

# **Tax Incentives, Small Businesses, and Physical Capital Reallocation**

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# Tax Incentives and Investment in Physical Capital

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- A very important topic as policymakers use tax incentives to spur investment and growth when economic growth is low.
- House and Shapiro (2008); Zwick and Mahon (2017)
  - Tax Incentives: Bonus depreciation (under section 168(k) of IRS), introduced after recessions
  - Bonus depreciation accelerates the deduction of the cost of investment in **new capital goods** from taxable income
  - Alters the timing (and not the amount) of deductions and incentivises investment as future deductions are worth less than current
  - Temporary tax subsidies on new capital goods results in immediate investments in new capital goods

If tax incentives influence investment in new capital, they can also have spillover effects on the availability, price, and investment in old capital

# The Paper

- **Question:** Does tax incentives has a spillover effect on the frims' investment in the old capital?
- **Conceptual Framework:**
  - Price of old capital is higher than its value, resulting in under-investment by financially constrained firms ([Lanteri and Rampini \(2023\)](#))
  - Tax incentives result in substitution between the new and old capital
  - Tax incentives  $\rightarrow$  Demand for new capital  $\uparrow\uparrow$   $\rightarrow$  Supply of old capital  $\uparrow\uparrow$   $\rightarrow$  Price of old capital  $\downarrow\downarrow$   $\rightarrow$  Investment in old capital  $\uparrow$
- **Empirical finding:**
  - Accelerated depreciation of new equipment increase investment in old capital goods by 9.2% (44.3% of the direct effect)
  - Tax subsidies on new equipment increase the supply of old equipment in the secondary market and lower its price.

Investment in new capital goods, motivated by tax incentives, fosters the reallocation of old capital goods in the economy during recessions.

# Data and Empirical Strategy

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- **Data:** Transaction-level equipment purchases by small U.S. firms
  - Uniform Commercial Code (UCC)-1 statements
  - 1.7 million purchases of new and old equipment by 424,768 firms
  - Only includes equipment such as tractors, loaders, excavators, copiers, mowers, trucks, trailers, sprayers, and cultivators.
- **Identification strategy:** [Zwick and Mahon \(2017\)](#)
  - Industries with long-lived assets are more likely to benefit from bonus depreciation (at the three-digit industry code level)
  - Present value of tax benefits due to bonus depreciation ( $z^\theta$ )
  - Most affected: crop production; fabricated metal manufacturing
  - Least affected: professional, scientific, and technical services; administrative and support services

Well-established identification strategy and good use of a novel dataset

# Direct Effect: Investment in New Capital Goods

## PANEL A: Direct Effect: New Equipment Investment

Dependent Variable:	<i>Log(\$ New Equipment Investment)</i>			
	(1)	(2)	(3)	(4)
Level: Buyer-Year				
$z_{j,t}^{\theta}$	8.881*** (5.570)	5.260*** (4.174)	5.443*** (4.046)	4.666*** (3.765)
Observations	543,670	543,670	376,494	376,494
Clusters (Industry)	240	240	237	237
R <sup>2</sup>	0.24	0.24	0.69	0.69
Year Fixed Effects	Y	Y	Y	
Industry Fixed Effects	Y	Y		
Sector Trends		Y	Y	Y
Buyer Fixed Effects			Y	Y
Buyer Size $\times$ Year Fixed Effects				Y

Increase in new equipment investment due to tax subsidy on new equipment is consistent with Zwick and Mahon (2017)

## Direct Effect: Prices of New Capital Goods

PANEL C: Impact on Price of New Equipment

Dependent Variable:	<i>New Price Residual</i>			
	(1)	(2)	(3)	(4)
Level: Equipment Code-County-Industry-Year				
$z_{j,t}^{\theta}$	0.130** (2.467)	0.014 (0.315)	0.010 (0.217)	0.006 (0.139)
Observations	546,459	546,437	546,432	546,432
Clusters (Industry)	240	240	240	240
R <sup>2</sup>	0.02	0.07	0.08	0.08
Year Fixed Effects	Y	Y	Y	Y
Industry Fixed Effects	Y	Y	Y	Y
Equipment Fixed Effects		Y	Y	Y
County Fixed Effects			Y	Y
Sector Trends				Y

Slight marginal increase in new equipment prices but not economically significant

