Does Threatening ‘Prospective Retrospection’ of Anti-Avoidance Measures Work in Deterring Tax Avoidance on Employee Remuneration?

Evaluation of anti-avoidance using difference-in-difference estimation

Nick Catton & Alice Dwyer
Outline

• The Avoidance Problem
• The Anti-Avoidance Measure
• Evaluation Objective & Approach
• Differences-in-Differences Methodology
• The Data
• The Model
• Results
• Pre-programme test
• Qualitative analysis
• Lessons
### The avoidance problem

Bonus should be paid as employment income

But incentive to pay bonuses as dividends:

<table>
<thead>
<tr>
<th>Tax rate for:</th>
<th>Bonus Paid as...</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Employment Income</td>
<td>Dividend Income</td>
<td></td>
</tr>
<tr>
<td>Income Tax</td>
<td>40%</td>
<td>25%</td>
<td></td>
</tr>
<tr>
<td>Employer NICs</td>
<td>12.8%</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>Employee NICs</td>
<td>1%</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>Effective tax rate</td>
<td>54%</td>
<td>25%</td>
<td></td>
</tr>
</tbody>
</table>
The policy response 1

- Takes time to find out
- Close down scheme
- History of avoidance
- Avoidance moves to new scheme
The policy response 2

Disclosures regime

Close down scheme

Financial Times: “unprecedented action”

History of avoidance

Prospective Retrospection
Evaluation objective & approach

What does success mean in practice?

• Avoidance disclosures? - already fallen away

• Revenues did not flow into a specific pot or come with a specific tag

• Only 0.1% of overall employment receipts, cannot be detected in aggregate data

• Change in form of remuneration and effective tax rate on individuals previously involved in avoidance. Detect these changes in individual-level data?
# Differences-in-Differences method

<table>
<thead>
<tr>
<th></th>
<th>Average before Treatment</th>
<th>Average after Treatment</th>
<th>Difference <em>Within Groups Over time</em></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Treatment Group</strong></td>
<td>Before\text{\textsubscript{Treatment}}</td>
<td>After\text{\textsubscript{Treatment}}</td>
<td>After\text{\textsubscript{Treatment}} - Before\text{\textsubscript{Treatment}}</td>
</tr>
<tr>
<td><strong>Control Group</strong></td>
<td>Before\text{\textsubscript{Control}}</td>
<td>After\text{\textsubscript{Control}}</td>
<td>After\text{\textsubscript{Control}} - Before\text{\textsubscript{Control}}</td>
</tr>
</tbody>
</table>

**Difference-in-Differences** = difference *between Treatment and Control groups over time*

$$(\text{After}_{\text{Treatment}} - \text{Before}_{\text{Treatment}}) - (\text{After}_{\text{Control}} - \text{Before}_{\text{Control}})$$
### Differences-in-Differences 2

<table>
<thead>
<tr>
<th></th>
<th>ETR Before Treatment (April 2004)</th>
<th>ETR After Treatment (April 2005)</th>
<th>Difference Within Groups Over time:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Treatment Group:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Avoiders</td>
<td>39%</td>
<td>45%</td>
<td>6 percentage points</td>
</tr>
<tr>
<td><strong>Control:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Avoiders</td>
<td>31%</td>
<td>33%</td>
<td>2 percentage points</td>
</tr>
<tr>
<td><strong>Difference-in-Differences:</strong></td>
<td></td>
<td></td>
<td>4 percentage points</td>
</tr>
</tbody>
</table>
The data: before the announcement

2001-02

Effective Tax Rate

Total Income (£, Logarithmic Scale)

Non-Avoid  Avoid  Dividend Avoid
The data: after the announcement

2005-06

Effective Tax Rate

Total Income (£, Logarithmic Scale)

