The Business Investment Response to the Domestic Production Activities Deduction

Eric Ohrn

University of Michigan, Grinnell College

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DPAD

- **Domestic Production Activities Deduction** (DPAD) part of AJCA 2004
- DPAD allows a percentage (d) of **Qualified Production Activities Income** (QPAI) to be deducted from taxable income
- QPAI is income derived from US domestic production more

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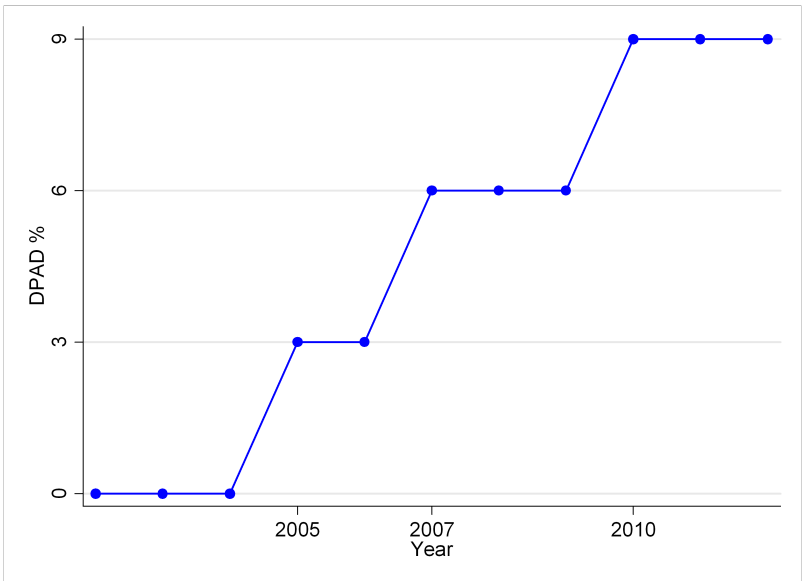
- QPAI is income derived from US domestic production more
- DPAD phased in during years 2005-2010

DPAD Phase-In

For QPAI Earned		DPAD %
After	Before	
	01/01/2005	0%
05/05/2004	01/01/2007	3%
12/31/2006	01/01/2010	6%
12/31/2010		9%

Notes: Figure 1 lists and plots the percentage of qualified production activities income that may be deducted from taxable income via the DPAD.



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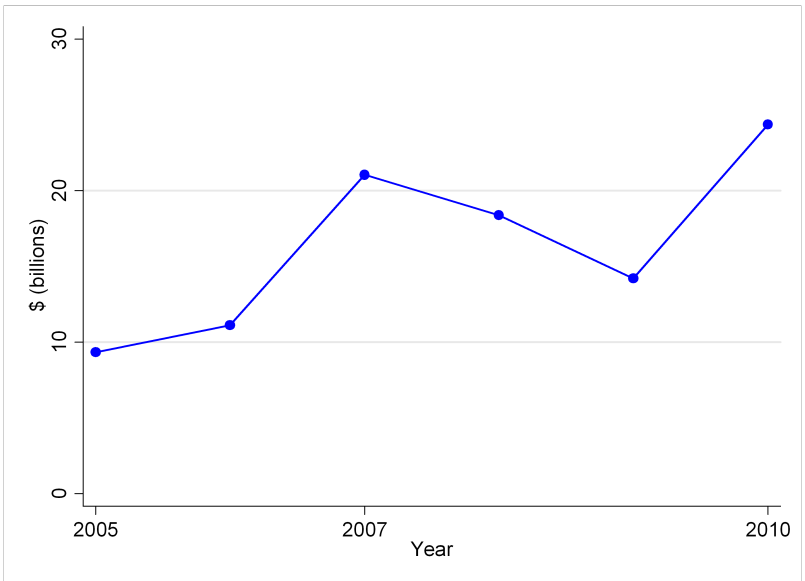
- When DPAD reached maximum rate of 9% in 2010
  - total DPAD deduction was $24 billion
  - cost of more than $8 billion to the federal government

DPAD Deduction

Year	$ (billions)	$(billions) $\times\tau$
2005	9.332	3.266
2006	11.106	3.887
2007	21.058	7.370
2008	18.374	6.320
2009	14.198	4.970
2010	24.365	8.528

Notes: Source: IRS Statistics of Income. Corporate statutory rate $\tau = .35$



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Empirically Testable Hypotheses

- **Hypothesis 1:** The investment effect of the DPAD should be larger for firms that derive a larger percentage of income (ρ) from QPAI (DD estimation)

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- **Hypothesis 2:** The investment effect of the DPAD should be concentrated among financially constrained firms. DPAD both increases ROI and increases slack in budget constraint (DDD)

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- **Hypothesis 3:** The investment effect of the DPAD should be concentrated among firms who will be taxable when income derived from new investment is earned (DDD)

