Motivation

• Private businesses earn more than 1/2 of US business net income

• Have few owners bearing substantial risks

• Use owner’s time or sweat for business activities
  ○ Production
    ○ Building capital, eg, client lists, tradenames

• Face different tax policies than public firms

• Currently, little known about assets or tax effects
Theory of Sweat Equity

• GE model with heterogeneous agents choosing to
  ◦ Work for someone else or
  ◦ Run own private business and
    – Accumulate sweat equity
    – Produce goods & services

• Provides new framework to:
  ◦ Measure private business activity and capital
  ◦ Study business tax reforms (eg, TJCA17)
What’s New?

- Standard analysis:
  - Based on Lucas span of control model
  - Extended to include financing frictions
  - Matched to survey data like SCF or PSID

- Our analysis:
  - Based on new framework with sweat
  - Found financing frictions not relevant for results
  - Matched to NIPA, IRS, Census data

$\Rightarrow$ Bigger capital stock, greater impact of tax policy
Main Findings

• Value of private business sweat equity ($V_b$)
  ○ Similar magnitude to value of fixed assets
  ○ Little dispersion in $V_b \Rightarrow$ high dispersion in returns

• Tax experiments show:
  ○ Large sectoral and aggregate effects
  ○ Abstracting from sweat leads to wrong answers
Related Literature

- Focuses on financing constraints

- Assumes non-pecuniary benefits to business owners

- Uses evidence from household surveys
  (Too many to list...)
Outline

• Theory

• Parameters

• Results
Theory: Overview
Environment

- Two sectors: C-corp, Pass-through
Environment

• Two sectors: C-corp, Pass-through

• Households of age $j$
  
  ◦ Endowed with stochastic abilities $z, \epsilon$
  
  ◦ Face occupational choice
Environment

- Two sectors: C-corp, Pass-through
- Households of age $j$
  - Endowed with stochastic abilities $z, \epsilon$
  - Face occupational choice

\[
\begin{array}{c}
\text{Work for someone else} \\
\text{Run own business}
\end{array}
\]
Environment

- Two sectors: C-corp, Pass-through
- Households of age $j$
  - Endowed with stochastic abilities $z, \epsilon$
  - Face occupational choice

\[ \downarrow \quad \downarrow \]

Work for someone else \hspace{2cm} Run own business

incomes: $w \epsilon \quad pz f_y(\kappa, k_p, h_y, n_p) - (r + \delta_k)k_p - wn_p - e$
Environment

- Two sectors: C-corp, Pass-through
- Households of age \( j \)
  - Endowed with stochastic abilities \( z, \epsilon \)
  - Face occupational choice
    \[ \begin{align*}
    \text{Work for someone else} & \quad \text{Run own business} \\
    \text{incomes: } w \epsilon & \quad p z f_y(\kappa, k_p, h_y, n_p) - (r + \delta_k)k_p - wn_p - e
    \end{align*} \]
    \[ \uparrow \]
    Sweat capital
Environment

• Two sectors: C-corp, Pass-through

• Households of age $j$
  
  ◦ Endowed with stochastic abilities $z, \epsilon$
  
  ◦ Face occupational choice

\[ \begin{array}{c}
\text{Work for someone else} \\
\text{Run own business}
\end{array} \]

incomes: $w \epsilon$

\[ pz f_y(\kappa, k_p, h_y, n_p) - (r + \delta_k)k_p - wn_p - \epsilon \]

↑

Fixed assets
Environment

- Two sectors: C-corp, Pass-through
- Households of age \(j\)
  - Endowed with stochastic abilities \(z, \epsilon\)
  - Face occupational choice

\[\left\{\begin{array}{c}
\text{Work for someone else} \\
\text{Run own business}
\end{array}\right.\]

incomes:

\[w\epsilon pzf_y(\kappa, k_p, h_y, n_p) - (r + \delta_k)k_p - wn_p - e\]

