

Do Investors Value Tax Investment Incentives? Evidence from Bonus Depreciation and the Fiscal Cliff

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Introduction

As 2012 drew to a close, the U.S. economy was speeding towards the “fiscal cliff”

- ▶ a series of previously enacted laws that would come into effect on Jan 1, 2013
- ▶ simultaneously increasing taxes while decreasing spending
- ▶ CBO projected fiscal cliff would plunge the economy back into recession

January 1, 2013, U.S. Congress passed **The American Taxpayer Relief Act of 2012**

→ postponed spending cuts, extended tax breaks to partial resolve the crisis

In a move that surprised many experts, ATRA extended a much maligned policy

Bonus Depreciation

- ▶ tax investment incentive
- ▶ accelerates the rate at which new capital purchases can be deducted for tax purposes
- ▶ reduces the present value cost of new capital investments

Project Overview

This project uses

1. this surprise extension of the policy
2. industry-level variation in its generosity
3. differential effects event study methodology

to **Estimate the Value of Bonus Depreciation to Investors**

Findings

- ▶ 0.5% increase in stock price for firms that benefited most from the extension
- ▶ response was not concentrated amongst firms shown to be most responsive
- ▶ was concentrated amongst firms most in need of cash

→ Investors value the near-term cash flow effects of bonus depreciation but not the additional investment it stimulates

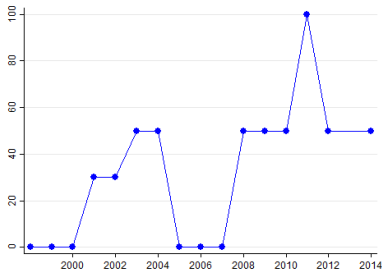
These results have implications for federal policymakers and provide new insights into investor behavior with regard to tax incentives and investor behavior more generally.

Bonus Depreciation

- ▶ Allows a “bonus” percentage of investment costs to be deducted from taxable income in the first year
- ▶ Stimulates investment by **decreasing the present value cost of investment**. Decrease depends on asset life, depreciation method, firm’s discount rate
- ▶ Federal **Bonus Depreciation** first enacted 2001, part of JCWA 2002

Figure: Federal Bonus Depreciation

For Qualifying Assets Purchased		Bonus
After	Before	
09/10/2001	05/06/2003	30%
05/05/2003	01/01/2005	50%
12/31/2004	01/01/2008	0%
12/31/2007	09/09/2010	50%
09/08/2010	01/01/2010	100%
12/31/2011	01/01/2015	50%



Notes: Figure 1 presents the maximum federal bonus depreciation rate offered in each year, 1998 to 2014.

The Extension of Bonus Depreciation via ATRA

This study's identification strategy is based on the assertion that the ATRA extension of bonus depreciation which was set to expire on Jan. 1, 2013, was a surprise.

Four pieces of supporting evidence

1. Contemporary reports suggested corporate investment was unresponsive to bonus depreciation. August 2012 CRS report (Guenther (2012)): "Three studies, two from 2006 and the other from 2007, provide additional support for the view that temporary accelerated depreciation is largely ineffective as a policy tool for economic stimulus."
2. Negotiations surrounding the fiscal cliff centered on four pieces of legislation. No draft of any of these bills ever contained a provision that extended bonus depreciation.
3. No major news organization (New York Times, Wall Street Journal, Fox News) mentioned bonus depreciation in coverage of the fiscal cliff prior to ATRA passage.
4. Many trade journals, industry blogs noted that the inclusion was a surprise. For example: TEQLease Capital wrote "Congress also surprised many by extending the "Bonus Depreciation" allowance on qualified new equipment through 2013 for businesses."

The Extension of Bonus Depreciation via ATRA

Two Final Points re: ATRA 2012

1. January 2nd was a Monday
 - ▶ Info re: negotiations that occurred over the December 31 / January 1 weekend would be capitalized into asset prices on Monday January 2nd
 - ▶ January 2nd is the event day (or day 1).
2. ATRA extended two other tax provisions that could affect stock prices
 - ▶ ATRA extended Section 179 expensing for equipment purchases < \$500,000
 - ▶ ATRA extended the R&D tax credit

Empirically Testable Hypotheses

Hypothesis 1 *If investors value bonus depreciation, after the passage of ATRA, shareholder value will increase more for those firms that invest in long-lived assets and therefore benefit the most from bonus depreciation extension.*

Hypothesis 2 *If investors value the additional investment stimulated by bonus then, after the passage of ATRA, increases in shareholder value due to bonus depreciation will be concentrated amongst firms whose investment will be the most responsive to the policy.*

Zwick and Mahon (2017): investment by small, financially constrained firms, that do not have TLCFs is the most responsive

Empirical Strategy

To test **Hypothesis 1**, I construct an industry-level measure of the effect of ATRA bonus depreciation extension.