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Industry Level QPAI % (ρ)

- IRS SOI publishes taxable income and DPAD data for all US corporations, for each of 17 sectors, and for each of 77 industries (latest year available: 2010)

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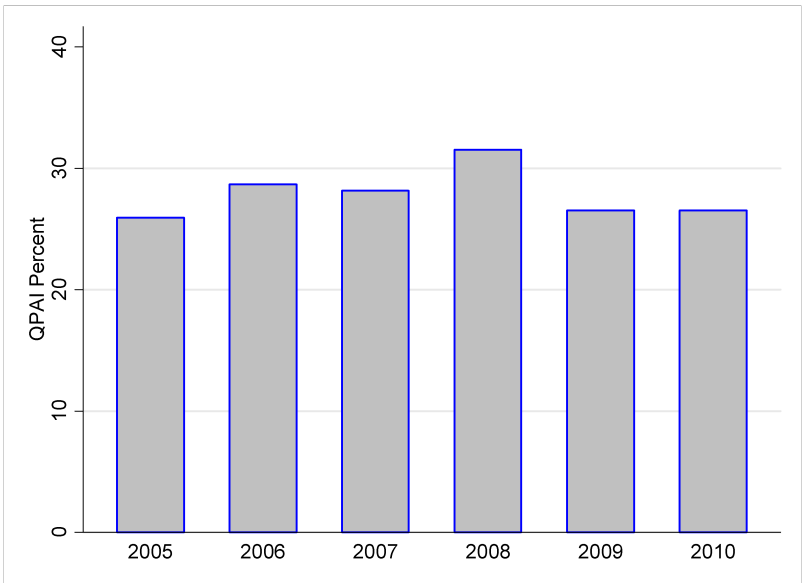
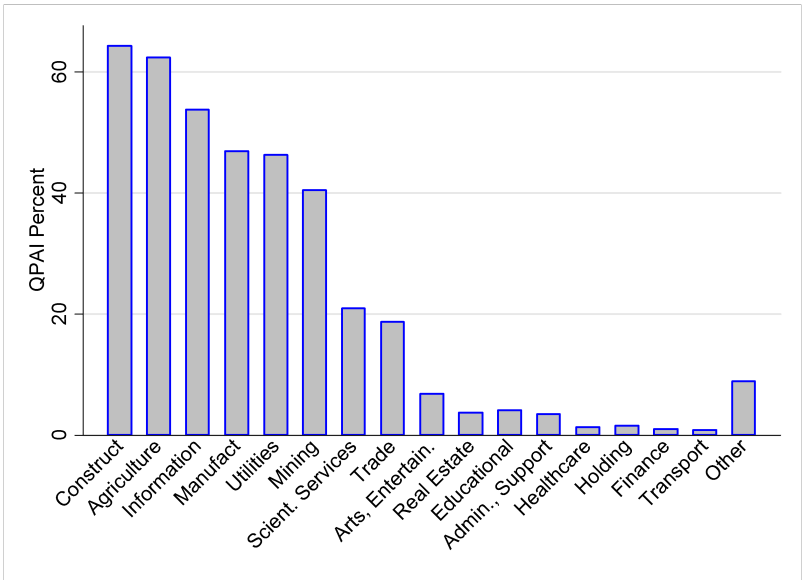
- Using these data and statutory DPAD % (d), ρ may be derived at the sector and industry level (continuous treatment variable)

QPAI Percent



QPAI by Sector



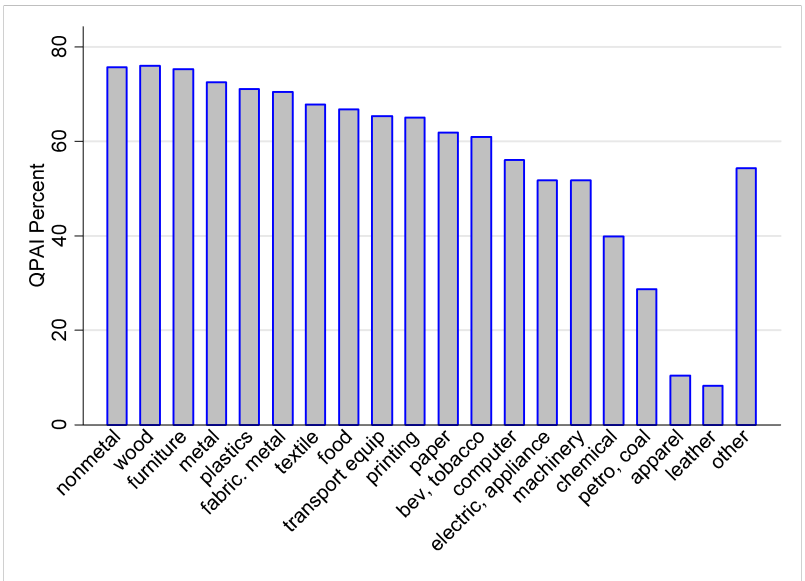
Notes: QPAI percentage is calculated the Domestic Production Deduction divided by Income Subject to Tax as defined by the IRS Statistics of Income Division. Figure 3A presents QPAI averaged across all corporations for years 2005 - 2010. Figure 3B presents QPAI for each major production section averaged across all years 2005 - 2010.

