Firm Entry and Exit and Growth

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What drives aggregate productivity growth?

- Is productivity growth due to
  - continuing firms?
  - entry and exit of firms?

- Foster, Haltiwanger, and Krizan (2001) net entry accounts for 25% of U.S. productivity growth
- Brandt, Van Biesebroeck, and Zhang (2012) net entry accounts for 72% of Chinese productivity growth

These studies are widely cited to justify assumptions that net entry (creative destruction) is unimportant/important.
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Firm entry and aggregate growth: empirics

- How does firm entry and exit contribute to aggregate productivity growth?
  - During periods of rapid GDP growth
  - During periods of slow GDP growth
Firm entry and aggregate growth: empirics

- How does firm entry and exit contribute to aggregate productivity growth?
  - During periods of rapid GDP growth
  - During periods of slow GDP growth
- Plant-level data from Chile and Korea
- Review literature that uses identical decomposition
- Net entry is more important in periods of rapid growth
  - Average contribution, rapid growth: 54 percent
  - Average contribution, slow growth: 26 percent
Firm entry and aggregate growth: model

- Construct a model of firm entry and exit
  - Calibrate to the United States

- Quantitatively accounts for Chile and Korea data

- Entry and exit are crucial to understanding reform
Firm entry and aggregate growth: model

- Construct a model of firm entry and exit
  - Calibrate to the United States
- Use the calibrated model for policy analysis
  - Reduce entry barriers
  - Reduce barriers to technology adoption
- Quantitatively accounts for Chile and Korea data
- Entry and exit are crucial to understanding reform
data
Plan

- Decompose aggregate productivity growth
  - Terms related to entry and exit of firms
  - Terms related to growth in continuing firms
  - Follow Foster, Haltiwanger, and Krizan (2001)
- Use manufacturing plant data from Chile and Korea
  - Periods of rapid growth
  - Periods of slow growth
- Review comparable studies in the literature
Defining industry productivity

- Productivity of industry $i$:

$$\log Z_{it} = \sum_{e \in E_{it}} s_{et} \log z_{et}$$

- $s_{et}$: gross output share of plant $e$ in time $t$ in industry $i$
- $z_{et}$: TFP of plant $e$ in time $t$ in industry $i$

- Change in productivity (window defined by $t - 1, t$):

$$\Delta \log Z_{it} = \log Z_{it} - \log Z_{i,t-1}$$
Estimating plant productivity

- Plant $e$ in industry $i$ production function

$$\log y_{eit} = \log z_{eit} + \beta_k^i \log k_{eit} + \beta_\ell^i \log \ell_{eit} + \beta_m^i \log m_{eit}$$

- Following Foster et al. (2001)
  - $\beta^i_j$: average cost shares of input $j$ in industry $i$

- Consider alternative methods to estimate $z$
  - Woolridge-Levinsohn-Petrin methods (Chile)
  - Generate similar productivity decompositions
Productivity decomposition of industry growth

\[ \Delta \log Z_{it} = \Delta \log Z_{it}^{NE} + \Delta \log Z_{it}^{C} \]

- \( \Delta \log Z_{it}^{NE} \): change due to entering/exiting plants
- \( \Delta \log Z_{it}^{C} \): change due to continuing plants
Net entry

\[ \Delta Z_{it}^{NE} = \sum_{e \in N_{it}} s_{et} \left( \log z_{et} - \log Z_{i,t-1} \right) - \sum_{e \in X_{it}} s_{e,t-1} \left( \log z_{e,t-1} - \log Z_{i,t-1} \right) \]

- "entering plants" is positive if entrants have high productivity (compared to initial aggregate productivity)
- "exiting plants" is negative if exiting plants have low productivity

\( N_{it} \) and \( X_{it} \) are sets of entering and exiting plants
Continuing plants

\[ \Delta Z_{it}^C = \sum_{e \in C_{it}} s_{e,t-1} \Delta \log z_{et} + \sum_{e \in C_{it}} (\log z_{e,t-1} - \log Z_{i,t-1}) \Delta s_{et} \]

- within plant
- between plant
- covariance

\[ + \sum_{e \in C_{it}} \Delta \log z_{e,t} \Delta s_{et} \]

\( C_{it} \) is the set of continuing plants

- “within plant” is average within-plant productivity growth
- “between plant” is positive if relatively productive plants expand market share
- “covariance” is positive if plants that expand also increase their productivity
Productivity growth and aggregation