## Indirect Effect: Investment in Old Capital Goods

PANEL B: Indirect Effect: Old Equipment Investment

Dependent Variable:	<i>Log(\$ Old Equipment Investment)</i>			
Level: Buyer-Year	(1)	(2)	(3)	(4)
$z_{j,t}^{\theta}$	3.431*** (3.111)	1.995*** (3.202)	2.330*** (3.624)	2.066*** (3.508)
Observations	545,869	545,869	396,142	396,142
Clusters (Industry)	238	238	237	237
R <sup>2</sup>	0.17	0.17	0.62	0.62
Year Fixed Effects	Y	Y	Y	
Industry Fixed Effects	Y	Y		
Sector Trends		Y	Y	Y
Buyer Fixed Effects			Y	Y
Buyer Size $\times$ Year Fixed Effects				Y

Positive and significant effect on the investment elasticity of used equipment, 40% of the new equipment investment elasticity (direct effect)

# Indirect Effect: Prices of Old Capital Goods

PANEL B: Impact on Price of Old Equipment

Dependent Variable: Level: Equipment Code-County-Industry-Year	<i>Old Price Residual</i>			
	(1)	(2)	(3)	(4)
$z_{j,t}^{\theta}$	-0.838*** (-5.590)	-0.940*** (-5.401)	-0.931*** (-5.435)	-0.640*** (-4.067)
Observations	553,601	553,580	553,573	553,573
Clusters (Industry)	238	238	238	238
R <sup>2</sup>	0.02	0.05	0.06	0.06
Year Fixed Effects	Y	Y	Y	Y
Industry Fixed Effects	Y	Y	Y	Y
Equipment Fixed Effects		Y	Y	Y
County Fixed Effects			Y	Y
Sector Trends				Y

Decline in the price of old equipment by 3.2% for long-duration (treatment group) industries, compared with the control industries



## Indirect Effect: Bonus State Conformity and Investment

Dependent Variable: Level: Buyer-Year	<i>Log(\$ Old Equipment Investment)</i>				
	(1)	(2)	(3)	(4)	(5)
$z_{j,t}^{\theta} \times \text{Bonus State Conformity}_{s,t}$	0.413*** (3.626)	0.401*** (3.537)	0.579*** (4.724)	0.457*** (3.082)	0.530*** (3.958)
$z_{j,t}^{\theta}$			2.122*** (2.766)		2.084*** (3.610)
Observations	545,719	545,719	396,142	395,687	396,142
Clusters (Industry)	236	236	237	223	237
R <sup>2</sup>	0.19	0.19	0.62	0.62	0.62
Group Fixed Effects	Y	Y	Y	Y	Y
State Fixed Effects	Y	Y	Y	Y	Y
Buyer Controls	Y		Y	Y	
Industry $\times$ Year Fixed Effects	Y	Y		Y	
Buyer Fixed Effects			Y	Y	Y
Buyer Size $\times$ Year Fixed Effects		Y			Y
Sector Trends					Y

Incremental effect on used investment is positive and statistically significant

## Indirect Effect: Bonus State Conformity and Prices

Dependent Variable: Level: Equipment Code-County-Industry-Year	<i>Old Price Residual</i>			
	(1)	(2)	(3)	(4)
$z_{j,t}^{\theta} \times \text{Bonus State Conformity}_{s,t}$	-0.039** (-2.185)	-0.058*** (-2.882)	-0.048** (-2.261)	-0.052** (-2.548)
$z_{j,t}^{\theta}$	-0.938*** (-5.396)	-0.926*** (-5.430)		-0.638*** (-4.066)
Observations	553,580	553,573	553,421	553,573
Clusters (Industry)	238	238	237	238
R <sup>2</sup>	0.05	0.06	0.07	0.06
Group Fixed Effects	Y	Y	Y	Y
Year Fixed Effects	Y	Y		Y
Industry Fixed Effects	Y	Y		Y
Equipment Fixed Effects		Y	Y	Y
County Fixed Effects		Y	Y	Y
Industry $\times$ Year Fixed Effects			[No Title]	
Sector Trends				Y

Effect of state bonus conformity on used equipment price is incrementally negative

# Comment 1: Substitution vs Augmentation

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- **Substitution:**

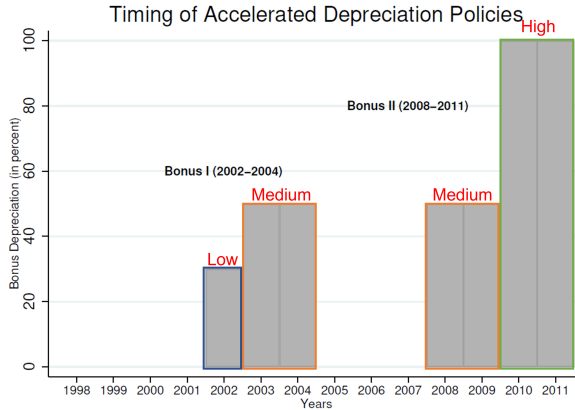
- Focuses on the case where some firms invest in new capital goods to replace old capital goods, reducing the prices of old capital goods
- Other financially constrained firms buy these old capital goods in the secondary market

- **Augmentation:**

- But what about the case in which firms invest in new capital goods to augment the old capital in order goods to expand capacity?
- No increase in the supply of old capital goods, thus no impact on investment in old capital goods
- What are the time dynamics of substitution versus augmentation across years?
- Does economic conditions determine the firms' substitution versus augmentation strategy?