Owner’s hours in production
Environment

• Two sectors: C-corp, Pass-through

• Households of age $j$
  
  • Endowed with stochastic abilities $z, \epsilon$
  
  • Face occupational choice

\[ \begin{array}{c}
\leftarrow \\
\text{Work for someone else}
\end{array} \quad \begin{array}{c}
\rightarrow \\
\text{Run own business}
\end{array} \]

incomes: $w\epsilon$

\[ pz f_y(\kappa, k_p, h_y, n_p) - (r + \delta_k)k_p - wn_p - e \]

\[ \uparrow \\
\text{Worker hours in production} \]
Environment

- Two sectors: C-corp, Pass-through
- Households of age $j$
  - Endowed with stochastic abilities $z, \epsilon$
  - Face occupational choice

Work for someone else  Run own business

incomes: $w\epsilon$

$$pzf_y(\kappa, k_p, h_y, n_p) - (r + \delta_k)k_p - wn_p - e$$

$$\kappa' = (1 - \delta_\kappa)\kappa + f_\kappa(h_\kappa, e)$$

Owner’s hours to build sweat capital
Environment

- Two sectors: C-corp, Pass-through
- Households of age $j$
  - Endowed with stochastic abilities $z, \epsilon$
  - Face occupational choice
    \[
    \uparrow \quad \downarrow
    \]
    Work for someone else \quad Run own business

incomes: $w\epsilon$
\[
pz f_y(\kappa, k_p, h_y, n_p) - (r + \delta_k)k_p - wn_p - e
\]
\[
\kappa' = (1 - \delta_\kappa)\kappa + f_\kappa(h_\kappa, e)
\]
\[
\uparrow \quad \text{Expenses to build sweat capital}
\]
Environment

- Two sectors: C-corp, Pass-through
- Households of age $j$
  - Endowed with stochastic abilities $z, \epsilon$
  - Face occupational choice

\[ \text{Work for someone else} \quad \text{Run own business} \]

incomes: $w\epsilon$

\[ pzf_y(\kappa, k_p, h_y, n_p) - (r + \delta_k)k_p - wn_p - e \]

\[ \kappa' = (1 - \lambda)\kappa \quad \kappa' = (1 - \delta_\kappa)\kappa + f_\kappa(h_\kappa, e) \]

\[ \uparrow \]

Sell for cash or keep, but depreciates if not in use
**Environment**

- Two sectors: C-corp, Pass-through
- Households of age $j$
  - Endowed with stochastic abilities $z, \epsilon$
  - Face occupational choice
    - Work for someone else
    - Run own business

\[
\begin{align*}
\text{incomes: } w\epsilon & \quad pzf_y(\kappa, k_p, h_y, n_p) - (r + \delta_k)k_p - wn_p - e \\
\kappa' &= (1 - \lambda)\kappa & \kappa' &= (1 - \delta_\kappa)\kappa + f_\kappa(h_\kappa, e)
\end{align*}
\]

- Government collects taxes on incomes & products
Theory: Details
Household Maximization

- States:
  - $j$: stochastic age $(y, o)$
  - $a$: financial assets
  - $\kappa$: sweat capital
  - $\zeta = (z, \epsilon)$: productivity shocks to business, wages

- Value functions:
  \[
  V_j(a, \kappa, \zeta) = \max \{ V_{j,p}(a, \kappa, \zeta), V_{j,w}(a, \kappa, \zeta) \}
  \]
  where 
  - Run business
  - Work for someone
Run Business

\[ V_{y,p}(a, \kappa, \zeta) = \max_{c_c, c_p, h_y, h_\kappa, \kappa_p, n_p, e, a', \kappa'} \left\{ U_p(c, \ell) + \beta \sum_{\zeta'} \mu(\zeta' | \zeta) V(a', \kappa', \zeta') \right\} \]
Run Business

\[ V_{y,p}(a, \kappa, \zeta) = \max_{c_c, c_p, h_y, h_\kappa, k_p, n_p, e, a', \kappa'} \left\{ U_p(c, \ell) + \beta \sum_{\zeta'} \mu(\zeta' | \zeta) V(a', \kappa', \zeta') \right\} \]

