Session Three:
Drivers of Noncompliance
A Balance Due Before Remittance
The Effect on Reporting Compliance

Small Business/Self Employed Research
Seattle/San Jose
SEA0064
A Balance Due Before Remittance - The Effect on Reporting Compliance

Roadmap

Introduction & Background
• Hypothesis: prepayment position and reporting compliance
• IRS Benefits
• Utility vs Prospect Theory

Data
• NRP and TCMP datasets

Method 1
• Weighted Least Squares Estimation
• Supports Prospect Theory

Method 2
• Checks - Instrumental Variables Estimation, Subset Estimation
• Mixed Results

Conclusions
Acknowledgements
Research Problem - There is evidence that balance due taxpayers have been found to understate their taxes more often than refund due taxpayers.

Hypothesis - prepayment position causes a portion of reporting non-compliance.

This research:

• Provides the Internal Revenue Service (IRS) insight to the behavior of the taxpayer population.

• Contributes to debate between expected utility theory versus behavioral economics reference dependent theories.
IRS Insight

There have been policy changes that temporarily change taxpayer’s withholding to stimulate the economy.

- President Bush enacted a stimulus nicknamed, “play in ’92 and pay in ’93.”
  
  (8.9 million taxpayers in unexpected balance due)

- President Obama’s “Making Work Pay” stimulus plan.
  
  (15.4 million taxpayers in unexpected balance due)
Expected Utility vs Loss Aversion

Prepayment position does not change the tax liability but the timing of the tax payments within the year.

**Expected Utility**: taxpayers should realize that lifetime resources remain unchanged

**Prospect theory** (loss aversion): taxpayers exhibit behavior change

Loss domain – individuals are risk seeking
Gain domain – individuals are risk averse
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**Tax Compliance Literature**

Allingham and Sandmo (1972)

- A taxpayer makes compliance decisions based on expectations of an audit, their risk aversion and the total amount of their assets (expected utility theory).

Third party income - Kleven et. al (2009)

Marginal tax rates and evasion - Clotfelter (1983), Slemrod

Prospect Theory - Behavioral Economics Literature

Kahneman and Tversky (1979) - Prospect theory
  • Value to gains and losses rather than final monetary assets


Other Applications

  Newcomers exhibit loss aversion
  Experienced traders exhibit neoclassical behavior

PGA Golf - Pope and Schweitzer (2009)
  Putts for par vs putts for birdies
  More experienced golfers exhibits loss aversion behavior
<table>
<thead>
<tr>
<th>Background</th>
<th>Data</th>
<th>WLS</th>
<th>Results1</th>
<th>IV/Subset</th>
<th>Results2</th>
<th>Conclusions</th>
<th>Acknowledgements</th>
</tr>
</thead>
</table>

If Prospect Theory Holds:

A taxpayer with a balance due would be more risk seeking and would be willing to underreport to reduce their liability.

A taxpayer with a refund due would be more risk averse and act cautious to preserve their gain.
Data

The 1988 Taxpayer Compliance Measurement Program (TCMP) and the 2001 National Research Program (NRP).

NRP dataset excluded 3,000 cases due to no information on the taxpayer from the previous two years as determined by the primary TIN.

Assumed: Audit reveals true line item values

All predictor variables used—including prepayment position—are the audited ‘As corrected’ values rather than the taxpayer reported values
# A Balance Due Before Remittance - The Effect on Reporting Compliance

**NRP Descriptive Statistics by Prepayment Position**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Refund Due/Exact Withheld</th>
<th>Balance Due - Small*</th>
<th>Balance Due - Large</th>
</tr>
</thead>
<tbody>
<tr>
<td>change in tax</td>
<td>$184.45</td>
<td>$293.43</td>
<td>$2,468.17</td>
</tr>
<tr>
<td>prepayment position</td>
<td>($2,225.90)</td>
<td>$179.52</td>
<td>$6,135.30</td>
</tr>
<tr>
<td>Primary Age</td>
<td>42.30</td>
<td>46.50</td>
<td>50.92</td>
</tr>
<tr>
<td>% w/ Sch A</td>
<td>36.07%</td>
<td>29.78%</td>
<td>52.26%</td>
</tr>
<tr>
<td>% w/ Sch C</td>
<td>10.78%</td>
<td>15.91%</td>
<td>37.07%</td>
</tr>
<tr>
<td>% w/ Sch D</td>
<td>19.78%</td>
<td>23.73%</td>
<td>33.93%</td>
</tr>
<tr>
<td>% w/ Sch E</td>
<td>11.20%</td>
<td>11.27%</td>
<td>27.15%</td>
</tr>
<tr>
<td>% w/ Sch F</td>
<td>1.29%</td>
<td>1.90%</td>
<td>3.94%</td>
</tr>
<tr>
<td>% w/ Interest Income</td>
<td>58.81%</td>
<td>67.04%</td>
<td>75.68%</td>
</tr>
<tr>
<td>% w/ Dividend Income</td>
<td>26.67%</td>
<td>31.66%</td>
<td>40.28%</td>
</tr>
<tr>
<td>N</td>
<td>21,600</td>
<td>2,027</td>
<td>18,252</td>
</tr>
</tbody>
</table>

