Firm Responses to Book Income Alternative Minimum Taxes

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Introduction

- In 2018 Amazon had $10 billion in income, paid 0 taxes

- Deductions and credits meant to incentivize productive economic behavior reduce tax bills, sometimes all the way to 0

- Alternative minimum taxes (AMTs) assign a lower tax rate to a broader tax base that excludes many deductions and credits
  - Raise revenue from profitable firms
  - Limit economic incentives

- Renewed interest in using book income as AMT base (Biden tax plan, OECD negotiations for global minimum tax)
Research Question

- How do firms respond to an AMT on book income?
  - How elastic is a book income tax base?
  - Do firms manage earnings to avoid an AMT on book income?
  - Do firms distort production and investment because AMT limits deductions?
This Paper

Diff-in-Diff exploiting 1987 introduction of AMT book income adjustment (AMTBIA87)

- Use balanced Compustat panel 1983-1992
- Compare firms with low effective tax rates (ETRs) that face AMTBIA87 to firms with higher ETRs that do not
- Treatment: $ETR < 23\%$, Control: $ETR \geq 23\%$
- Average ETR over 1984-86 for firms with persistently low ETRs
Findings

- Book income tax base is not responsive to AMTBIA87, firms do not manage their earnings
  - $\varepsilon_{BI,TB} \in [-1.20, 1.36]$ and $\varepsilon_{BI,EM} \in [-0.28, 0.32]$

- No evidence that AMTBIA87 causes firms to modify production or investment policies
  - Investment response per 1% increase in tax rate $\in [-0.29\%, 0.09\%]$

- Revenue scores close to mechanical tax calculations, differ significantly from think-tank estimates
Minimum Tax Policy Timeline

- AMTBIA87 Announced
- ACEA90 Announced
- AMTBIA87 In Effect
- AMTBIA87 Replaced With ACEA90

Marginal Tax Rate on Book Tax Differences

## Book Tax Differences

<table>
<thead>
<tr>
<th>Permanent BTDs</th>
<th>Book Income</th>
<th>Taxable Income</th>
</tr>
</thead>
<tbody>
<tr>
<td>State &amp; Local Taxes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Tax Exempt Income</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Fines</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Meals &amp; Entertainment</td>
<td>100%</td>
<td>50%</td>
</tr>
<tr>
<td>Interest on Govt Bonds</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Temporary BTDs</th>
<th>Book Income</th>
<th>Taxable Income</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depreciation</td>
<td>Straight Line</td>
<td>Accelerated</td>
</tr>
<tr>
<td>Mark to Market</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Rental Income</td>
<td>Smooth</td>
<td>Year of Contract</td>
</tr>
<tr>
<td>Bad Debts</td>
<td>Estimated on Issue</td>
<td>When Realized</td>
</tr>
</tbody>
</table>
Specification

- Differences in differences setup

\[ Y_{it} = \sum_{\tau=1983, \tau \neq 1985}^{1992} (\beta_\tau \cdot Treat_{i\tau}) + \beta_1 X_{it} + \delta_t + \gamma_i + \varepsilon_{it} \]

- \(Treat_i = 1\) in post-period if \(ETR_{84-86} < 23\%\), 0 otherwise

- \(Treat_{i\tau}\) is interaction of \(Treat_i\) with year dummies
Book Tax Differences Response

[Graph showing changes in Book Tax Differences over time, with x-axis labeled from 1984 to 1992, and y-axis labeled as Book Tax Differences / Lagged Assets. The graph includes markers and error bars, with vertical dashed lines at 1986 and 1990.]

Temp vs Perm  Levels  Scaled by Avg Assets  Scaled by Tax Liability
Book Tax Differences Mean Reversion

Event Time

Baseline Specification

Stacked Placebo Estimates (83-85, 85-87, 86-88)
Earnings Management and Investment Responses

- $BTD$ measure earnings management and tax planning behavior
- Do firms manage their earnings? Use discretionary accruals
  - Accruals: income for which cash has not yet been exchanged
  - Residualize on current economic conditions
- Do firms change investment or production policies?
Earnings Management and Investment Responses

(a) Earnings Management
- Reject downwards earnings management > 1% of lagged assets

(b) Investment
- Reject investment declines > 0.3% per 1% change in the tax rate
Revenue Scores

- Project revenue implications of 1 proposed policy
  - 15% minimum tax on book income for firms with >$100M in income
  - Assume book income elasticities and project revenues over 10 year scoring window
Think-Tank Scores Use Large Elasticities

- Mechanical
- Within Empirical Bounds
- Biden Campaign
- Tax Foundation
- PWBM
- TPC
- AEI

Tax Revenue (Billions USD) vs. Largest Elasticity
Conclusion

- Estimate null book income and earnings management responses to AMTBIA87
- Estimate null real responses to AMTBIA87
- Existing revenue scores of proposed book income AMTs use larger elasticities
- These results do not necessarily suggest implementing a book income AMT is good policy
  - Should the FASB control part of the tax base?
  - Should we use minimum taxes as a backstop?
Appendix
Robustness