↑

value of running business when young
Run Business

\[ V_{y,p}(a, \kappa, \zeta) = \max_{c, c', h_y, h_\kappa, \kappa'} \left\{ U_p(c, \ell) + \beta \sum_{\zeta'} \mu(\zeta' | \zeta) V(a', \kappa', \zeta') \right\} \]

\[ c = \text{ces}(c_c, c_p) \]

\[ c_c = \text{C-corp goods} \]

\[ c_p = \text{private business goods} \]
Run Business

\[ V_{y,p}(a, \kappa, \zeta) = \max_{c_c, e_p, h_y, h_\kappa, k_p, n_p, e, a', \kappa'} \left\{ U_p(c, \ell) + \beta \sum_{\zeta'} \mu(\zeta'|\zeta)V(a', \kappa', \zeta') \right\} \]

\[ \ell = 1 - h_y - h_\kappa \]

\[ h_y = \text{hours in production} \]

\[ h_\kappa = \text{hours accumulating sweat capital} \]
Run Business

\[ V_{y,p}(a, \kappa, \zeta) = \max_{c_c, c_p, h_y, h_\kappa, k_p, n_p, e, a', \kappa'} \{ U_p(c, \ell) + \beta \sum_{\zeta'} \mu(\zeta'|\zeta)V(a', \kappa', \zeta') \} \]

\[ a' = (1 + r)a \quad \text{(financial returns)} \]
\[ + py_p - (r + \delta_k)k_p - wn_p - e \quad \text{(business net income)} \]
\[ - c_c - pc_p \quad \text{(consumption)} \]
\[ - \text{taxes} \]
\[ \geq \chi py_p \quad \text{(working capital)} \]

\[ \kappa' = (1 - \delta_\kappa)\kappa + f_\kappa(h_\kappa, e) \quad \text{(sweat capital)} \]

\[ y_p = zf_y(\kappa, k_p, h_y, n_p) \quad \text{(private output)} \]
Example: Dental Office

• Assets:
  - \( a \): Financial assets (e.g., bank account, shares)
  - \( k_p \): Dental equipment (owned or leased)
  - \( \kappa \): Patient list

• Time use:
  - \( h_y \): Owner examines existing patients
  - \( h_\kappa \): Owner finds new patients
  - \( n_p \): Hygenists examine existing patients

• Expenses:
  - \( e \): Local advertising
Work for Someone Else

\[ V_{y,w}(a, \kappa, \zeta) = \max_{c_c, c_p, n, a', \kappa'} \left\{ U_w(c, \ell) + \beta \sum_{\zeta'} \mu(\zeta'|\zeta) V(a', \kappa', \zeta') \right\} \]
Work for Someone Else

\[ V_{y,w}(a, \kappa, \zeta) = \max_{c_{c,c_p},n} \{ U_w(c, \ell) + \beta \sum_{\zeta'} \mu(\zeta'|\zeta)V(a', \kappa', \zeta') \} \]

↑

value of employment when young
Work for Someone Else

\[ V_{y,w}(a, \kappa, \zeta) = \max_{c, c_p} \left\{ U_w(c, \ell) + \beta \sum_{\zeta'} \mu(\zeta'|\zeta) V(a', \kappa', \zeta') \right\} \]

\[ c = \text{ces}(c_c, c_p) \]

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Work for Someone Else

\[ V_{y,w}(a, \kappa, \zeta) = \max_{c_c, c_p, n, a', \kappa'} \{ U_W(c, \ell) + \beta \sum_{\zeta'} \mu(\zeta'|\zeta) V(a', \kappa', \zeta') \} \]

\[ \ell = 1 - n \]

\[ n = \text{hours in production} \]
Work for Someone Else

\[ V_{y,w}(a, \kappa, \zeta) = \max_{c_c, c_p, n, a', \kappa'} \{ U_w(c, \ell) + \beta \sum_{\zeta'} \mu(\zeta'|\zeta) V(a', \kappa', \zeta') \} \]

\[ a' = (1 + r)a \quad \text{(financial returns)} \]
\[ + w \epsilon n \quad \text{(compensation)} \]
\[ - c_c - p c_p \quad \text{(consumption)} \]
\[ - \text{taxes} \]
\[ \geq 0 \]

\[ \kappa' = (1 - \lambda)\kappa \quad \text{(sweat capital)} \]
Stochastic Aging

- Continuation value when young:

\[ V(a', \kappa', \zeta') = \pi_y \sum_{\zeta'} \pi(\zeta' | \zeta)V_y(a', \kappa', \zeta') + (1 - \pi_y) \sum_{\zeta'} \pi(\zeta' | \zeta)V_o(a', \kappa', \zeta') \]