QPAI % Variation

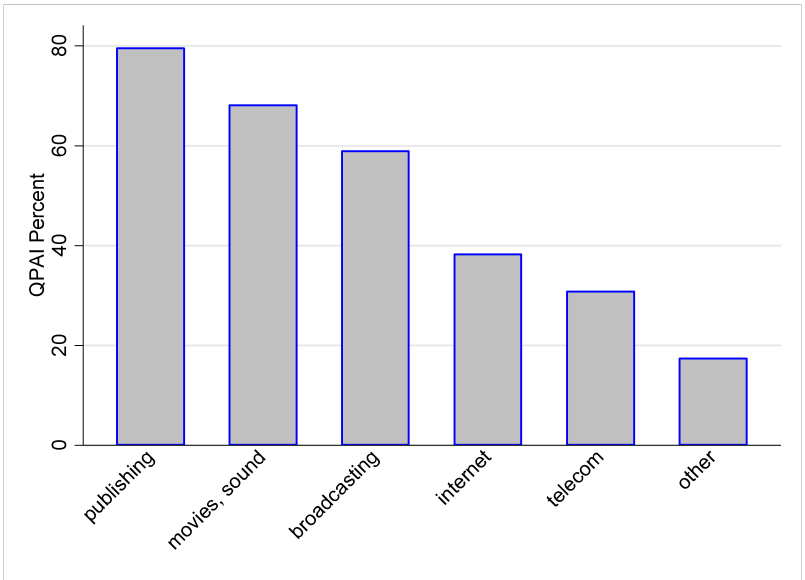
- QPAI % relative stable over time (25.5% during years 2005-2010)
  - allays treatment endogeneity concerns

- Significant variation across sectors and within sectors
  - within sector variation, control for sector level FE, trends

Manufacturing Industries



Information Industries



Notes: QPAI percentage is calculated the Domestic Production Deduction divided by Income Subject to Tax as defined by the IRS Statistics of Income Division. Figure 3C presents QPAI for each major industry in the manufacturing sector averaged across all years 2005 - 2010. Figure 3D presents QPAI for each major industry in the information sector averaged across all years 2005 - 2010.

DPAD variable

- DPAD = QPAI % $\times$ DPAD statutory rate = $\rho \times d$
- DPAD = industry level effective corporate income tax rate cut
- QPAI % average over years 2005 - 2010 (robust to alternative constructions)

QPAI, DPAD % for Investment Sample

Variable	Years	Median	Mean	10th pct	90th pct
QPAI%	2005 - 2012	41.335	38.7431	3.471	66.660
DPAD	2005 - 2012	2.298	2.409	0.208	4.729
DPAD	2005 - 2006	1.149	0.882	0.022	1.850
DPAD	2007 - 2009	2.298	1.729	0.045	3.699
DPAD	2010 - 2012	3.447	2.521	0.067	5.542
Firms		11,189			
Firms x Years		72,341			

Notes: Table 2 presents QPAI % and DPAD for years 2005-2012 for the Compustat Sample - listed firms with non-zero financial statement variables needed for baseline regression analysis. QPAI % is the percentage of income derived from qualified production activities and eligible for the domestic production activities deduction. DPAD is equal to QPAI % multiplied by the statutory rate of the deduction. DPAD can be interpreted as the effective rate of the deduction given a fixed QPAI %.