- At the industry-level we determine
  1. Productivity change
  2. Productivity change from entry/exit
  3. Productivity change from continuing plants

- To aggregate, weight each of these three components by gross output of industry (using average of beginning and end of window)
Decomposing productivity growth: Chile and Korea

- How does the net entry term change in Chile and Korea?
- Look within the same country at two windows
  - Avoids cross-country differences
  - Uses consistent datasets
Real GDP per working-age person

- **Chile**
  - Fast growth (6.8%) 1990-1995
  - Slow growth (2.4%) 2001-2006

- **Korea**
  - Fast growth (5.9%) 1992-1997
  - Slow growth (4.0%) 2002-2007

Index (1985=100)

- 1985
- 1990
- 1995
- 2000
- 2005
- 2010
Plant-level manufacturing data

- Chile
  - Encuesta Nacional Industrial Anual
  - Collected by the Chilean national statistical agency
  - Covers all plants with more than 10 employees
  - 127 industries and 5,500 plants (2005)

- Korea
  - Survey of Mining and Manufacturing
  - Collected by the Korean national statistical agency
  - Covers all plants with more than 10 employees
  - 104 industries and 8,300 plants
The relative importance of net entry

<table>
<thead>
<tr>
<th>Country</th>
<th>Period</th>
<th>GDP growth (percent)</th>
<th>Window</th>
<th>Effect of net entry (percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chile</td>
<td>1990-1995</td>
<td>6.8</td>
<td>5 years</td>
<td>85</td>
</tr>
<tr>
<td>Chile</td>
<td>2001-2006</td>
<td>2.4</td>
<td>5 years</td>
<td>35</td>
</tr>
<tr>
<td>Korea</td>
<td>1992-1997</td>
<td>5.9</td>
<td>5 years</td>
<td>44</td>
</tr>
<tr>
<td>Korea</td>
<td>2002-2007</td>
<td>4.0</td>
<td>5 years</td>
<td>39</td>
</tr>
</tbody>
</table>
Other empirical studies

- Existing studies with identical methodology
  - Slow growth: Portugal, U.K., U.S.
  - Rapid growth: China, Korea, Chile

- Problem: Studies use different length time windows
  - Makes comparisons difficult

- Solution: Use calibrated model to make adjustments
Other empirical studies

- Existing studies with identical methodology
  - Slow growth: Portugal, U.K., U.S.
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- Problem: Studies use different length time windows
  - Makes comparisons difficult
- Solution: Use calibrated model to make adjustments
Use model to make window adjustments

- Solve the baseline equilibrium for the U.S.
- Decompose model output using 5, 10, 15 year windows
- Fit a quadratic to contribution of net entry to productivity growth for the 3 windows
Net entry under various windows in the model

Contribution of net entry to aggregate productivity

Window length (years)
Use model to make window adjustments

- Portugal: 3-year window, 15 percent net entry contribution
- In the calibrated model
  - 5 year window generates 25 percent contribution
  - 3 year window generates 20 percent contribution
- Adjust proportionally
- Adjustment: $15 \times \frac{25}{20} = 19$ (5-year window equivalent)
## Contribution of net entry

Net entry more important during periods of fast growth

<table>
<thead>
<tr>
<th>Country</th>
<th>Period</th>
<th>GDP growth 15–64</th>
<th>Window</th>
<th>Effect of net entry</th>
<th>5 year equiv.</th>
</tr>
</thead>
<tbody>
<tr>
<td>US</td>
<td>1977–1992</td>
<td>1.9</td>
<td>5 years*</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>UK</td>
<td>1982–1987</td>
<td>3.3</td>
<td>5 years</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Portugal</td>
<td>1991–1997</td>
<td>1.4</td>
<td>3 years*</td>
<td>15</td>
<td>19</td>
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<td>2002–2007</td>
<td>4.0</td>
<td>5 years</td>
<td>39</td>
<td>39</td>
</tr>
<tr>
<td>Average</td>
<td></td>
<td>2.6</td>
<td></td>
<td></td>
<td>26</td>
</tr>
<tr>
<td>China</td>
<td>1998–2007</td>
<td>8.3</td>
<td>9 years</td>
<td>72</td>
<td>54</td>
</tr>
<tr>
<td>Chile</td>
<td>1990–1997</td>
<td>6.4</td>
<td>7 years</td>
<td>49</td>
<td>42</td>
</tr>
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<td>1990–1998</td>
<td>4.3</td>
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</table>