- Different samples, treatment definitions, controls, scalings
  - DA Levels
  - DA by Avg At
  - DA by Lag At
  - DA by Tax Liability
  - BTD Levels
  - BTD by Avg At
  - BTD by Lag At
  - BTD by Tax Liability
  - temp BTD Levels
  - temp BTD by Avg At
  - temp BTD by Lag At
  - temp BTD by Tax Liability
  - perm BTD Levels
  - perm BTD by Avg At
  - perm BTD by Lag At
  - perm BTD by Tax Liability

- Mean reversion
  - DA mean reversion

- Measurement of accruals
  - DA Levels definitions
  - DA by Avg At definitions
  - DA by Lag At definitions
  - DA by Tax Liability definitions
Earnings Management Heterogeneity

- Null earnings management estimates across the firms size distribution
  - DA Size Quintiles
  - DA Scaled by Avg Assets Size Quintiles
  - DA Scaled by Lagged Assets Size Quintiles

- Null earnings management estimates across industries (noisy in levels)
  - DA Industry
  - DA Scaled by Avg Assets Industry
  - DA Scaled by Lagged Assets Industry
AMTBIA87 imposed a 10% minimum tax on the difference between book income ($BI$) and taxable income ($TI$).

Rate raised to 15% in 1990 (ACEA90).
Minimum Tax Policy Details

- AMTBIA87 imposed 20% minimum tax on half the difference between book income and taxable income plus depreciation.

- Law specifies that AMTBIA87 will be replaced by Adjusted Current Earnings adjustment (ACEA90) in 1990.
  - ACEA90 imposed 20% tax on 75% of difference between ACE and taxable income plus depreciation.
  - ACE uses tax principles to try to construct a measure of income as broad as book income.
Constructing Discretionary Accruals

- **Total accruals:** 
  \[ TA_t = \Delta A_t - \Delta Liab_t - \Delta Cash_t + \Delta Taxes_t - Dept \]

- **Discretionary accruals:** residual of a regression of total accruals on assets, change in sales and PPE. “Jones (1991) Model”

\[
\frac{TA_{i,t}}{A_{i,83-86}} = \sum_{j=1}^{J} \beta_{1,j} \frac{1}{A_{i,83-86}} + \beta_{2,j} \Delta \frac{Sales_{i,t}}{A_{i,83-86}} + \beta_{3,j} \frac{PPE_{i,t}}{A_{i,83-86}} + \psi_j + \epsilon_{i,t}
\]

\[
DA_{i,t} = TA_{i,t} - \overline{TA_{i,t}}
\]

- Construct in levels, and scaled by average pre-period assets and lagged assets

- Run regression on all firms in pre-period, make predictions across full time series

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Earnings Management
Relating ETRs to AMT Liability

\[
BIA = 0.5(BI - (TI + TPA))
\]

\[
AMT = \max\{0.2(TI + TPA + BIA) - \tau TI, 0\}
\]

\[
\frac{AMT}{BI} = \max\{0.1 + 0.1f + [(0.1 - \tau) - 0.1f] \frac{TI}{BI}, 0\}
\]

\[
\frac{AMT}{BI} = \max\{0.1 + 0.1f - \left[\frac{\tau - 0.1}{\tau} + \frac{0.1f}{\tau}\right] ETR, 0\}
\]

So a firm has positive AMT liability if

\[
ETR_{87} < \frac{\tau_{87}(0.1 + 0.1f)}{(\tau_{87} - 0.1) + 0.1f} = 0.2 \implies ETR_{86} < 0.23
\]
Book Tax Differences Response

Scaled by Lagged Assets
Book Tax Differences Response

Scaled by Lagged Assets
Book Tax Differences Response

Scaled by Lagged Assets
Book Tax Differences Mean Reversion

Scaled by Lagged Assets
Book Tax Differences Mean Reversion

Scaled by Lagged Assets
Book Tax Differences Mean Reversion

Scaled by Lagged Assets
Book Tax Differences Mean Reversion

Scaled by Lagged Assets

Baseline Specification

Stacked Placebo Estimates (82-84, 87-89)

Scaled by Lagged Assets
Deferred Tax Expense

- Firms report $BI$, current tax expense and deferred tax expense on their financial statements

\[ BTD = BI - \hat{TI}. \]

I estimate $\hat{TI} = \text{current tax expense}/\tau$

- Temporary $BTD$ reclassify tax expense from current to deferred
  - $100$ bonus depreciation in excess of straight line depreciation creates a $100$ $BTD$ and reduces $TI$ by $100$
  
  - For accounting purposes, the firm should have owed $100\tau$ in current tax expense based on its current period taxable book income
  
  - The $100\tau$ is recorded as deferred tax expense. It will “come due” in some future period when bonus is less than straight line depreciation
Discretionary Accrual Responses

