Small Business Incorporation and Investment: 
The Role of Corporation Tax

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Motivation: Why Do Small Businesses Incorporate?

- Limited liability?
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- Separation of ownership and control?
Why Do Small Businesses Incorporate?

- Limited liability?
- Separation of ownership and control?
- Better access to external finance for more investment?
- Information for lenders better if incorporated, and improves over time
- Lower tax
What is the Role of Corporation Tax?

- Lower CT induces firms to incorporate conditional on personal tax
- Lower CT increases post-tax cash flow for companies and allows financially-constrained companies to invest more
- Lower CT reduces cost of capital for companies and provides greater incentive to invest
Our empirical approach

- Use population of UK corporation tax records in 2001/02 - 2008/09
  so data only on corporations, not unincorporated businesses

- Explore the UK 2006 abolition of zero starting rate as a quasi-natural experiment
  - examine effect on incorporation, and
  - effect on investment, via cost of capital and cash flow
Results

- Estimate a significant positive effect of tax savings to incorporation
  - On average, a 1 percentage point increase in tax saving raises probability of incorporation by 2% to 4%

- Estimate effects of CT on investment by companies through 2 channels:
  - a higher user cost of capital, and
  - a reduction in internal cash flow available for investment

- Effects of cash flow diminish with company age
Some Existing Literature

Corporate Investment and Financial Constraints
- Theoretical models of capital markets with asymmetric information: e.g. Stiglitz and Weiss (1981), and Myers and Majluf (1984)

Taxes, Risk Taking and Entrepreneurship

Taxes and the Choice of Organizational Form
Basic Setup with Corporation Tax

\[
\begin{align*}
C_{oC} & \quad C_{oC}^{T+} \\
C_{oC}^{T+} & \quad C_{oC}^{T+} \\
C_{oC}^{T+} & \quad C_{oC}^{T+} \\
C_{oC}^{T+} & \quad C_{oC}^{T+} \\
\end{align*}
\]

\[MP^A\]

\[\text{cash flow} \quad I^A \quad I\]

\[\text{internal} \quad \text{external} \]
Following a Decrease in the Corporation Tax

Devereux and Liu (Oxford)
Data

- Population of UK corporate tax returns (CT600), 2001/02 to 2008/09
  - 10.7 million observations for 2.5 million companies
  - Detailed and precise information on taxable profits and how they are determined

- Around 90% of the tax records matched with company accounts in FAME

- Year of Incorporation: FAME
- Investment: qualifying expenditure on machinery and plant, including
  - qualifying expenditure for FYA (CT600, Box 118),
  - long-life assets and integral features (Box 120), and
  - other machinery and plant (Box 121).
Policy Reform to the Zero Starting Rate: Marginal Tax Rate in 2002/03

Devereux and Liu (Oxford)
Small Business Incorporation
Zero Starting Rate Abolished in 2006/07

The diagram illustrates the tax rates for different income levels, with two distinct lines: one for Retained Earnings and the other for Self-Employment Income. The x-axis represents taxable income, while the y-axis shows the tax rates. The graph shows the tax rates as a function of income, with a notable change in rate at certain income thresholds.
Tax Gains to Incorporate: Retained Profit

- Tax Gains to Incorporate (%): Average Tax Rate\textsubscript{Self-Employment Income} - Average Tax Rate\textsubscript{Corporate Profit}
Number of Newly Incorporated Firms

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Small Business Incorporation
The Causal Effect of Tax Incentives on Incorporation

\[ E (c_{it}|Tax\_Gain_{it}, X_{it}) = \exp (\gamma_i + \lambda_t + \beta_{tax} Tax\_Gain_{it} + X_{it} \beta_x) \]

- \( c_{it} \): number of newly incorporated businesses in income bin \( i \) of £100 at time \( t \)
- \( \gamma_i \): income bin dummies
- \( \lambda_t \): time dummies
- \( Tax\_Gain_{it} \): the difference between average tax rate for observed corporate profit, and the corresponding average tax rate if the corporate profit were earned as self-employment income
- \( X_{it} \): other observed firm characteristics that may matter for incorporation
- Associated error term can be additive or multiplicative depending on functional form
Baseline Specification: Model Comparison

<table>
<thead>
<tr>
<th>Estimation Model</th>
<th>Log Linear</th>
<th>Poisson GLM</th>
<th>Negative Binomial</th>
<th>Poisson Pseudo-MLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tax Gains:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Retained Profits</td>
<td>0.043***</td>
<td>0.042***</td>
<td>0.046***</td>
<td>0.042***</td>
</tr>
<tr>
<td></td>
<td>(0.001)</td>
<td>(0.004)</td>
<td>(0.001)</td>
<td>(0.002)</td>
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<tr>
<td>Income Bin FE</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Year FE</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>No. of Observations</td>
<td>6,000</td>
<td>6,000</td>
<td>6,000</td>
<td>6,000</td>
</tr>
<tr>
<td>No. of Income Bins</td>
<td>1,000</td>
<td>1,000</td>
<td>1,000</td>
<td>1,000</td>
</tr>
</tbody>
</table>

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Full Model Specification

- Coefficients lower (1.9% to 2.2%) if based on tax saving for distributed dividends