- Non-Avoid
- Avoid
- Dividend Avoid

HM Revenue & Customs
## Data: Average effective tax rates

<table>
<thead>
<tr>
<th>Year</th>
<th>Average (Mean) Effective Tax Rate</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Non-Avoider</td>
<td>Avoider</td>
<td>Positive-Dividend Avoider</td>
</tr>
<tr>
<td>2001-02</td>
<td>30.6%</td>
<td>39.0%</td>
<td>37.7%</td>
</tr>
<tr>
<td>2002-03</td>
<td>31.1%</td>
<td>40.2%</td>
<td>38.8%</td>
</tr>
<tr>
<td>2003-04</td>
<td>30.4%</td>
<td>42.3%</td>
<td>42.4%</td>
</tr>
<tr>
<td>2004-05</td>
<td>30.8%</td>
<td>43.3%</td>
<td>44.4%</td>
</tr>
<tr>
<td>2005-06</td>
<td>28.9%</td>
<td>44.0%</td>
<td>44.4%</td>
</tr>
</tbody>
</table>
**Model I Basic D-i-D**

- Simple ordinary least squares regression

\[ Y_{it} = \alpha + \beta D_i + \gamma_{1 \text{after}t} + \delta D_i \times \text{after}_t + \gamma_2 X_{it} + \epsilon_{it} \]

- **Treatment dummy for ‘avoider’**
- **Post treatment year indicator**
- **Post treatment year & treatment dummy interaction term**
- **Control variables:** age, age squared, gender, enquiries
- **Error term**

\[ \alpha = \text{constant} \]
\[ \beta = \text{treatment group specific effect} \] (to account for average permanent differences between treatment and control)
\[ \gamma_1 = \text{time trend common to control and treatment groups} \]
\[ \delta = \text{true effect of treatment} \]
Model II  Subgroup Specific effects

- Estimate sub-group effects for avoiders with positive dividend income

\[ Y_{it} = \alpha + \beta_1 D_{i1} + \gamma_1 \text{after} + \delta_1 D_{i1}^\text{after} \]
\[ + \beta_2 D_{i1}^\text{before} D_{i2} + \gamma_2 \text{after}^* D_{i2} + \delta_2 D_{i1}^\text{before} D_{i2}^\text{after} \]
\[ + \gamma_3 X + \epsilon_i \]

Interact treatment dummy for positive dividends subgroup \((D^2)\) with:
- treatment dummy for avoider subgroup \((D^2)\)
- the after indicator
- the interaction term to pick up the subgroup specific treatment effect

- Sub-group treatment effect is: \([\delta_1 \neq \delta_2]\)
# Summary of regression results

<table>
<thead>
<tr>
<th>Estimated percentage point (ppt) increase in:</th>
<th>2004-05</th>
<th>2005-06</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Avoider $[\delta_1]$</td>
<td>Positive Dividends Avoiders $[\delta_1+\delta_2]$</td>
</tr>
<tr>
<td>Effective tax rate</td>
<td>0</td>
<td><strong>5.6</strong></td>
</tr>
<tr>
<td>% dividend income</td>
<td>3.4</td>
<td>-11.4</td>
</tr>
<tr>
<td>% employment income</td>
<td>-4.2</td>
<td>14.3</td>
</tr>
</tbody>
</table>
Pre-programme Test
Pre-programme Test

- Failed pre-programme test for 2003-04: positive dividend avoiders increased ETR by 4.9 percentage points
- Model using ‘Random Growth Model’
Qualitative analysis

- 50 complex taxpayers, 7 known employer avoiders:
- 34 had some change in avoidance:
  - 3 started to avoid
  - 15 changed avoidance scheme
  - 16 stopped avoiding
- Ending some employer- & individual-based avoidance
  - Yield may be greater than found in quant analysis
- Switching from employer- to individual-based avoidance
  - Switch in risk, lose economies of scale
- Some on-going individual based avoidance
  - Areas for future action
## Lessons learned

<table>
<thead>
<tr>
<th><strong>Policy</strong></th>
<th><strong>Analysis</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Policy worked – 5ppt increase in effective tax rates</td>
<td>5. Data cleansing and matching for future use</td>
</tr>
<tr>
<td>2. Raised most of forecast yield</td>
<td>6. Developed our in-house econometric skills</td>
</tr>
<tr>
<td>3. Understanding elements not working well, to inform future policy</td>
<td>7. Combining data, institutional knowledge &amp; analysis to refine as we went along</td>
</tr>
<tr>
<td>4. Success of threat of retrospection?</td>
<td>8. New model for technical support from consultants</td>
</tr>
</tbody>
</table>