Step 1 I calculate, z_0 , the industry-averaged present value of tax shields generated by \$1 of new investments under MACRS using IRS publication 946 and BEA data on industry-level investment data.

Step 2 I use z_0 to construct **BONUS**, the industry-average percentage point decrease in present value investment costs due to bonus extension.

$$\mathbf{BONUS} = (0.5 + (1 - 0.5) \times z_0) \times 35\%$$

REMINDER: BONUS is larger when z_0 is smaller / investments are longer-lived

Step 3 (In the majority of the analysis), I assume that investors

1. do not perfectly observe z_0 in the past
2. cannot they perfectly predict z_0 in the future

Therefore, I construct **High BONUS**: = 1 in the top half of BONUS distribution,
= 0 else.

Empirical Strategy

I then regress (5-day) Buy-and-Hold-Abnormal Returns (BHARs) constructed based on event date Jan. 2, 2013 on High BONUS:

$$\text{BHAR}_{i,t} = \beta_0 + \beta_1[\text{High BONUS}]_i + \mathbf{X}_i' \boldsymbol{\gamma} + \epsilon_i \quad (1)$$

β_1 : pct. point increase in stock prices for High BONUS versus Low BONUS firms

Two Main Threats to Identification

1. Abnormal returns prior to ATRA differ between High BONUS and Low BONUS industries for reasons unrelated to bonus depreciation

Pre-Trend BHARs Calculate BHARs beginning 15 days prior to ATRA, show these BHARs exhibit no divergence prior to ATRA

2. Industry-level shocks to BHARs correlated with High BONUS that coincide with the passage of ATRA are responsible for any observed differences in BHARs

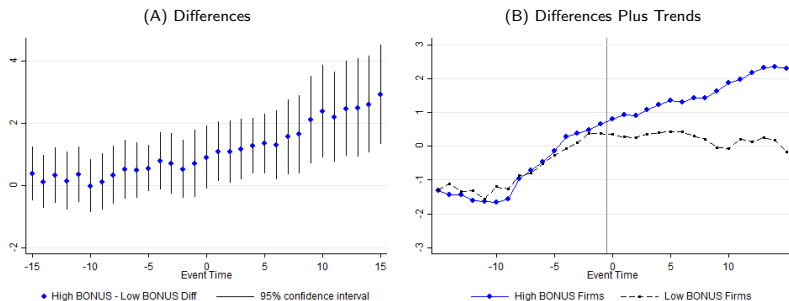
R&D Tax Credit I control for R&D levels in the regression; only information orthogonal to Avg R&D is used to estimate β_1 .

Section 179 Extension I estimate (1) using only **High Investment** firms (those that usually invest more than \$2.5 million).

Alternatively, I include an interaction between High BONUS and Low Investment.

Preliminary Graphical Evidence

Figure: Raw BHAR Differences Between High and Low BONUS Firms



Notes: Panel (A) plots coefficients from a regression of BHARs on High BONUS where the BHARs vary from day -15 to +15. Vertical lines represent 95% confidence intervals. In Panel (B) these raw differences are added to BHAR trends. To add the trends, for each day, one half of the coefficient from Panel (A) is subtracted from the average BHAR to create the Short-lived asset firm line. Then, for each day, one half of the coefficient from Panel (A) is added to the average BHAR to create the Long-lived asset firm line. Finally, the two lines are equalized in days prior to the event by subtracting the average difference during days -15 to -1 to eliminate level-difference prior to ATRA2012.