- When old:
  - Receive old-age transfers \( (T_r) \)
  - Hit by permanent productivity shock \( (\xi) \)

- When die:
  - Transfer \( a' \) and part of \( \kappa \) to descendants \( (\varphi) \)
Rest of Model

- C corporation maximization

\[ \max_{k_c, n_c} A k_c^\theta n_c^{1-\theta} - w n_c - (r_c + \delta_k) k_c \]

- All markets clear

- Government budget balances

\[ g + (r - \gamma) b = \tau_c (\int c_{ci} \, di + \int p c_{pi} \, di) + \int T^w (w e_i n_i) \, di \]
\[ + \int T^b (p y_{pi} - (r + \delta_k) k_{pi} - w n_{pi} - e_i) \, di + \tau_p (y_c - w n_c - \delta_k k_c) \]
\[ + \tau_d (y_c - w n_c - (\gamma + \delta_k) k_c - \tau_p (y_c - w n_c - \delta_k k_c)) \]
Model National Accounts

**Income shares:**

- Sweat income: \( \int (py_{pi} - (r + \delta_k)k_{pi} - wn_{pi} - e_i) \, di \)
- Pass-thru labor: \( w \int n_{pi} \, di \)
- Pass-thru capital: \( (r + \delta_k) \int k_{pi} \, di \)
- C corp labor: \( wn_c \)
- C corp capital: \( (r_c + \delta_k)k_c \)

**Product shares:**

- Private consumption: \( \int (c_{ci} + pc_{pi}) \, di \)
- Pass-thru investment: \( \int x_{pi} \, di \)
- C corp investment: \( x_c \)
- Govt consumption: \( g \)

*Note:* Nonbusiness activity added separately
Parameters
Disciplining the Theory

- NIPA with private/public business categorized separately
- Census survey of business owners (SBO)
  - Age of business
  - Hours of owners
  - Financing requirements
- IRS panel of W-2s and business net incomes
- Pratts Stats brokered sales of private businesses
Disciplining the Theory

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Next: Show how data used to identify key parameters
Functional forms

- Preferences:
  \[ U_w(c, \ell) = (c\ell^\psi)^{1-\sigma}/(1 - \sigma) \]
  \[ U_p(c, \ell) = (c\ell^\psi)^{1-\sigma}/(1 - \sigma) + \zeta \]
  \[ c(c_c, c_p) = c_c^{\eta} c_p^{1-\eta} \]

- Technologies:
  \[ F(k_c, n_c) = k_c^{\theta} n_c^{1-\theta} \]
  \[ f_\kappa(h_\kappa, e) = h_\kappa^{\vartheta} e^{1-\vartheta} \]
  \[ f_y(\kappa, k_p, h) = \kappa^\phi k_p^{\alpha} h^{1-\phi-\alpha} \]
  \[ h(h_y, n_p) = (\omega h_y^\rho + (1 - \omega)n_p^\rho)^{1/\rho} \]

- Fiscal policy:
  \[ T^b(\cdot), T^w(\cdot): \text{piecewise linear} \]

- Shocks:
  \[ (z, \epsilon): \text{finite state Markov process} \]
## Baseline Model Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discount factor ((\beta))</td>
<td>0.98</td>
<td>Risk-free rate 4%</td>
</tr>
<tr>
<td>Inverse IES ((\sigma))</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td>Leisure weight ((\psi))</td>
<td>1.38</td>
<td>BLS hours</td>
</tr>
<tr>
<td>C-corp good share ((\eta))</td>
<td>45.6</td>
<td>NIPA income shares</td>
</tr>
<tr>
<td>FA shares &amp; depr. ((\theta, \alpha, \delta_k))</td>
<td>50.7, 30, 4.1</td>
<td>NIPA</td>
</tr>
<tr>
<td>CES hours ((\omega, \rho))</td>
<td>64, 0.5</td>
<td>NIPA, IRS, LBD</td>
</tr>
<tr>
<td>Sweat share &amp; depr. ((\phi, \lambda, \delta_\kappa))</td>
<td>15, 70, 4.1</td>
<td>SBO age profile</td>
</tr>
<tr>
<td>Sweat accumulation ((\vartheta))</td>
<td>41.8</td>
<td>BEA IO table</td>
</tr>
<tr>
<td>Transition matrix for ((z, \epsilon))</td>
<td>see text</td>
<td>IRS panel data</td>
</tr>
<tr>
<td>Life cycle ((\pi_y, \pi_o, \xi, \varphi))</td>
<td>98, 93, 50, 90</td>
<td>Census, SBO</td>
</tr>
</tbody>
</table>
# Government policies