*Average over multiple windows
Net entry important for fast-growth economies

*adjusted to 5 year windows using elasticities generated by model
model
We develop a model in which

- Potential entrants draw from frontier efficiency distribution, which improves by growth factor $g_e$
- Efficiency of continuing firms grows, by $g_c < g_e$
- Endogenous entry/exit of firms

Easy to characterize balanced growth path
Model

- We develop a model in which
  - Potential entrants draw from frontier efficiency distribution, which improves by growth factor $g_e$
  - Efficiency of continuing firms grows, by $g_c < g_e$
  - Endogenous entry/exit of firms

- Easy to characterize balanced growth path

- Implications:
  - BGP growth factor $g_e$
  - Level is determined by barriers to entry, technology adoption

- Purpose of model: Investigate policy reforms
Household problem

- Representative household solves

\[
\max_{C_t, B_{t+1}} \sum_{t=0}^{\infty} \beta^t \log C_t
\]

subject to

\[
P_t C_t + q_{t+1} B_{t+1} = w_t + D_t + B_t
\]

\[
C_t \geq 0, \text{ No Ponzi condition, } B_0 \text{ given}
\]

\[D_t: \text{ aggregate dividends}\]

- Normalize \( P_t = 1, \ \forall t \)
Firm dynamics

- Based on Hopenhayn (1992)
- Continuum of perfectly competitive firms
  - A firm in the model is a plant in the data
- Heterogenous in efficiency $\times$
  - Productivity depends on efficiency
- Pay $\kappa$ to draw initial efficiency, $f$ to operate
- Exogenous exit probability $\delta$ and endogenous exit
Fixed costs paid by firms

- Potential entrants pay $\kappa_t = \kappa Y_t$ to draw efficiency $x$

$$\kappa = \kappa^T + \kappa^P$$

- Paid in consumption/investment good
- $\kappa^T$ is the technological cost, common across countries
- $\kappa^P$ is the policy induced cost
Fixed costs paid by firms

- Potential entrants pay $\kappa_t = \kappa Y_t$ to draw efficiency $x$

  $$\kappa = \kappa^T + \kappa^P$$

- Paid in consumption/investment good
- $\kappa^T$ is the technological cost, common across countries
- $\kappa^P$ is the policy induced cost

- Firms pay fixed cost of operating, $f_t = f Y_t$, or exit
- $\kappa_t + f_t$ is the capital of a firm in $t$
Firms face two decisions

1. Entry/exit decision
2. Conditional on operating: maximize profits
Firm’s static problem

- Conditional on operating, firm with efficiency $x$ solves

$$\pi_t(x) = \max_{\ell_t(x)} x \ell_t(x)^\alpha - w_t \ell_t(x) - f_t$$

- Solution is

$$\ell_t(x) = \left( \frac{w_t}{\alpha x} \right)^{\frac{1}{\alpha-1}}$$

- More efficient firms are larger
Firm’s dynamic problem

- Firms with efficiency $x$ choose to exit or continue to solve

$$V_t(x) = \max \left\{ \pi_t(x) + q_{t+1}(1 - \delta) V_{t+1}(g_{c,t+1}x), 0 \right\}$$

- Efficiency grows at $g_c$
Operating firm efficiency growth

- Efficiency of existing firms grow by

\[ g_{ct} = \bar{g} g_t^\varepsilon \]

- \( \bar{g} \) is constant
- \( g_t \) is average efficiency growth
- \( \varepsilon \) measures the degree of spillovers

Further discussion in calibration
Operating firm efficiency growth

- Efficiency of existing firms grow by

\[ g_{ct} = \bar{g}g_t^\varepsilon \]

- \( \bar{g} \) is constant
- \( g_t \) is average efficiency growth
- \( \varepsilon \) measures the degree of spillovers

- Quantitatively, but not qualitatively important
  - Further discussion in calibration
New entrant’s problem

- Potential entrants draw efficiency from

\[ F_t(x) = 1 - \left( \frac{\varphi x}{g_e^t} \right)^{-\gamma}, \quad x \geq \frac{g_e^t}{\varphi} \]

