	First Difference			Fixed Effects		

Panel C: Data

FIRMID	t	MSZ_TAXDECR	OUR_TAXDECR	PAT_t	PAT_{t+1}	PAT_{t+2}	PAT_{t+3}	ΔPAT_t	ΔPAT_{t+1}	ΔPAT_{t+2}	ΔPAT_{t+3}
1	-5	0	0	0	0	0	0	0	0	0	0
1	-4	0	0	0	0	0	0	0	0	0	0
1	-3	0	0	0	0	0	0	0	0	0	0
1	-2	0	0	0	0	0	2	0	0	0	2
1	-1	0	0	0	0	2	2	0	0	2	0
1	0	1	1	0	2	2	2	0	2	0	0
1	1	0	1	2	2	2	2	2	0	0	0
1	2	0	1	2	2	2	2	0	0	0	0
1	3	0	1	2	2	2		0	0	0	
1	4	0	1	2	2			0	0		
1	5	0	1	2				0			
2	-5	0	0	0	0	0	0	0	0	0	0
2	-4	0	0	0	0	0	0	0	0	0	0
2	-3	0	0	0	0	0	0	0	0	0	0
2	-2	0	0	0	0	0	0	0	0	0	0
2	-1	0	0	0	0	0	2	0	0	0	2
2	0	1	1	0	0	2	2	0	0	2	0
2	1	0	1	0	2	2	2	0	2	0	0
2	2	0	1	2	2	2	2	2	0	0	0
2	3	0	1	2	2	2		0	0	0	
2	4	0	1	2	2			0	0		
2	5	0	1	2				0			
3	-5	0	0	0	0	0	0	0	0	0	0
3	-4	0	0	0	0	0	0	0	0	0	0
3	-3	0	0	0	0	0	0	0	0	0	0
3	-2	0	0	0	0	0	0	0	0	0	0
3	-1	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0
3	1	0	0	0	0	0	0	0	0	0	0
3	2	0	0	0	0	0	0	0	0	0	0
3	3	0	0	0	0	0		0	0	0	
3	4	0	0	0	0			0	0		
3	5	0	0	0				0			