<table>
<thead>
<tr>
<th>Parameter</th>
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<th>Source</th>
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</thead>
<tbody>
<tr>
<td><strong>Spending shares:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Government consumption ((g/y))</td>
<td>13.3</td>
<td>NIPA</td>
</tr>
<tr>
<td>Old-age transfers ((T_r/y))</td>
<td>6.4</td>
<td>NIPA</td>
</tr>
<tr>
<td><strong>Tax rates:</strong></td>
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<tr>
<td>Consumption ((\tau_c))</td>
<td>6.5</td>
<td>NIPA</td>
</tr>
<tr>
<td>Dividends ((\tau_d))</td>
<td>13.3</td>
<td>IRS, FOF</td>
</tr>
<tr>
<td>C-corporate profits ((\tau_p))</td>
<td>36.0</td>
<td>NIPA, KPMG</td>
</tr>
<tr>
<td>Tax schedules</td>
<td>see text</td>
<td>IRS</td>
</tr>
</tbody>
</table>
Private Business Sales

- *Pratt’s Stats*: transaction level broker data
  - 27,000 acquired private businesses
  - Seller and sale details
  - Income and balance sheet data
  - Purchase price allocation for IRS Form 8594

- Main finding: these businesses are intangible intensive
Intangible Intensity

\[
\text{Intensity} = \frac{\text{Section 197 intangibles} + \text{goodwill}}{\text{Total asset value}}
\]

*Note:* total assets is purchase price net of assumed debts
## Intangible Intensity by Legal Structure

<table>
<thead>
<tr>
<th></th>
<th>Count</th>
<th>Mean</th>
<th>Median</th>
<th>StDev</th>
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</thead>
<tbody>
<tr>
<td>S Corporations</td>
<td>5,519</td>
<td>0.58</td>
<td>0.64</td>
<td>0.32</td>
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<tr>
<td>Sole Proprietors</td>
<td>1,140</td>
<td>0.57</td>
<td>0.64</td>
<td>0.31</td>
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<tr>
<td>Partnerships</td>
<td>196</td>
<td>0.57</td>
<td>0.67</td>
<td>0.32</td>
</tr>
</tbody>
</table>

Furthermore, intensity high regardless of industry or size.
Intangible Intensity: Model

In the model, we compute the intangible intensity \( ii(s) \) for a business with state \( s \) as follows:

\[
ii(s) = \frac{v_\kappa(s)}{v_\kappa(s) + k_p(s)}
\]

where \( v_\kappa(s) \) is the amount of cash needed to leave a business owner indifferent between continuing in business with sweat capital \( \kappa \) and selling it, that is, \( v_\kappa(s) \) satisfies:

\[
V_{j,p}(s) = V_{j,w}(a + v_\kappa(s), 0, \epsilon, z).
\]

In effect, \( v_\kappa(s) \) is the value of transferable intangible assets.

We use \( ii \) to discipline \( \phi \).
Business Age Profile: Data and Model

- **Data**
- **Model**

Percent of owners vs. Years since acquiring business.
Measuring Sweat Equity
Measurement Concepts

- Sweat dividend

\[ d = \text{factor share of } \kappa \times \text{output} - \text{expenses} \]

\[ \text{rents to sweat capital} \]

- Sweat equity

\[ V_b(a, \kappa, \zeta) = d + \sum_{\zeta'} \mu(\zeta' | \zeta) M(s' | s)V_b(a', \kappa', \zeta') \]

with \( M(\zeta' | \zeta) = \beta \frac{U_c(c', \ell')}{U_c(c, \ell)} \) or \( \frac{(1+g)}{(1+r)} \)
Measuring Aggregate Sweat Equity

- Total sweat equity

\[ \int V_{bi} \, di = 0.93 \text{ to } 1.1 \times GDP \]