- Mean grows by growth factor \( g_e \)

- Barrier to technology adoption, \( \varphi \) (Parente-Prescott 1994)

- Mass of potential entrants, \( \mu_t \), from costly entry condition:

\[ E_x [V_t(x)] = \kappa_t \]

- Firm enters if and only if \( x \geq \hat{x}_t \)
Measure of firms

- Measure of firms of age $j$ in operation

$$\eta_{jt} = \mu_{t-j+1}(1 - \delta)^{j-1} \left[ 1 - F_{t-j+1} \left( \frac{\hat{x}_t}{\prod_{s=1}^{j-1} g_{c,t-s+1}} \right) \right]$$

- Convert age-$j$ efficiency to initial efficiency

$$\prod_{s=1}^{j-1} g_{c,t-s+1}$$

- Total measure of operating firms

$$\eta_t = \sum_{i=1}^{\infty} \eta_{it}$$
Equilibrium definition

Given initial conditions, an equilibrium is

- Household consumption and bond plans
- Allocations and entry/exit thresholds for firms
- Measure of potential entrants for firms
- Prices and aggregate dividends
Equilibrium definition

such that

- Household maximizes lifetime utility
- Firms maximize discounted dividends
- Costly entry condition binds
- Goods, labor, and bond markets clear
- Dividends satisfy

\[ D_t = \Pi_t - \mu_t \kappa_t \]
Existence of balanced growth path

Economy converges to a balanced growth path in which

1. Entry and exit thresholds grow by $g_e$

2. Real consumption, output, wages, and dividends grow by $g_e$

3. Masses of potential entrants and operating firms are constant
Characterizing BGP: growth

\[ \hat{x}_t = \frac{g_e^t}{\varphi} \left( \frac{\omega}{\mu} \right)^{\frac{1}{\gamma}} \]
\[ w_t = \alpha \left( \frac{1 - \alpha}{f} \right)^{1-\alpha} \hat{x}_t \]
\[ Y_t = \left( \frac{1 - \alpha}{f} \right)^{1-\alpha} \hat{x}_t \]
\[ \mu = \frac{\xi}{\gamma \kappa \omega} \]
\[ \eta = \frac{\gamma(1 - \alpha) - 1}{\gamma f} \]

Economy grows by \( g_e \)
Characterizing BGP: levels

\[
\begin{align*}
\mu &= \frac{\xi}{\gamma \kappa \omega} \\
\hat{x}_t &= \frac{g_e^t}{\varphi} \left( \frac{\omega}{\eta} \frac{\mu}{\mu} \right)^{\frac{1}{\gamma}} \\
w_t &= \alpha \left( \frac{1 - \alpha}{f} \right)^{1-\alpha} \hat{x}_t \\
Y_t &= \left( \frac{1 - \alpha}{f} \right)^{1-\alpha} \hat{x}_t \\
\eta &= \frac{\gamma(1 - \alpha) - 1}{\gamma f}
\end{align*}
\]

- As \( \kappa \) decreases
  - More potential entrants pay to draw efficiency
  - More-efficient firms enter and aggregate income increases
quantitative exercise
Entry cost reform

1. Calibrate model to U.S. (high BGP)
   ▶ No policy distortions in entry costs
   ▶ \( \kappa_{us} = \kappa^T \)

2. Model a distorted country on a lower balanced growth path
   ▶ Income level is 15 percent lower than U.S.
   ▶ \( \kappa_D = \kappa^T + \kappa^P \)
   ▶ \( \kappa_D = 5 \times \kappa_{us} \)

3. Reform entry costs in distorted country to U.S. level
   ▶ Solve for transition to higher balanced growth path
Measuring capital

- Fixed costs ($\kappa, f$) are investments (new approach)
- How are they accounted for
  - In the firm’s accounts?
  - In the national accounts?
Measuring capital

- Fixed costs \((\kappa, f)\) are investments (new approach)
- How are they accounted for
  - In the firm’s accounts?
  - In the national accounts?
- Aggregate investment \(\mu_t \kappa_t + \eta_t f_t\)
- Depreciation is the sum of
  - Capital of firms that die or exit
  - \(\kappa_t\) of potential entrants that do not enter
  - \(f_t\) minus costs of upgrading capital for continuing firms
Measuring capital