Baseline Results
Discretionary Accrual Responses

Baseline Results
Discretionary Accrual Responses

Baseline Results
Discretionary Accruals (Millions USD)

-300 -200 -100 0 100


ETR=20
ETR=26
Ind x Yr FE
Size x Yr FE
FYE Dec
No Controls
No Multinationals
No Losses
No Fin, No Util
Baseline

Robustness
Robustness
Robustness
Robustness

Book Tax Differences / Lagged Assets

ETR=20
Ind x Yr FE
FYE Dec
No Multinationals
No Fin, No Util
ETR=26
Size x Yr FE
No Controls
No Losses
Baseline

-0.06 -0.04 -0.02 0 0.02
Robustness
Robustness
Robustness
Robustness

The diagram illustrates the book tax differences relative to lagged assets across different years, with various factors such as ETR=20, Ind x Yr FE, Size x Yr FE, FYE Dec, No Multinationals, No Losses, No Fin, No Util, and No Controls. The x-axis represents the years 1984 to 1992, and the y-axis shows the book tax differences in relation to lagged assets. The baseline is represented by a solid black line, while other conditions are indicated by different line styles and colors.
Discretionary Accruals Mean Reversion

Robustness
Discretionary Accruals Alternative Definitions

Robustness
Discretionary Accruals Alternative Definitions

Robustness
Discretionary Accruals Alternative Definitions

![Graph showing discretionary accruals over time with different definitions including robustness.](image)

- **Ind FE, Ind Slopes**: Individually fixed effects, individual slopes.
- **Ind FE, Ind Slopes, Revenues w/out Receivables**: Same as above, but excluding revenues related to receivables.
- **Ind FE, Year FE, Ind Slopes**: Individually fixed effects with year fixed effects, individual slopes.
- **Ind FE, Ind Slopes, Total Accruals w/ Taxes Paid**: Including total accruals with taxes paid.

Robustness
Earnings Management Heterogeneity by Firm Size

1 DA SD = 89 Million USD
Earnings Management Heterogeneity by Firm Size

1 DA SD = 6.3% of avg assets

Discretionary Accrual SD

Size Quantiles

Earnings Management Heterogeneity
Earnings Management Heterogeneity by Firm Size

1 DA SD = 6.9% of lagged assets
Earnings Management Heterogeneity by Industry

1 DA SD = 6.3% of avg assets
Earnings Management Heterogeneity by Industry

1 DA SD = 6.9% of lagged assets

Discretionary Accrual SD

Trade  Manuf  Transp  Util
AMTBIA87 Real Outcome Responses

Baseline Investment Results

Share of Lagged Assets

Sales
COGS
Debt

AMTBIA87 Employment Responses

Baseline Investment Results

Thousands of Employees

-10
-5
0
5
10

1984
1986
1988
1990
1992

Employment

Baseline Investment Results
## AMTBIA87 IV Estimates

### Table 1: Production and Investment Instrumental Variable Variable Estimates

<table>
<thead>
<tr>
<th>Coefficient</th>
<th>(1) Tax Revenue</th>
<th>(2) Sales</th>
<th>(3) COGS</th>
<th>(4) Investment</th>
<th>(5) Debt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Predicted Liability Effect</td>
<td>1.33 (0.45)</td>
<td>20.12 (9.01)</td>
<td>7.88 (5.03)</td>
<td>0.00 (0.00)</td>
<td>0.00 (0.00)</td>
</tr>
<tr>
<td>First Stage Coefficient</td>
<td>3.00 (1.12)</td>
<td>3.00 (1.12)</td>
<td>3.00 (1.12)</td>
<td>3.00 (1.12)</td>
<td>3.00 (1.12)</td>
</tr>
<tr>
<td>Observations</td>
<td>5718</td>
<td>5718</td>
<td>5718</td>
<td>5671</td>
<td>5718</td>
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<tr>
<td>Clusters</td>
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<td>953</td>
<td>953</td>
<td>947</td>
<td>953</td>
</tr>
</tbody>
</table>
Scoring the Proposed Biden Book Income AMT

- Use 2018 cross section of Compustat firms present in 2017 and 2018, project income and tax variables over 10 year period using CBO GDP forecasts, incorporate behavioral response estimates into book income projections

- Revenue Scores depend on choice of $\varepsilon_t$

$$BI_t = BI_t^{mech} + \varepsilon_t \cdot BI_t^{mech} \cdot \frac{\Delta(1 - \tau)}{1 - \tau} \cdot 1(T = 1)$$
SOI Compustat Aggregates Comparison

![Graph showing SOI (Billions USD) against Compustat (Billions USD) with various categories represented by different shapes: Taxable Income (green triangles), Depreciation (red squares), Total Taxes (blue dots), and Loss Deductions (light green squares). The graph includes a trend line indicating the relationship between the two variables.]