Investment variable & controls

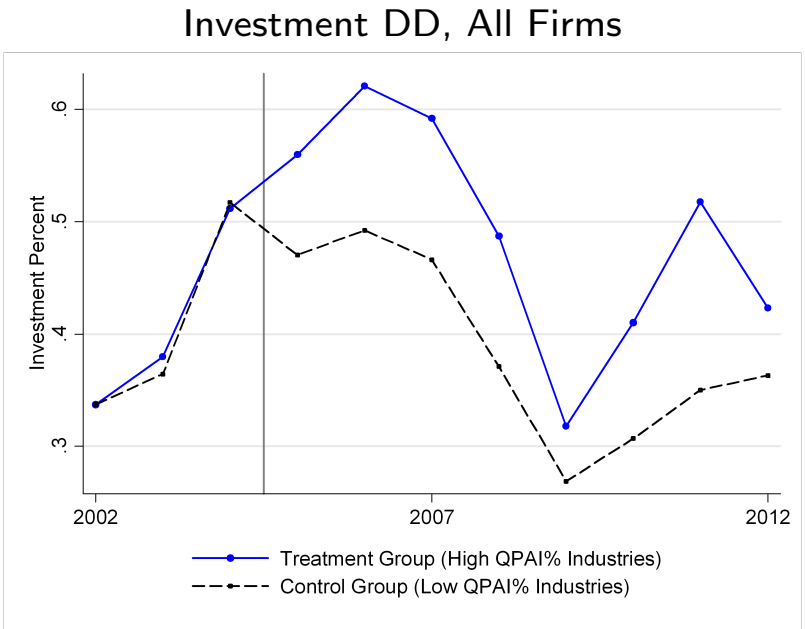
- Investment Percent $= CAPX_t / PPENT_{t-1}$
- Controls for tax depreciation allowances, investment opportunities, cash flow
- Splits based on fiscal year, international income, financial distress, tax status

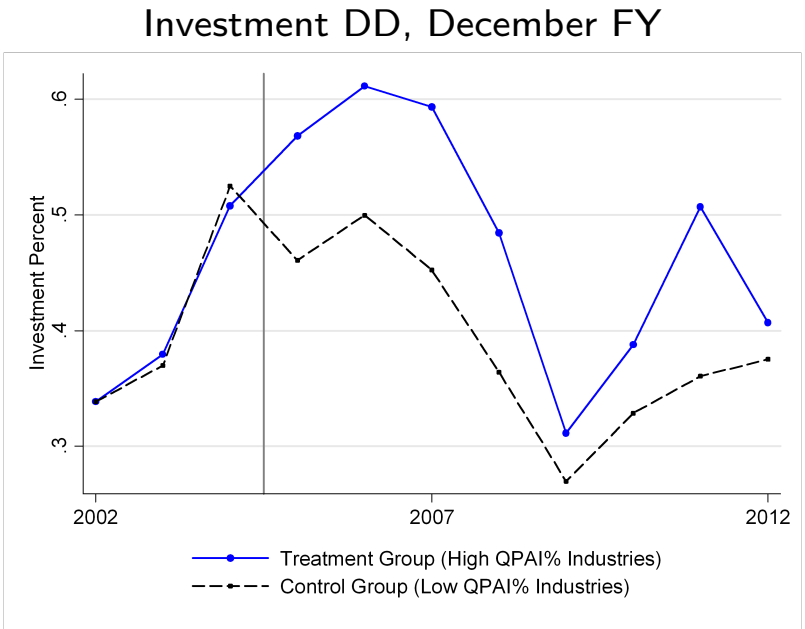
Descriptive Statistics for Investment Sample

	Median	Mean	10th pctile	90th pctile
Investment Percent	0.196	0.450	0.033	0.821
Z Tax Term	0.924	0.917	0.876	0.952
Marg Q	1.493	4.630	0.835	4.986
Cash Flow	0.160	-8.368	-27.864	1.746
HP Index	-4.172	-4.129	-6.629	-1.626
Dec Fiscal Year	1.000	0.682	0.000	1.000
Domestic	1.000	0.672	0.000	1.000
Firms			11,189	
Firms x Years			72,341	

Notes: Table 3 reports the mean, median, 10th percentile, and 90th percentile statistics for the outcome variable (investment percent), control variables (Z Tax Term, Marg Q, Cash Flow, and HP Index), and sample splitting variables (Foreign, Foreign percent, and December Fiscal Year) for the main investment analysis sample. Tax Loss is measured in millions of dollars.

