
Matthias Kehrig and Nicolas Vincent

Mannheim and HEC Montréal

Dec 5, 2016

Any opinions and conclusions expressed herein are those of the author and do not necessarily represent the views of the U.S. Census Bureau. All results have been reviewed to ensure that no confidential information is disclosed.
The fact

Figure: The US aggregate labor share (Elsby, Hobijn and Sahin, 2013)

Source: Bureau of Labor Statistics, Bureau of Economic Analysis, and authors' calculations
Motivation

Decline of the labor share (LS) of interest for:

- Nature of (aggregate) production function
- Views on trade and (global) competition; structural change
- Capital embodied technological change and non-unitary EOS
- Compensation of workers and inequality; stagnant median labor incomes
1. The decline did not happen or is not that large
   - Accounting for self-employment income (Elsby et al., 2013)
   - Rise in capital income from housing (Rognlie, 2015)
   - Capitalization of intellectual property (Koh et al., 2015)
1. The decline did not happen or is not that large
   ▶ Accounting for self-employment income (Elsby et al., 2013)
   ▶ Rise in capital income from housing (Rognlie, 2015)
   ▶ Capitalization of intellectual property (Koh et al., 2015)

2. Explaining the decline
   ▶ Fall in the price of equipment (Karabarbounis-Neiman, 2014)
   ▶ Exposure to foreign competition (Elsby et al., 2013)
Aim of this project

- Study dynamics of LS at micro level
  - So far, predominantly macro/industry approach; makes it difficult to disentangle different forces

- What are the margins of adjustment?
- Are relatively high-LS units pushed out of the economy?
- Do relatively low-LS units enter?
- Reallocation?
- Wages versus employment/output size?
- At what level do things change?
- Plants?
- Firms?
- Sectors?
Aim of this project

- Study dynamics of LS at micro level
  - So far, predominantly macro/industry approach; makes it difficult to disentangle different forces
- What are the margins of adjustment?
  - Are rel. high-LS units pushed out of the economy?
  - Do rel. low-LS units enter?
  - Reallocation?
  - Wages versus employment/output size?
Aim of this project

- Study dynamics of LS at micro level
  - So far, predominantly macro/industry approach; makes it difficult to disentangle different forces
- What are the margins of adjustment?
  - Are rel. high-LS units pushed out of the economy?
  - Do rel. low-LS units enter?
  - Reallocation?
  - Wages versus employment/output size?
- At what level do things change?
  - Plants?
  - Firms?
  - Sectors?
Data

- Use Census data 1967-2007; universe of manufacturing establishments (plants)
  Circumvents the issue of self employment

\[
\gamma_t = \frac{\text{labor costs}_t}{\text{value added}_t} = \sum_i \gamma_{it} y_{it}
\]

- Labor costs = wage bill for production workers + payroll for non-production workers + benefits (unemployment tax, pension contributions, ...)

- Value added = sales – inventory changes – resales – materials use & contract work (⇒ Koh et al. (2015)) – energy expenditures

- Look at labor costs paid by firm side, not income accounting

Addresses issues raised by Rognlie (2015): decline in aggr. LS driven by capital income from housing
Use Census data 1967-2007; universe of manufacturing establishments (plants)
Circumvents the issue of self employment

Labor share: \( \gamma_t = \frac{\text{labor costs}_t}{\text{value added}_t} = \sum_i \gamma_{it} \frac{y_{it}}{y_t} \)
**Data**

- Use Census data 1967-2007; universe of manufacturing establishments (plants)
  Circumvents the issue of self employment

- Labor share: \( \gamma_t = \frac{\text{labor costs}_t}{\text{value added}_t} = \sum_i \gamma_{it} \frac{y_{it}}{y_t} \)

- Labor costs = wage bill for production workers
  + payroll for non-production workers
  + benefits (unemployment tax, pension contributions, ...)

- Value added = sales – inventory changes – resales
  – materials use & contract work (⇒ Koh et al. (2015))
  – energy expenditures
Data

- Use Census data 1967-2007; universe of manufacturing establishments (plants)
  Circumvents the issue of self employment

- Labor share: $\gamma_t = \frac{\text{labor costs}_t}{\text{value added}_t} = \sum_i \gamma_{it} \frac{y_{it}}{y_t}$

- Labor costs = wage bill for production workers
  + payroll for non-production workers
  + benefits (unemployment tax, pension contributions, ...)

- Value added = sales – inventory changes – resales
  – materials use & contract work (⇒ Koh et al. (2015))
  – energy expenditures

- Look at labor costs paid by firm side, not income accounting
  Addresses issues raised by Rognlie (2015): decline in aggr. LS driven by capital income from housing
Decline in US economy since 1975: \(-1.4\%\) per decade
(Karabarbounis/Neiman, 2014)

Decline in US manufacturing since 1967:
- pre 1982: \(-0.6\%\) per decade
- post 1982: \(-6.8\%\) per decade
What is behind this decline?