Headline Regression Results

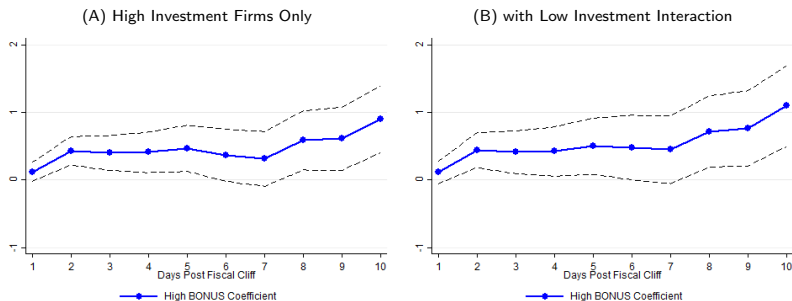
Table: Effect of High BONUS on BHARs

Dep Var.	5-Day Buy-and-Hold Abnormal Return				
	All Firms	All Firms	All Firms	High Inv.	All Firms
Sample	(1)	(2)	(3)	(4)	(5)
High Bonus	0.426*	0.474**	0.444**	0.469**	0.499**
	(0.226)	(0.204)	(0.211)	(0.213)	(0.240)
Low Investment					-0.297
					(0.597)
High Bonus x Low Inv.					-0.186
					(0.627)
R&D Control		✓	✓	✓	✓
Other Controls			✓	✓	✓
Firms	4,293	4,293	4,293	3,337	4,293

Notes: This table reports estimates of the effect of the ATRA 2012 bonus depreciation extension on stock prices. The dependent variable in all specifications is the Buy-and-Hold Abnormal Return calculated five days after passage of ATRA 2012. High Bonus is the dependent variable in all specifications. Specification (2) includes Avg R&D to the regressions. Specifications (3)–(5) include the full set of controls described in Table 2. Specification (4) limits the analysis to firms that invested more than 2 million, on average, during the prior three years. Low Investment and Low Investment interacted with High Bonus are added to Specification (5).

Headline Regression Results, Variable BHAR Date

Figure: Effect of High BONUS on BHARs



Notes: Figure 3 displays High BONUS coefficients from regressions of BHAR on High BONUS as the BHAR outcome varies from 1 to 10 days after ATRA2012 passage. Panel (A) coefficients correspond to Specification (2) with the full suite of controls but limits the analysis to firms that invest more than \$2.5 million, on average. Panel (B) coefficients correspond to Specification (3) that includes Low Investment and Low Investment interacted with High BONUS. The dashed lines represent 95% confidence intervals on the High BONUS coefficients.

Summary and Scrutiny

Summary of Headline Results

- ▶ After bonus depreciation extension, stock prices increase approximately 0.5 percentage points more for firms that invest in longer-lived assets / benefit relatively more from the extension
- ▶ Controlling for R&D activity does not substantially alter empirical results
- ▶ Consistent with the extension of Section 179 in the same bill, stock price increase is concentrated among High Investment Firms
- ▶ Overall, the empirical analysis strongly supports Hypothesis 1 and suggests investors value bonus depreciation.

Results Scrutiny Exercises

- ▶ Use Cumulative Abnormal Returns instead of BHARs
- ▶ Use permutation tests to provide a comprehensive series of placebo tests and to validate standard error estimates
- ▶ Verify the measurement of the High BONUS → re-estimate baseline parameters analysis using an empirically constructed measure of bonus depreciation benefit

Summary and Scrutiny

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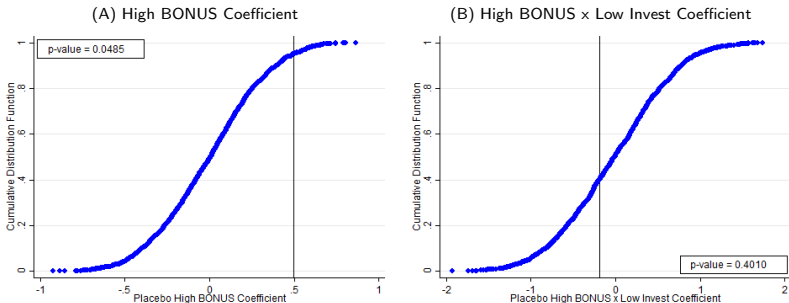
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Permutation Tests, Nonparametric Standard Errors

Figure: Placebo Coefficient CDFs



Notes: Panels (A) and (B) of this figure plot empirical distributions of placebo coefficients for High Bonus and High Bonus \times Low Tax. Each CDF is constructed by regressing the 5-Day Buy-and-Hold Abnormal Returns on 2,000 randomly assigned High Bonus and High Bonus \times Low Tax treatments and controls as in Specification (5) of Table 1. To create the random treatments, each industry is assigned another industry's actual High Bonus treatment (0 or 1) without replacement. High Bonus is then interacted with each firm's actual Low Invest (0 or 1) to create the High Bonus \times Low Tax treatment. No parametric smoothing is applied: the CDF appears smooth because of the large number of points used to construct it. The vertical lines show the treatment effect estimate reported in Specification (4) of Table 1. In Panel (A), 97 out of the 2000 (4.85 percent) of placebo coefficients are larger than the estimated effect. In Panel (B), 802 out of the 2000 (40.1 percent) of placebo coefficients are smaller than the estimated effect.