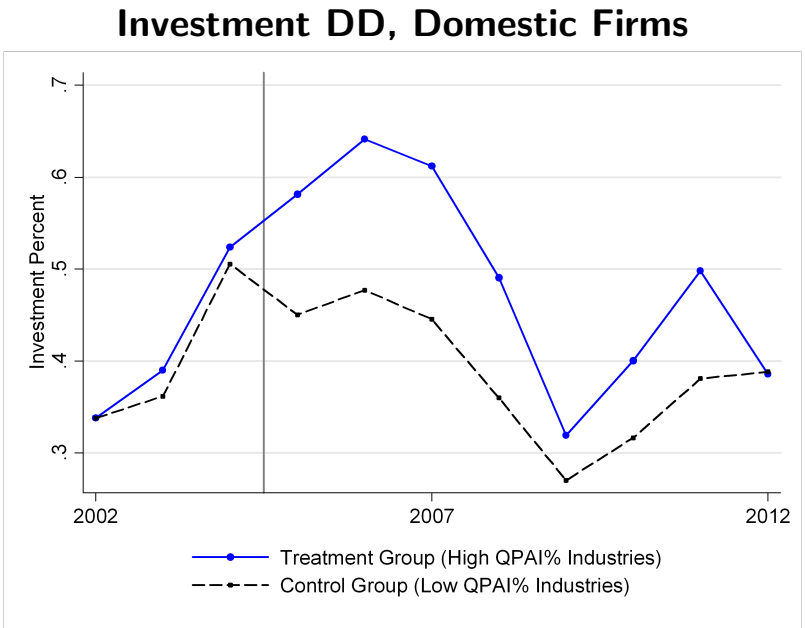
Graphical DD; Baseline

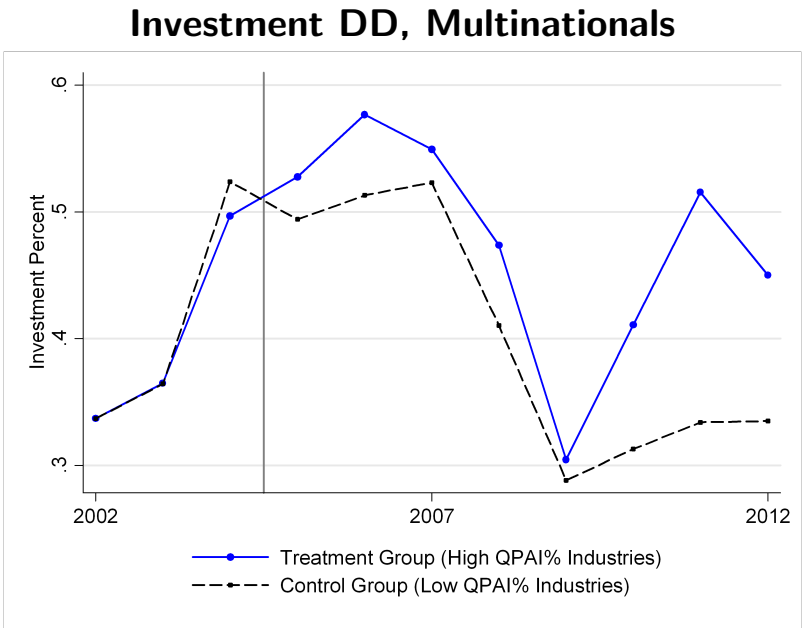




Notes: Figures 4(A) - 4(D) plot the mean investment percent over time for groups sorted according to their industry-based treatment intensity. The intensity of the treatment depends on the percentage of income that is eligible for the Domestic Production Activities Deduction and therefore qualifies as Qualified Production Activities Income. The Treatment Group (Control Group) is defined as firms within industries in which more than (less than) 40% of income is derived from Qualified Production Activities. The treatment years are years 2005-2012 as the DPAD increases from 0 to 3 to 6 to 9% in 2005, 2007, and 2010. The averages plotted here are derived through the following procedure: cross-sectional regression of investment percent on controls for tax depreciation allowances, cash flows, and financial constraint are run in each year. Residual group means for the treatment and control group are then calculated and added to the mean investment percent for each year. Finally, group means in year 2002 are subtracted from all observations and the overall mean investment percentage in added to ease the comparison of trends. All means are count weighted.

Graphical DD; Domestic vs. Multinational





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Regression Analysis; Baseline

- DPAD coefficient: increase in Investment % for a 100% QPAI firm & 9% DPAD
- mean Investment % = 0.45, mean QPAI % = 38% → conver factor = 0.84
- From (2) DPAD increase Investment % by 12% for the average firm

Baseline DPAD Investment Response

Dependent Variable:	Investment Percent			
Specification	(1)	(2)	(3)	(4)
DPAD	0.099**			
	(0.049)			
Controls				
Dec. Fiscal Year End				
Prior to 2008				
Adj. R-Square	0.009			
Firms	11,189			
Firm x Years	72,341			

Notes: Specifications (1) through (4) present coefficients from regressions of the form

$$\frac{I_{it}}{K_{i,t-1}} = \beta_0 + \beta_1 DPAD_{jt} + \sum_{s=1}^{n} \beta_s \text{Control}_s + \epsilon_{it}.$$

In specifications (2), (4), and (5), controls for bonus depreciation, financial distress, marginal Q, and cash flows are included. In specifications (3) and (4), the analysis is limited to firms with December fiscal year ends. Specification (5) is limited to years prior to 2008. All specifications include firm and year fixed effects. Standard errors are clustered at the firm level and are robust to heteroskedasticity. *** indicates statistical significance at the 1% level, ** at 5%, and * at 10%.