- Back of the envelope:
  - Divide NIPA pass-thru income by \( r-g \)
  - Adjust for share of sweat capital (\( \approx 1/3 \)) and risk
Measuring Aggregate Sweat Equity

- Total sweat equity

\[ \int V_{bi} \, di = 0.93 \text{ to } 1.1 \times GDP \]

- Some comparisons:
  - Fixed assets used in pass-thrus about \( 1 \times GDP \)
  - Non-sweat intangibles about \( 1.4 \times GDP \)
Measuring Aggregate Sweat Equity

- Total sweat equity

\[ \int V_{bi} \, di = 0.93 \text{ to } 1.1 \times \text{GDP} \]

- Some comparisons:
  - Fixed assets used in pass-thrus about \( 1 \times \text{GDP} \)
  - Non-sweat intangibles about \( 1.4 \times \text{GDP} \)

What about the distribution?
## Distributional Statistics

<table>
<thead>
<tr>
<th></th>
<th>Intangible Intensity</th>
<th>Sweat Equity</th>
<th>Gross Return</th>
<th>Dividend Yield</th>
<th>ln TFP</th>
<th>Markups</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mean</strong></td>
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<td><strong>Stdev</strong></td>
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Only “young” businesses included
## Distributional Statistics

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**Salient features:**
- Significant intensities throughout
- Little dispersion in equity, much in returns
- Little dispersion in TFPs, much in markups

*Only “young” businesses included*
## Distributional Statistics

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<tr>
<td>Mean</td>
<td>0.60</td>
<td>1.59</td>
<td>13.2</td>
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<td>0.79</td>
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<td>0.36</td>
<td>0.67</td>
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<td>0.0</td>
<td>0.0</td>
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</tr>
<tr>
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<td>117.4</td>
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Only “young” businesses included
## Distributional Statistics

<table>
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<tr>
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Only “young” businesses included

How do measured TFP, markups compare to true?
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</table>

Only “young” businesses included

**Answer:** Measured and true are completely different
## Sort Businesses by Sweat Capital

<table>
<thead>
<tr>
<th></th>
<th>Business Income</th>
<th>Owner Hours</th>
<th>Fin. Assets</th>
<th>Fixed Assets</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Q1</td>
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<td>12.2</td>
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<tr>
<td>Q3</td>
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<td>0.17</td>
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<td>2.7</td>
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<tr>
<td>Q4</td>
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<td>0.22</td>
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<td>5.2</td>
<td>0.76</td>
<td>28.2</td>
</tr>
<tr>
<td>Q5</td>
<td>0.70</td>
<td>0.31</td>
<td>5.2</td>
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Only “young” businesses included

Proxies for $\kappa$: incomes, hours, tangibles, measured markups
Tax Policy Experiments
Tax Policy Experiments

• Lower tax rates ($\Delta \log(1-\tau_{AMTR}) = 15\%$):
  
  o Private pass-through business net income
  
  o C corporate profits
  
  o Wages

• Comparable to TJCA17 change in corporate rates

• Show key margins missed with existing framework, eg,
  
  o Lucas span of control ($y_p = z k_p^\alpha n_p^\nu$)
## Lower Rates on Businesses (% Changes)

<table>
<thead>
<tr>
<th>Private Activity</th>
<th>Private Businesses</th>
<th>All Businesses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Baseline</td>
<td>No Sweat</td>
</tr>
<tr>
<td>Output</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sales</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Owner hours, production</td>
<td></td>
<td></td>
</tr>
<tr>
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<td></td>
</tr>
<tr>
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<td></td>
</tr>
<tr>
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<td></td>
</tr>
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<td>Owner hours, sweat</td>
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<td></td>
</tr>
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</tr>
<tr>
<td>Fixed asset investment</td>
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<tr>
<td>Employee hours</td>
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<td>Measured markups</td>
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Significant % of change is intensive margin
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<td>Output</td>
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<td>Owner hours, production</td>
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<td>Owner hours, sweat</td>
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<tr>
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Small effects because $T^b$ doesn’t impact intensive margin
## Lower Rates on Businesses (% Changes)

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Large differences in effects on time use and age
## Lower Rates on Businesses (% Changes)