Testing Hypothesis 2: Heterogeneous Effects

$$\text{BHAR}_{i,t} = \beta_0 + \beta_1[\text{High BONUS}]_j + \beta_2[\text{High BONUS}_i \times \text{Het Indicator}_i] + \mathbf{X}_i' \boldsymbol{\gamma} + \epsilon_i$$

- ▶ β_2 is *not* statistically significant for interactions with responsiveness indicators
 1. Firm Size
 2. Firm Age
 3. HP Financial Constraint Index
 4. TLCF / Asset

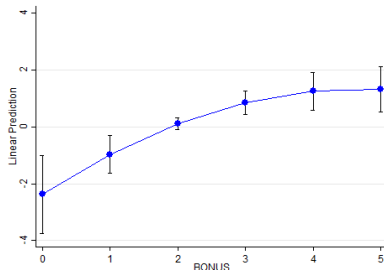
- ▶ β_2 is statistically significant for interactions with cash flow indicators
 1. Debt Ratio
 2. Cash Flow / Asset (negative)

→ Investors value the cash flows generated by the policy but not the investment responses that it creates.

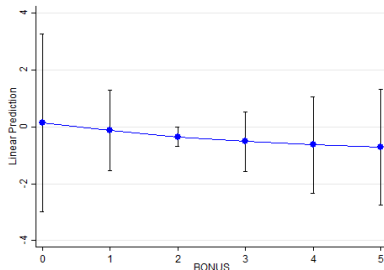
Using Industry-level Estimates on BONUS

Figure: Predicted Effects of Industry-Varying BONUS on BHARs

(A) High Tax Firms



(B) Low Tax Firms



Notes: This figure displays predicted 5-day Buy-and-Hold Abnormal Returns as a function of BONUS. Panel (A) is produced using estimates from the quadratic BONUS specification for firms in the top half of the LR Cash ETR distribution (Specification (5) of Table ??). Panel (B) is produced using estimates from the quadratic BONUS specification for firms in the bottom half of the LR Cash ETR distribution (Specification (6) of Table ??).

Findings and Conclusions

This study has used the surprise extension of bonus depreciation after the partial resolution of the U.S. 2013 fiscal cliff to show

1. Stock prices of firms that benefit the most from bonus depreciation increase by 0.5 percent relative to firms that benefit the least
 - ▶ Investors value bonus depreciation
2. Stock price responses to bonus extension are concentrated amongst firms that have constrained cash flows but not amongst firms that are most responsive to the policy
 - ▶ Investors value the near-term cash flows generated by bonus
 - ▶ Investors do not value the investment generated by the policy
 - ▶ Relatively large stock price response suggests investors are fairly myopic
3. Stock price responses were similar for firms whose investment costs decreased more than 3% via the extension
 - ▶ Either investors were limitedly rational or may not value investment response

So Why Does This Research Matter?

Tax Reforms

The Government Accountability Office estimates

- ▶ In the U.S., accelerated depreciation is 2nd largest corporate tax expenditure
- ▶ In 2011 alone, depreciation policies decreased federal revenue by \$76.1 billion

How to treat depreciation is a key element in corporate tax reforms packages.

Because investors care about accelerated depreciation policies, low-rate, broad base tax reforms may not receive the “applause” that some have prognosticated
(Neubig (2006))

So Why Does This Research Matter?

Insights into Investor Behavior

A current characterization of investors behavior

- ▶ Large literature suggests investors “fixate” on accounting earnings (Sloan (1996))
- ▶ Corporate managers seem to share this belief (Graham, Harvey, Rajgopal (2005))
- ▶ .. and act in ways that sacrifice real profits to increase accounting earnings
(i.e. Erickson, Hanlon, Maydew (2004))

This research suggest the opposite conclusion.

- ▶ Because bonus depreciation only affects the *timing* of cash flows, accounting earnings are unaffected by the policy (Mills (2006))
- ▶ That investors responds to the extension of bonus, therefore, suggests investors care about the timing of cash flows and are more sophisticated than we give them credit for.

Thank you for your comments and feedback.

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