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Controls		✓		
Dec. Fiscal Year End				
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Adj. R-Square	0.009	0.114		
Firms	11,189	11,189		
Firm x Years	72,341	72,341		

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	(0.049)	(0.050)	(0.068)	
Controls		✓	✓	
Dec. Fiscal Year End			✓	
Prior to 2008				
Adj. R-Square	0.009	0.114	0.115	
Firms	11,189	11,189	7,873	
Firm x Years	72,341	72,341	49,338	

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	(0.049)	(0.050)	(0.068)	(0.096)
Controls		✓	✓	✓
Dec. Fiscal Year End			✓	
Prior to 2008				✓
Adj. R-Square	0.009	0.114	0.115	0.149
Firms	11,189	11,189	7,873	9,588
Firm x Years	72,341	72,341	49,338	44,532

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Regression Analysis; Sector FE & Trends

DPAD Investment Response w/ Sector FE & Trends

Dependent Variable:	Investment Percent		
Specification	(1)	(2)	(3)
DPAD	0.551***	0.509***	0.503***
	(0.125)	(0.112)	(0.113)
Sector x Year FE	✓		
Sector Linear Time Trends		✓	
Sector Quadratic Time Trends			✓
Adj. R-Square	0.120	0.126	0.126
Firms	10,936	10,267	10,267
Firm x Years	70,746	60,154	60,154

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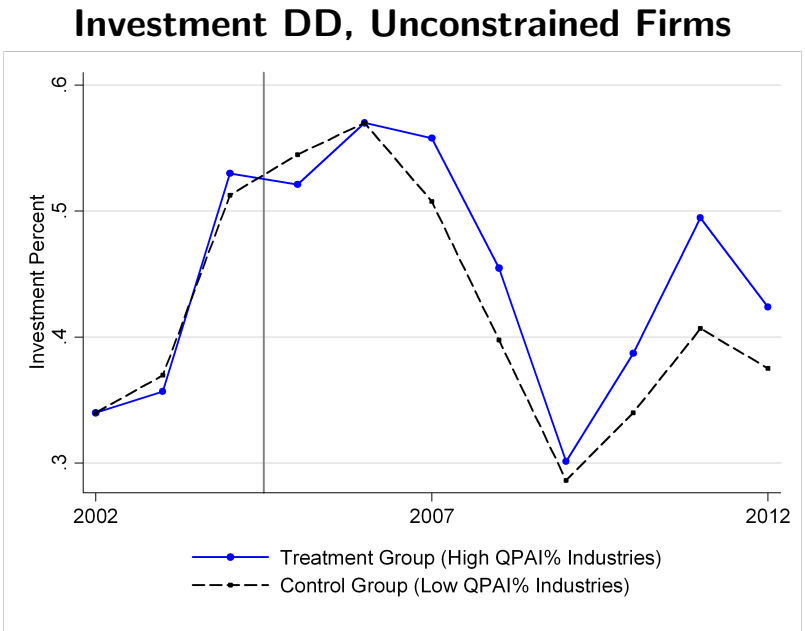
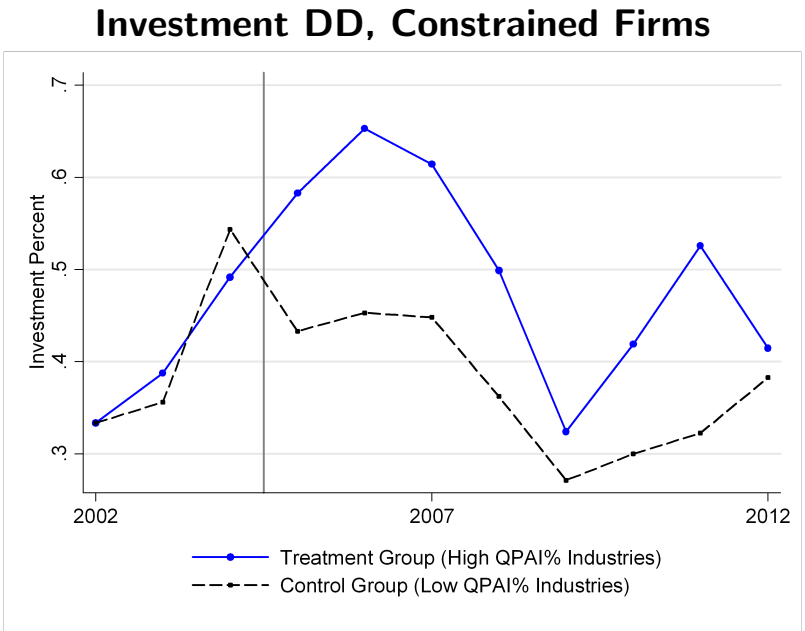
Graphical DDD; Financial Constraint





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Regression Analysis; Financial Constraint Heterogeneity

Investment Response and Financial Constraint

Dep. Variable:	Investment Percent			
Specification	(1)	(2)	(5)	(6)
HP Index Split	<Medan	>=Median		
DPAD	0.058*	0.223*		
	(0.030)	(0.114)		
Equality Test	P = 0.160			
Adj. R-Square	0.016	0.124		
Firms	3,782	4,763		
Firm x Years	31,296	31,294		