*source: 2001 NRP*

*10th percentile of balance due

**negative values denote overreporting / refund due**
**Net Misreporting Percentage* by Income and Prepayment Position**

<table>
<thead>
<tr>
<th>TPI Level</th>
<th>Large Refund</th>
<th>Medium Refund</th>
<th>Small Refund</th>
<th>Small Balance Due</th>
<th>Medium Balance Due</th>
<th>Large Balance Due</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10.95%</td>
<td>8.19%</td>
<td>11.47%</td>
<td>16.32%</td>
<td>26.55%</td>
<td>34.15%</td>
</tr>
<tr>
<td>2</td>
<td>12.38%</td>
<td>7.87%</td>
<td>7.16%</td>
<td>6.25%</td>
<td>7.85%</td>
<td>9.27%</td>
</tr>
<tr>
<td>3</td>
<td>3.83%</td>
<td>6.13%</td>
<td>22.47%</td>
<td>10.39%</td>
<td>7.10%</td>
<td>3.96%</td>
</tr>
</tbody>
</table>

Source: Tax Year 2001 NRP reporting compliance study of individual income tax returns

Large, Medium and Small prepayment are designated by 75th, interquartile range, and 25th of BD and RD even prepay comprised of 2% of sample and was included in small refund group. Estimates weighted to compensate for stratification.

*NMP = The sum of the net amounts of tax misreported expressed as a percentage of the sum of the absolute values of the amounts that should have been reported.*
Data suggests a link between a balance due prepayment position and reporting compliance.

- Large balance due positions associated with higher proportion of complex returns (by the percent of attachments)

- Large balance due positions associated with largest understatement of tax liability (higher NMP)

- Caution should be taken using *reported prepayment position*

  - Those who *claim* a large refund often claim too much.
  - Those who *admit* to a large balance due tend to be honest about that.
Compliance Decision

Taxpayers face a decision between misreporting with a higher risk of an audit, or comply by fully paying tax liability.

- Enter the filing process with an expectation of no additional liability owed
- Draft a return and realize true prepayment position
- Make reporting compliance decision
  (finalize draft or change income/deductions/credits)
- File return

**Assumed:** Zero additional liability = Reference point
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Weighted Least Squares Regression Equation

Underreport = f (return characteristics, actual prepayment position, interaction terms …)

\[ U = \beta_0 + X_1 \beta_1 + \beta_2 BD + \beta_3 RD + X_1 D \cdot BD \beta_4 + X_1 D \cdot RD \beta_5 + \epsilon_u \]

The parameters of interest: marginal effects of a balance due or refund due position.
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**Weighted Least Squares Regression Equation**

If prospect theory holds: $\beta_2 > 0$, $\beta_3 < 0$ and $|\beta_2| > |\beta_3|$

- A balance due increases the amount of underreporting
- A refund due decreases the amount of underreporting
- Steeper for balance due than for refund due (Loss aversion)

Otherwise, these parameters would not be significantly different from zero.
## WLS Parameter Estimates

### TCMP Prepayment Parameter Estimates

**Dependent Variable: Tax Change** (underreport > 0, over report < 0)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Full Sample</th>
<th>TPI Level 1</th>
<th>TPI Level 2</th>
<th>TPI Level 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\beta_2$ Bal Due</td>
<td>0.364 ** (0.014)</td>
<td>0.343 ** (0.012)</td>
<td>0.289 ** (0.010)</td>
<td>0.344 ** (0.038)</td>
</tr>
<tr>
<td>$\beta_3$ Refund</td>
<td>-0.107 ** (0.033)</td>
<td>-0.159 ** (0.008)</td>
<td>-0.058 ** (0.016)</td>
<td>-0.109 (0.276)</td>
</tr>
<tr>
<td>N</td>
<td>54,088</td>
<td>13,522</td>
<td>27,044</td>
<td>13,522</td>
</tr>
</tbody>
</table>

### NRP Prepayment Parameter Estimates

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Full Sample</th>
<th>TPI Level 1</th>
<th>TPI Level 2</th>
<th>TPI Level 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\beta_2$ Bal Due</td>
<td>0.404 ** (0.011)</td>
<td>0.378 ** (0.022)</td>
<td>0.501 ** (0.013)</td>
<td>0.383 ** (0.024)</td>
</tr>
<tr>
<td>$\beta_3$ Refund</td>
<td>-0.052 * (0.030)</td>
<td>-0.074 ** (0.020)</td>
<td>-0.074 ** (0.016)</td>
<td>-0.067 (0.157)</td>
</tr>
<tr>
<td>N</td>
<td>41,417</td>
<td>10,503</td>
<td>20,902</td>
<td>10,478</td>
</tr>
</tbody>
</table>