Proposed Explanations:

▶ Trade/Globalisation: labor intensive activities outsourced
▶ Union power eroded.
▶ Computers: replace workers

Let’s look at evolution of micro-level labor shares.
The distribution of labor shares

Figure: How a symmetric downward shift would look like
The distribution of labor shares

Figure: The distribution of labor shares in 1967 and 2007
How does the LS look like for individual plants?

**Figure:** Plant-level vs. aggregate labor share

Decline in manufacturing labor share: $-4.5\%$ per decade  
**Increase** in labor share of median plant: $+1.7\%$ per decade
The distribution of labor shares

$$\gamma_{67} = \sum_i \gamma_{i,67} \omega_{i,67}$$

Figure: Who produces most value added in 1967?
The distribution of labor shares

\[ \gamma_{07} = \sum_i \gamma_{i,07} \omega_{i,07} \]

Figure: Who produces most value added in 2007?
What can we learn more from plant-level LS?

- Do high-labor share firms lose market share? Exit?
- Are entrants/disruptors behind the dynamics?
- How do plants lower their LS?
  - ... lowering employment and/or wages?
  - ... growing output with same number of workers?
- Where does entry/exit and reallocation happen? Firms v. markets.
- Do plants lower LS by investing a lot in equipment (computers)? ⇒ Karabarbounis/Neimann
- Are foreign competition, offshoring drivers of the process? ⇒ Elsby/Hobijn/Sahin
Understanding what is going on at the micro level

Decomposing the change in the aggregate labor share in post-1982 US manufacturing:

\[
\Delta \gamma_t = \gamma_t - \gamma_{t-1} = \sum_i \gamma_{it} \frac{y_{it}}{y_t} - \sum_i \gamma_{it-1} \frac{y_{it-1}}{y_{t-1}}
\]

\[
= \alpha_t^{en} (\gamma_t^{en} - \gamma_{t-1}^{inc}) - \alpha_{t-1}^{ex} (\gamma_{t-1}^{ex} - \gamma_{t-1}^{inc}) + (1 - \alpha_t^{en}) (\gamma_{t}^{inc} - \gamma_{t-1}^{inc})
\]

Contr. Entry Contr. Exit Change of incumbents

\[-4.5 = -0.3\% - 1.9\% - 2.5\% (72-07)\]

Unimportance of entry margin somewhat surprising

Biggest margin: change of incumbent units; can take form of

... adjustment,

... reallocation of value added to low-LS firms,

... workerless growth of some firms.
Understanding what is going on at the micro level

Decomposing the change in the aggregate labor share in post-1982 US manufacturing:

\[
\Delta \gamma_t = \gamma_t - \gamma_{t-1} = \sum_i \gamma_{it} \frac{y_{it}}{y_t} - \sum_i \gamma_{it-1} \frac{y_{it-1}}{y_{t-1}}
\]

\[
= \alpha_{en}^t (\gamma_t^{en} - \gamma_{t-1}^{inc}) - \alpha_{ex}^{t-1} (\gamma_{t-1}^{ex} - \gamma_{t-1}^{inc}) + (1 - \alpha_{en}^t) (\gamma_t^{inc} - \gamma_{t-1}^{inc})
\]

Contr. Entry \hspace{3cm} Contr. Exit \hspace{3cm} Change of incumbents

\[
-4.5 = -0.3\% \hspace{3cm} -1.9\% \hspace{3cm} -2.5\% \hspace{0.5cm} (72-07)
\]

\[
-6.8 = -0.0\% \hspace{3cm} -2.3\% \hspace{3cm} -4.5\% \hspace{0.5cm} (87-07)
\]

Unimportance of entry margin somewhat surprising

Biggest margin: change of incumbent units; can take form of...

...adjustment, ...

...reallocation of value added to low-LS firms, ...

...workerless growth of some firms.
Understanding what is going on at the micro level

Decomposing the change in the aggregate labor share in post-1982 US manufacturing:

\[ \Delta \gamma_t = \gamma_t - \gamma_{t-1} = \sum_i \gamma_{it} \frac{y_{it}}{y_t} - \sum_i \gamma_{it-1} \frac{y_{it-1}}{y_{t-1}} \]

\[ = \alpha^\text{en}_t (\gamma^\text{en}_t - \gamma^\text{inc}_{t-1}) \]

Contr. Entry

\[ - \alpha^\text{ex}_{t-1} (\gamma^\text{ex}_{t-1} - \gamma^\text{inc}_{t-1}) \]

Contr. Exit

\[ + (1 - \alpha^\text{en}_t) (\gamma^\text{inc}_t - \gamma^\text{inc}_{t-1}) \]

Change of incumbents

- 4.5 = -0.3%  
- 1.9%  
- 2.5% (72-07)  
- 6.8 = -0.0%  
- 2.3%  
- 4.5% (87-07)

- Unimportance of entry margin somewhat surprising  
- Biggest margin: change of incumbent units; can take form of 
  ...  
  ... adjustment,  
  ... reallocation of value added to low-LS firms,  
  ... workerless growth of some firms.
Adjustment, between- and within-firm reallocation