Notes: All specifications include controls for bonus depreciation, marginal Q, and cash flows. Specifications (1) and (3) limit the analysis to firms with below median levels of financial constraint as measured by the HP Index. Specifications (2) and (4) limit the analysis to firms with above median levels of financial constraint. Specifications (5) and (6) limits analysis to firms with above and below the 80th percentile of financial constraint respectively. The equality test measures whether the $DPAD$ coefficient is equal in specifications (1) and (2), (3) and (4), and (5) and (6); P-values are presented. All specifications include firm and year fixed effects. Standard errors are clustered at the firm level and are robust to heteroskedasticity. *** indicates statistical significance at the 1% level, ** at 5%, and * at 10%.

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Investment Response and Financial Constraint

Dep. Variable:	Investment Percent			
Specification	(1)	(2)	(5)	(6)
HP Index Split	<Medan	>=Median	>80%	>=80%
DPAD	0.058*	0.223*	0.063	0.545**
	(0.030)	(0.114)	(0.040)	(0.258)
Equality Test	P = 0.160		P= 0.064*	
Adj. R-Square	0.016	0.124	0.030	0.159
Firms	3,782	4,763	6,518	2,027
Firm x Years	31,296	31,294	50,080	12,510

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DPAD: An Effective Investment Stimulus?

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Empirical Results

- Investment Percent increases by more than 12% for a firm with average percentage (40%) of income derived from domestic manufacturing
- Finding robust to sector-by-year FE and trends
- Firms facing severe financial constraints are much more responsive

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Compared to other corporate tax policies?

- DPAD: strong investment response

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- DPAD: strong investment response
- Bush Tax Cuts: no investment response
- Bonus Depreciation: small investment response among large publicly traded corporations, smaller, financially constrained firms more responsive

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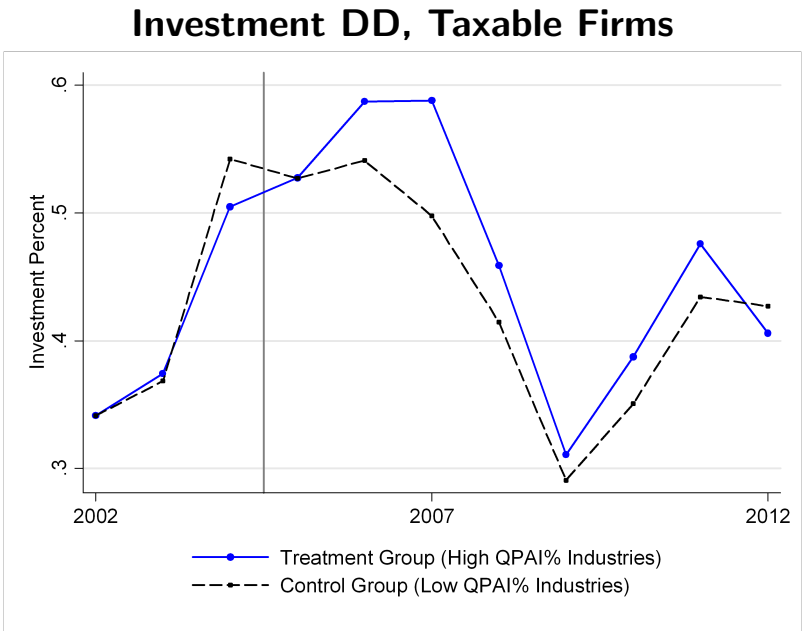
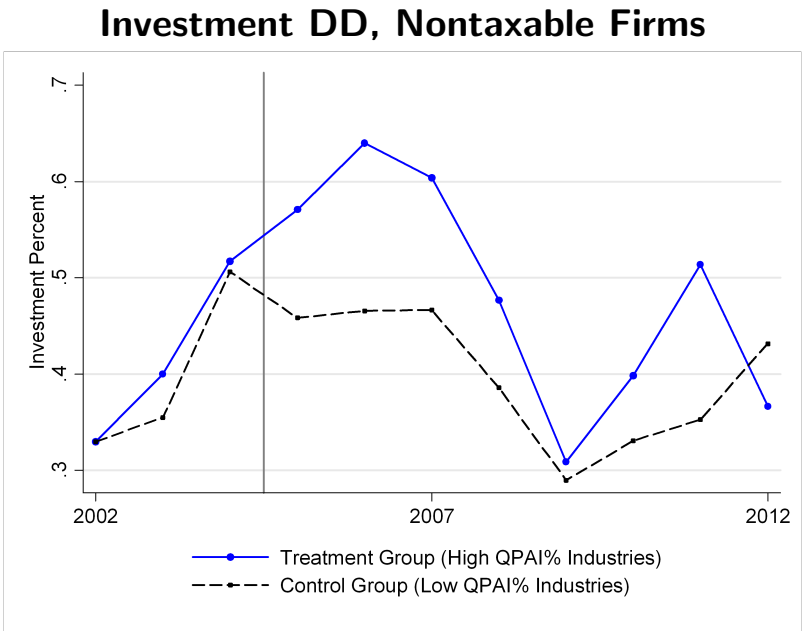
- Bonus Depreciation: small investment response among large publicly traded corporations, smaller, financially constrained firms more responsive
- Comparison suggests corporate tax rate cut is an effective investment stimulus; payouts rate cut, accelerated depreciation are not