- Effects robust to
  - inclusion of covariates. such as turnover, total asset, and number of workers
  - exclusion of the bunching region
  - industry-level estimation controlling for industry fixed effects, industry-specific time trend, and industry-level covariates
  - heterogeneous responses across different industries
Static Specification:

\[ \frac{I_{it}}{K_{i,t-1}} = \Delta \ln Y_{it} - \sigma \Delta \ln \text{CoC}_{it} + d_i + \eta_t + \epsilon_{it} \]

- \( \frac{I_{it}}{K_{i,t-1}} \): investment undertaken by company \( i \) in year \( t \), scaled by beginning-of-year book value of tangible asset \( K_{t-1} \); approximation for \( \Delta \ln K_{it} + \delta_i \)
Excess Sensitivity to Cash Flow

\[
\frac{I_i}{K_{t_{-1}}} = \Delta \ln Y_{it} - \sigma \Delta \ln C_{it} - \gamma_{\text{tax}} \frac{\Delta Tax_{i,t_{-1}}}{K_{t_{-1}}} + d_i + \eta_t + \varepsilon_{it}
\]

- \(\Delta Tax_{i,t_{-1}}\) : one-year lagged increase in tax bill after abolishing the zero starting rate; = \(\Delta \tau_{i,t_{-1}} \cdot \text{Taxable Profit}_{i,t_{-1}}\), where \(t = 2007\) or \(2008\)

- Instrumented with \(\Delta \tau_{i,t_{-1}}\), change in the statutory marginal tax rate due to exogenous changes in the tax system

- Allow \(\gamma_{\text{tax}}\) to depend on "age" ie. time since incorporation
Changes in the Cost of Capital

Devereux and Liu (Oxford)
Increase in Tax Liability 2006/07, £000

Devereux and Liu (Oxford)
# Excess Sensitivity to Cash Flow: Empirical Findings

<table>
<thead>
<tr>
<th>Static Specification</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
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</thead>
<tbody>
<tr>
<td>$\Delta \ln Y_{it}$</td>
<td>0.125***</td>
<td>0.139***</td>
<td>0.138***</td>
</tr>
<tr>
<td></td>
<td>(0.002)</td>
<td>(0.003)</td>
<td>(0.003)</td>
</tr>
<tr>
<td>$\Delta \ln CoC_{it}$</td>
<td>-1.895***</td>
<td>-1.696***</td>
<td>-1.677***</td>
</tr>
<tr>
<td></td>
<td>(0.066)</td>
<td>(0.084)</td>
<td>(0.086)</td>
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<tr>
<td>$\frac{\Delta Tax_{i,t-1}}{K_{i,t-1}}$</td>
<td>-0.783***</td>
<td>-1.371***</td>
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</tr>
<tr>
<td></td>
<td>(0.260)</td>
<td>(0.229)</td>
<td></td>
</tr>
<tr>
<td>$\frac{\Delta Tax_{i,t-1}}{K_{i,t-1}} \times Age_{it}$</td>
<td></td>
<td></td>
<td>0.090***</td>
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<td></td>
<td></td>
<td></td>
<td>(0.035)</td>
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<tr>
<td>Firm FE</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Year FE</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>No. Obs</td>
<td>561,486</td>
<td>381,499</td>
<td>381,499</td>
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</table>
### Excess Sensitivity to Cash Flow: Empirical Findings

<table>
<thead>
<tr>
<th></th>
<th>Error-Correction Specification</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>(4)</td>
<td>(5)</td>
<td>(6)</td>
</tr>
<tr>
<td>$\Delta \ln Y_{it}$</td>
<td>0.354***</td>
<td>0.354***</td>
<td>0.352***</td>
</tr>
<tr>
<td></td>
<td>(0.003)</td>
<td>(0.004)</td>
<td>(0.004)</td>
</tr>
<tr>
<td>$\Delta \ln CoC_{it}$</td>
<td>-1.052***</td>
<td>-0.911***</td>
<td>-0.904***</td>
</tr>
<tr>
<td></td>
<td>(0.060)</td>
<td>(0.070)</td>
<td>(0.071)</td>
</tr>
<tr>
<td>$EC_{it-1}$</td>
<td>-0.481***</td>
<td>-0.519***</td>
<td>-0.516***</td>
</tr>
<tr>
<td></td>
<td>(0.003)</td>
<td>(0.006)</td>
<td>(0.007)</td>
</tr>
<tr>
<td>$\Delta Tax_{i,t-1} / K_{i,t-1}$</td>
<td>-0.352***</td>
<td>-0.725***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.211)</td>
<td>(0.178)</td>
<td></td>
</tr>
<tr>
<td>$\Delta Tax_{i,t-1} / K_{i,t-1} \times Age_{it}$</td>
<td>0.057*</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.029)</td>
<td></td>
</tr>
</tbody>
</table>

| Firm FE | Y   | Y   | Y   |
| Year FE | Y   | Y   | Y   |
| No. Obs | 526,457 | 381,499 | 381,499 |
Conclusions

- Evidence that
  - incorporation decisions depend on scale of tax advantage
  - investment of companies affected by exogenous change to cash flow
  - cash flow effect greater for younger companies, consistent with cost of external finance falling as banks have access to more information