- Fixed costs ($\kappa, f$) are investments (new approach)
- How are they accounted for
  - In the firm’s accounts?
  - In the national accounts?
- Aggregate investment $= \mu_t \kappa_t + \eta_t f_t$
- Depreciation is the sum of
  - Capital of firms that die or exit
  - $\kappa_t$ of potential entrants that do not enter
  - $f_t$ minus costs of upgrading capital for continuing firms
- Aggregate capital stock $= \eta_t(\kappa_t + f_t)$
- Depreciation rate constant on BGP, not in transition
Measuring capital

- Alternatives we are considering
- In the model
  - $\kappa_t, f_t$ scale with $g_t$ rather than $Y_t$
  - Policy distortions are ad valorem, $\kappa^T + \kappa^P = \tau \kappa^T$
- In the accounting
  - Some parts of $\kappa$ and $f$ are intermediate inputs
  - Expensed, rather than counted as investment
Measuring productivity

- Need model measurement consistent with data measurement
- Productivity \( z \) of firm with efficiency \( x \)

\[
\log(z_t(x)) = \log(y_t(x)) - \alpha \log(l_t(x)) - \alpha_{kt} \log(k_t)
\]

\[
= \log(x) - \alpha_{kt} \log(k_t)
\]

- Capital share is given by

\[
\alpha_{kt} = \frac{R_t K_t}{Y_t}
\]

where \( R_t = \frac{1}{q_t} - 1 + \delta_{kt} \)
Calibration

Calibrate model to match size distribution of plants as well as effect of net entry on aggregate productivity growth.
Calibrated parameters

- Model period is 5 years
- Data from United States

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating cost $f$</td>
<td>$0.32 \times 5$</td>
<td>average establishment size $= 16.0$</td>
</tr>
<tr>
<td>Entry cost $\kappa$</td>
<td>0.26</td>
<td>entry cost / fixed cost$^*$ $= 0.82$</td>
</tr>
<tr>
<td>Pareto parameter $\gamma$</td>
<td>10.08</td>
<td>establishment size s.d. $= 91.2$</td>
</tr>
<tr>
<td>Firm growth $\bar{g}^{1/(1-\varepsilon)}$</td>
<td>$(1.017)^5$</td>
<td>effect of net entry on growth$^\dagger$ $= 25%$</td>
</tr>
<tr>
<td>Death rate $\delta$</td>
<td>$1 - (0.97)^5$</td>
<td>exiting plant employment share$^\ddagger$ $= 17.7%$</td>
</tr>
<tr>
<td>Entrant productivity $g_e$</td>
<td>$(1.02)^5$</td>
<td>BGP growth factor $= 1.02$</td>
</tr>
<tr>
<td>Discount factor $\beta$</td>
<td>$(0.98)^5$</td>
<td>4 percent real interest rate</td>
</tr>
<tr>
<td>Returns to scale $\alpha$</td>
<td>0.8</td>
<td>Atkeson and Kehoe (2005)</td>
</tr>
</tbody>
</table>

$^*$ Survey in Barseghyan and DiCecio (2011); $^\dagger$ Foster et al. (2001); $^\ddagger$ Dunne et al. (1989)
Technological spillovers

- Take logs of equation that characterizes spillovers

\[ \log g_{ct} = \log \bar{g} + \varepsilon \log g_t \]

- We estimate this equation as follows

\[ \log g_{ct,i} = \beta_0 + \varepsilon \log g_{it} + \nu_{it} \]

- \( g_{ct,i} \) is weighted productivity growth of continuing plants in \( i \)
- \( g_{it} \) is weighted productivity growth of entire industry \( i \)

- Estimate using Chile and Korea data (would like U.S. data)
- Average estimate: \( \varepsilon = 0.52 \)
Solving for transition path

- Unanticipated reform at $t = t_0$: $\kappa_D = \kappa_{us}$
- System of 2 $T$ equations and 2 $T$ unknowns for large $T$
  - Labor market clearing
    \[ \hat{x}_t^\gamma = \frac{g_e^\gamma}{\eta} \sum_{i=1}^{N} \varphi_{t-i+1}^{-\gamma} \mu_{t-i+1} (1 - \delta)^{i-1} g_e^{\gamma(1-i)} \prod_{s=1}^{i-1} g_c^{\gamma}_{t-s+1} \]
  - Costly entry condition
    \[ \kappa_t = \frac{g_e^\gamma}{\gamma \eta} \varphi_t^{-\gamma} \sum_{i=1}^{N} (1 - \delta)^{i-1} \left( \prod_{s=1}^{i-1} q_{t+s} g_c^{\gamma}_{t+s} \right) \frac{w_{t+i-1}}{\alpha} \hat{x}_{t+i-1} \]
Transition: more potential entrants