Thank you for your comments and feedback.

Grpahical DD; Tax Status





Notes: Figure 5 plots the mean investment percent over time for groups sorted according to their industry-based treatment intensity. The intensity of the treatment depends on the percentage of income that is eligible for the Domestic Production Activities Deduction and therefore qualifies as Qualified Production Activities Income. The Treatment Group (Control Group) is defined as firms within industries in which more than (less than) 40% of income is derived from Qualified Production Activities. The treatment years are years 2005-2012 as the DPAD increases from 0 to 3 to 6 to 9% in 2005, 2007, and 2010. The averages plotted here are derived through the following procedure: cross-sectional regression of investment percent on controls for tax depreciation allowances, cash flows, and financial constraint are run in each year. Residual group means for the treatment and control group are then calculated and added to the mean investment percent for each year. Finally, group means in year 2002 are subtracted from all observations and the overall mean investment percentage in added to ease the comparison of trends. Taxable (Non Taxable) firms are those with taxable income in at least (less than) half of the years prior to 2005. All means are count weighted.

Investment Response and Tax Status

Dep. Variable:	Investment Percent					
Specification	(1)	(2)	(3)	(4)	(5)	(6)
Tax Loss Split	<2 Yr	>2 Yr	Taxable	Tax Loss		
MTR Split					>21%	<=21%
DPAD	0.118*	0.152	0.073	0.291	0.054	0.207*
	(0.062)	(0.120)	(0.075)	(0.268)	(0.042)	(0.124)
Equality Test	P = 0.802		P = 0.433		P= 0.245	
Adj. R-Square	0.109	0.141	0.125	0.110	0.013	0.159
Firms	4,148	3,050	3,376	1,162	2,692	3,600
Firm x Years	31,379	20,526	24,596	6,529	22,533	23,063

Notes: All specifications include controls for bonus depreciation, marginal Q, and cash flows. Specifications (1) and (2) split the sample based on whether the firm is taxable in fewer than 2 or more than 2 years during the period 2002-2004. Specifications (3) and 42) split the sample based on whether the firm is taxable in all years or no years during the period 2002-2004. Specifications (5) and (6) limit the analysis to firms with above/below median average MTRs during years 2001-2004. The equality test measures whether the $DPAD$ coefficient is equal in specifications (1) and (2), (3) and (4), and (5) and (6); P-values are presented. All specifications include firm and year fixed effects. Standard errors are clustered at the firm level and are robust to heteroskedasticity. *** indicates statistical significance at the 1% level, ** at 5%, and * at 10%.

QPAI

QPAI is income derived from US domestic production. More technically...

QPAI is equal to the excess Domestic Production Gross Receipts (DPGR) over the Domestic Production Gross Costs (DPGC)

DPGR is defined as any income derived from

- Lease, rental, license, sale of goods manufactured in the US
- Construction and engineering and architectural services performed in the US
- Except sale of prepared foods and energy transmission

DPGC are defined as

- Costs of goods allocable to DPGR
- Other deductions, expenses or losses directly allocable to DPGR or
- A ratable portion of other expenses not directly allocable to such receipts

An item qualifies as produced in the United States if at least 20% of the total costs are the result of direct labor and overhead costs from US–based operations.

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Table 1: QPAI % for IRS Sample

Variable	Year(s)	Median	Mean	10th pctile	90th pctile
QPAI %	2005-2010	9.394	25.538	0.291	71.127
QPAI %	2005	7.979	21.098	0.098	67.005
QPAI %	2006	9.571	25.487	0.156	74.922
QPAI %	2007	9.361	27.588	0.370	68.330
QPAI %	2008	10.696	26.219	0.524	70.171
QPAI %	2009	8.588	27.046	0.307	77.863
QPAI %	2010	10.013	25.883	0.280	73.811
Industries			77		
Industries x Years			462		

Notes: Table 1 provides descriptive statistics for the variable QPAI % for the IRS Sample – all corporations that filed a tax return during the year in question. QPAI % is defined as the percentage of taxable income that is derived from Qualified Production Activities.