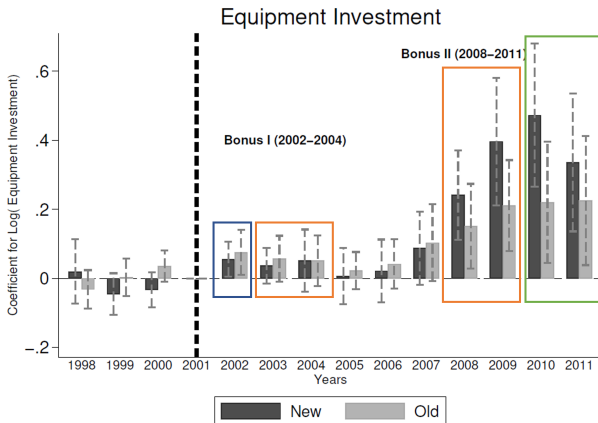
Data allows us to see the time trend of substitution versus augmentation

## Comment 2: Time Dynamics of Tax Incentives



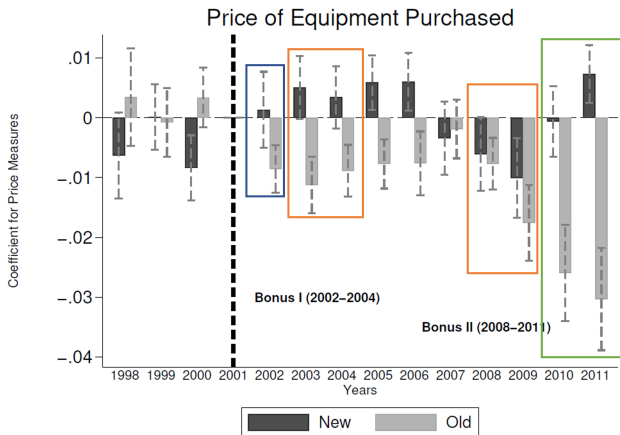
Different rate of bonus depreciation across years

## Comment 2: Time Dynamics of Investments



Different investments (both old and new) in periods with the same rate of bonus depreciation

## Comment 2: Time Dynamics of Prices



Similarly, different responses to equipment prices in periods with the same rate of bonus depreciation; lower price of the old capital in no-tax incentive years

## Comment 3: Conformity with Section 179

PANEL B: Impact on Old Equipment Investment

Dependent Variable: Level: Buyer-Year	<i>Log(\$ Old Equipment Investment)</i>				
	(1)	(2)	(3)	(4)	(5)
$z_{j,t}^{\theta} \times \text{Sec179 State Conformity}_{s,t}$	0.076 (1.126)	0.053 (0.755)	0.088 (0.953)	-0.003 (-0.035)	0.047 (0.483)
$z_{j,t}^{\theta}$			2.109*** (2.695)		2.042*** (3.446)
Observations	545719	545719	396142	395687	396142
Clusters (Industry)	236	236	237	223	237
R <sup>2</sup>	0.19	0.19	0.62	0.62	0.62
Group Fixed Effects	Y	Y	Y	Y	Y
State Fixed Effects	Y	Y	Y	Y	Y
Buyer Controls	Y		Y	Y	
Year Fixed Effects			Y		
Industry $\times$ Year Fixed Effects	Y	Y		Y	
Buyer Fixed Effects			Y	Y	Y
Buyer Size $\times$ Year Fixed Effects		Y			Y
Sector Trends					Y

Small businesses can fully expense the purchase of both new and used qualified assets, but only within certain limits under Section 179. So why is there no effect on old investments? What about new investments?

## Minor Comments

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- Tax incentives work due to discounting, so what are the effects of interest rate regime on tax incentives?
- More detailed discussion about data limitations and robustness test done to address the issues
- Only observe a firm when it makes new investments funded by loans and not investments funded by internal capital
- Can the data be converted into a stock of capital to see argumentation versus substitution?



# Conclusion

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- Important topic with considerable policy implication
- Clear contribution
- Rich dataset and well-established identification strategy
- More analysis and discussion on the heterogeneous response of the investment to tax incentives across time periods will further enrich the paper