Standard errors in parenthesis, ** $p < 0.05$; * $p < 0.10$
Weighted Least Squares Regression Results

Taxpayers’ reporting compliance behavior is different depending on prepayment position, holding all else constant.

\[ \beta_2 > 0 \]

For every dollar balance due increases the amount of underreporting by about $0.38

\[ \beta_3 < 0 \]

For every dollar refund due decreases the amount of underreporting by about $0.09
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Endogeneity of Prepayment Position & Reporting Compliance

- Prepay position is endogenous
- Least-squares estimates are potentially biased and inconsistent.
- Mfx of balance due biased upwards and mfx of refund is biased down

Other Influences:
- Complexity
- Burden
- Visibility
Solutions:

WLS on Subset of data

Stable withholding the prior two years, but large change in tax liability in the NRP year.

If prepayment position is unanticipated then it is not determined by the taxpayer, thus reducing the endogeneity.

Instrumental Variables Estimation

Prior year data assumed to influence 2001 prepayment position but not 2001 reporting compliance decision.

Estimate prepayment position then use these fitted results to estimate the level of reporting non-compliance.
## Subset Estimation Results

### NRP WLS Regression - Stable Withholding

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Full Sample</th>
<th>TPI lev 1</th>
<th>TPI lev 2</th>
<th>TPI lev 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bal Due</td>
<td>0.730 **</td>
<td>1.465 **</td>
<td>0.594 **</td>
<td>0.709 **</td>
</tr>
<tr>
<td></td>
<td>(0.028)</td>
<td>(0.088)</td>
<td>(0.035)</td>
<td>(0.067)</td>
</tr>
<tr>
<td>Refund</td>
<td>-0.047</td>
<td>-0.048</td>
<td>-0.055</td>
<td>0.311</td>
</tr>
<tr>
<td></td>
<td>(0.031)</td>
<td>(0.049)</td>
<td>(0.026)</td>
<td>(0.426)</td>
</tr>
</tbody>
</table>

Source: 2001 NRP, stable withhold <= -15% change in withholding

Standard errors in parenthesis

** p < 0.05; * p < 0.10

Consistent with previous results
### Instrumental Variables Estimation Results

**IV Estimation – Second Stage Results**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>TPI Level 1</th>
<th>TPI Level 2</th>
<th>TPI Level 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bal Due</td>
<td>0.524</td>
<td>2.631</td>
<td>1.253</td>
</tr>
<tr>
<td></td>
<td>(1.96)</td>
<td>(3199.20)</td>
<td>(1.23)</td>
</tr>
<tr>
<td>Refund</td>
<td>-0.439</td>
<td>-3.335</td>
<td>-6.044</td>
</tr>
<tr>
<td></td>
<td>(1.27)</td>
<td>(3.88)</td>
<td>(17.51)</td>
</tr>
</tbody>
</table>

Standard errors in parentheses, ** p < 0.05; * p < 0.10

Source: 2001 NRP

Evidence towards Expected utility theory not Prospect theory
# WLS vs IV – Hausman Test Statistics

## Hausman's Specification Test Stats

Comparing WLS to 2SLS

- **Ho:** WLS and IV consistent, WLS efficient
- **Ha:** IV consistent and efficient

<table>
<thead>
<tr>
<th>TPI Level</th>
<th>DF</th>
<th>Statistic</th>
<th>Pr &gt; ChiSq</th>
<th>Suggested Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1</td>
<td>31</td>
<td>417.7</td>
<td>&lt;.0001</td>
<td>IV</td>
</tr>
<tr>
<td>Level 2</td>
<td>31</td>
<td>289.8</td>
<td>&lt;.0001</td>
<td>IV</td>
</tr>
<tr>
<td>Level 3</td>
<td>28</td>
<td>16.04</td>
<td>0.9652</td>
<td>WLS</td>
</tr>
</tbody>
</table>

*source: WLS and IV estimations with 2001 NRP data*

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Cannot reject the null for the high income group (TPI Level 3).

Appears to be an endogeneity issue with prepayment position.
A Balance Due Before Remittance - The Effect on Reporting Compliance

Summary

WLS and the subset analysis supports the theory of a behavioral shift in taxpayers depending on their prepayment position.

IV analysis does not report such a link.

<table>
<thead>
<tr>
<th>Summary of estimation results</th>
<th>WLS</th>
<th>Subset</th>
<th>IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Different Signs</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Loss Aversion</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Sig BD</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Sig RD</td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Conclusions and Recommendations

IRS Insight

Suggestive evidence in support of a change in taxpayer behavior due to their prepayment position.

Increased education (withholding calculator) could decrease non-compliance at a low cost

Utility vs Prospect Theory

Further work on the endogeneity problem is needed.

Alt. modeling techniques: probit, tobit analysis
Thanks!

**IRS:** Adelsheim, Defiel, DeWald, Hunt, Johns, Miller, Plumley, Parker, Shipley, Turk, Zanetti

**UW:** Rose, Shi, Wolff