- More potential entrants increases efficiency thresholds

![Graph of Mass of potential entrants and Detrended efficiency thresholds over model periods](image-url)
Transition: more entry and exit

- Efficient firms enter, inefficient firms exit
- Total mass of firms is constant

![Graph of entering firms](image1)

![Graph of exiting firms](image2)
Transition: wages and output

- Higher wages increase efficiency thresholds
- More efficient firms increase output
Transition: consumption and interest rates

- More attractive investment opportunities
## Productivity growth decompositions

<table>
<thead>
<tr>
<th>Model periods (5 years)</th>
<th>Entry Cost (%)</th>
<th>Output growth (% annualized)</th>
<th>Contribution of net entry (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-2</td>
<td>1.32</td>
<td>2.0</td>
<td>25.0</td>
</tr>
<tr>
<td>3 (reform)</td>
<td>0.26</td>
<td>5.0</td>
<td>78.3</td>
</tr>
<tr>
<td>4</td>
<td>0.26</td>
<td>2.3</td>
<td>33.5</td>
</tr>
<tr>
<td>5</td>
<td>0.26</td>
<td>2.0</td>
<td>26.3</td>
</tr>
<tr>
<td>6+</td>
<td>0.26</td>
<td>2.0</td>
<td>25.0</td>
</tr>
</tbody>
</table>
Net entry and productivity in model and data

- Model generates quantitatively reasonable numbers

<table>
<thead>
<tr>
<th></th>
<th>Model reform</th>
<th>Data rapid</th>
<th>Model BGP</th>
<th>Data slow</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP/WAP growth (%)</td>
<td>5.0</td>
<td>6.3</td>
<td>2.0</td>
<td>2.6</td>
</tr>
<tr>
<td>Contribution of net entry (%)</td>
<td>78.3</td>
<td>54.0</td>
<td>25.0</td>
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</tr>
</tbody>
</table>

- Calibration and experiment need further work
Reforming barriers to technology adoption

- A reform that does not involve entry costs
- Potential entrants draw efficiency from

\[ F_t(x) = 1 - \left( \frac{\varphi x}{g_e t} \right)^{-\gamma}, \quad x \geq \frac{g_e t}{\varphi} \]

\( \varphi \geq 1 \): policy-induced barriers to technology adoption

- Set \( \varphi \) so that distorted BGP is 15 percent lower than U.S.
- Reform \( \varphi \) to generate a transition to higher BGP
Transition: more potential entrants

- More potential entrants only in the transition
- Efficiency thresholds increase
Transition: more entry and exit

» Efficient firms enter, inefficient firms exit
» Total mass of firms is constant
Transition: wages and output

- Higher wages increase efficiency thresholds
- More efficient firms increase output

![Detrended wage](image1)

![Detrended output](image2)
Transition: consumption and interest rates

- More attractive investment opportunities
# Productivity growth decompositions

<table>
<thead>
<tr>
<th>Model periods (5 years)</th>
<th>Barrier to tech. adoption</th>
<th>Productivity growth (%, annualized)</th>
<th>Contribution of net entry (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-2</td>
<td>1.17</td>
<td>2.0</td>
<td>25.0</td>
</tr>
<tr>
<td>3 (reform)</td>
<td>1.00</td>
<td>5.0</td>
<td>78.2</td>
</tr>
<tr>
<td>4</td>
<td>1.00</td>
<td>2.3</td>
<td>33.5</td>
</tr>
<tr>
<td>5</td>
<td>1.00</td>
<td>2.0</td>
<td>26.2</td>
</tr>
<tr>
<td>6+</td>
<td>1.00</td>
<td>2.0</td>
<td>25.0</td>
</tr>
</tbody>
</table>

- Almost identical to reform in entry cost
Reform and growth

- Reforms that increase aggregate productivity
  - Increase entry and exit in the transition
  - Increase the contribution of net entry
- Need models of entry and exit to understand productivity