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<td></td>
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<td>No Sweat</td>
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<tr>
<td><strong>C corporations</strong></td>
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<tr>
<td>Output</td>
<td>0.3</td>
<td>-0.7</td>
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<tr>
<td>Employee hours</td>
<td>-0.3</td>
<td>-0.7</td>
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<tr>
<td>Fixed asset investment</td>
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<td>-0.1</td>
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<tr>
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<td>-0.1</td>
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<td>-0.5</td>
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<tr>
<td>Total hours</td>
<td>1.5</td>
<td>-0.7</td>
</tr>
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</table>

Tax on C-corporate profits most relevant for aggregates
Taxing Labor

• Large differences in
  o Effective tax rates
  o Effects of tax changes

across labor inputs (owners vs. employees)
Effective Rates on Labor

- Estimates of tax misreporting
  - 57% for sole proprietors
  - 53% for partnerships
  - 18% for S corporations

$\Rightarrow$ Large pecuniary benefits to business ownership
## Lower Rates on Businesses vs. Wages

<table>
<thead>
<tr>
<th>Lower Tax Rates on:</th>
<th>Owners</th>
<th>Employees</th>
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<tr>
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<tr>
<td>Private business</td>
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<td>18.4</td>
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<tr>
<td>C-corporate</td>
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<td>11.9</td>
</tr>
<tr>
<td>Total owner hours</td>
<td>15.7</td>
<td>-11.1</td>
</tr>
<tr>
<td>Production</td>
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<td>-13.0</td>
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<tr>
<td>Sweat building</td>
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<td>-3.9</td>
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## Sensitivity of Main Results

<table>
<thead>
<tr>
<th>Statistics (%)</th>
<th>Baseline Model</th>
<th>Financial Frictions</th>
<th>Superstar Owners</th>
<th>Brokered Sales</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agg. sweat equity/GDP</td>
<td>101</td>
<td>102</td>
<td>115</td>
<td>103</td>
</tr>
<tr>
<td>Intangible intensity</td>
<td>57.9</td>
<td>57.9</td>
<td>55.5</td>
<td>52.3</td>
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<tr>
<td>Gross return</td>
<td>7.7</td>
<td>7.7</td>
<td>10.4</td>
<td>6.5</td>
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<td>18.3</td>
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Summary

• Value of private business sweat equity ($V_b$)
  ○ Similar magnitude to value of fixed assets
  ○ Little dispersion in $V_b \Rightarrow$ high dispersion in returns

• Tax experiments show:
  ○ Large sectoral and aggregate effects
  ○ Abstracting from sweat leads to wrong answers
Appendix
Evidence from Widely-Used Surveys

- Bhandari, Birinci, McGrattan, & See (2018) analyzed:
  - Survey of Consumer Finances (SCF)
  - Panel Surveys of Income Dynamics (PSID)
  - Survey of Income and Program Participation (SIPP)
  - Current Population Survey (CPS)
- Found inconsistent with IRS, across surveys, across years
SCF

• Can compare survey responses directly to IRS data
  ○ Total adjusted gross incomes (AGI) match
  ○ Business net incomes do not

• Households with business income asked

  What was the business’s total net income before taxes?
  
  Partnership: IRS Form 1065, Line 22
  Sole proprietorship: IRS Form 1040, Sch. C, Line 31
  S-corporation: IRS Form 1120S, Line 21
AGI: SCF vs IRS

- SCF
- IRS

$ Billions

Pass-through Net Income: SCF vs IRS

$ Thousands per return

- SCF
- IRS

Standard Arguments for Overstatement

- Many business owners:
  - Do hardly anything
  - Lie on taxes but not on surveys
  - Confuse Schedules C, E, and F

- If true, no issues with current survey designs
Standard Arguments for Overstatement

- Many business owners:
  - Do hardly anything
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  - Confuse Schedules C, E, and F

- If true, no issues with current survey designs

- But, all can be rejected
Eg, Adjusting for Misreporting

- SCF
- IRS Audit
- IRS
Implications for Valuations & Returns

- SCF owners asked for value of ongoing businesses

- Value-weighted income yields:
  - 19% SCF
  - 8% CRSP, all firms
  - 2% Pratt’s Stats
  - −8% CRSP, lowest asset quintile

- Value-weighted capital gains: not comparable
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• Value-weighted capital gains: not comparable

• Bottom line: Need theory to derive implications