Decomposing the “Change of incumbents” term

- Decomposing the contribution of incumbent plants:

\[ \Delta \gamma_{inc}^t = \int \gamma \omega_t(\gamma)dF(\gamma_t) - \int \gamma \omega_{t-1}(\gamma)dF(\gamma_{t-1}) \]

\[ = \int_{\gamma^0}^{\gamma^1} \gamma \omega_t(\gamma)dF(\gamma_t) + \int_{\gamma^1}^{\gamma^2} \gamma \omega_t(\gamma)dF(\gamma_t) + \ldots + \int_{\gamma^{q-1}}^{\gamma^q} \gamma \omega_t(\gamma)dF(\gamma_t) \]

\[ \approx \sum_q \Delta \gamma_t^q \omega_{t-1}(\gamma_{t-1}^q) + \sum_q \Delta \omega_t(\gamma_t^q) + \sum_q \Delta \gamma_t^q \Delta \omega_t(\gamma_t^q) \]

\[ \begin{array}{c}
\text{Adjustment} \\
\text{Reallocation} \\
\text{Interaction}
\end{array} \]

▶ Traditional Decomp.
Contributions of various margins

Figure: Contributing margins
Explaining the labor share decline

Pre 1982:
- Positive adjustment of labor shares was counterbalanced by reallocation of market share from high-LS to low-LS firms and exit of high-LS plants
Explaining the labor share decline

Pre 1982:
- Positive adjustment of labor shares was counterbalanced by reallocation of market share from high-LS to low-LS firms and exit of high-LS plants

Post 1982:
- Any labor share increases at the micro level disappears
- Reallocation from high-LS to low-LS firms becomes dominant
- Some of that reallocation takes the form of mergers and acquisitions

⇒ Shift from within-plant drivers (increases in labor share) to between-plant forces
Recall…

Figure: Distribution of value added as a function of labor share

\[ \gamma_t = \sum_i \gamma_{it} \omega_{it} \iff 0 = \sum_i \omega_{it} (\gamma_{it} - \gamma_t) \]

⇒ Focus on the production units at the bottom end in the 2000’s; lowest quintile of \( \overline{\gamma}_{it}, t = 2002, 2007 \)
How do HP plants compare to non-HP plants?

⇒ Focus on the production units at the bottom end in the 2000’s; lowest quintile of \( \chi_{it} \equiv \omega_{it}(\gamma_{it} - \gamma_t), t = 2002, 2007 \)
How do HP plants compare to non-HP plants?

⇒ Focus on the production units at the bottom end in the 2000’s; lowest quintile of \( \chi_{it} \equiv \omega_{it} (\gamma_{it} - \gamma_t) \), \( t = 2002, 2007 \)

▶ focus on balanced panel for this analysis of HP plants
How do HP plants compare to non-HP plants?

⇒ Focus on the production units at the bottom end in the 2000’s; lowest quintile of $\chi_{it} \equiv \omega_{it}(\gamma_{it} - \gamma_t)$, $t = 2002, 2007$

▶ focus on balanced panel for this analysis of HP plants
▶ What is their average LS?
How do HP plants compare to non-HP plants?

⇒ Focus on the production units at the bottom end in the 2000’s; lowest quintile of \( \chi_{it} \equiv \omega_{it}(\gamma_{it} - \gamma_t) \), \( t = 2002, 2007 \)

▶ focus on balanced panel for this analysis of HP plants
▶ What is their average LS?

Figure: Average LS of HP and non-HP plants
How do HP plants do it?

One can lower labor share $\gamma = \frac{wL}{y}$ by ...

... cutting wages $w$

... cutting employment $L$

... growing value added $y$
How do HP plants do it?

One can lower labor share $\gamma = \frac{wL}{y}$ by ...

... cutting wages $w$
... cutting employment $L$
... growing value added $y$

Run panel regression:

$$\log w_{it} = \beta_0 + \beta_1 t + \beta_2 \chi_i + \beta_3 \chi_i \times t + \beta_4 X_{it}$$

Object of interest: $\beta_3$. How much do wage, employment and output trajectories differ for HP and non-HP plants?
How do HP plants do it?

One can lower labor share $\gamma = \frac{wL}{y}$ by ...

... cutting wages $w$

... cutting employment $L$

... growing value added $y$

Run panel regression: $\log w_{it} = \beta_0 + \beta_1 t + \beta_2 \chi_i + \beta_3 \chi_i \times t + \beta_4 X_{it}$

Object of interest: $\beta_3$. How much do wage, employment and output trajectories differ for HP and non-HP plants?

$\hat{\beta}_3$ Growth above non-HP plants annually 1982-2007
How do HP plants do it?

One can lower labor share \( \gamma = \frac{wL}{y} \) by ...

... cutting wages \( w \)

... cutting employment \( L \)

... growing value added \( y \)

Run panel regression: 
\[
\log w_{it} = \beta_0 + \beta_1 t + \beta_2 \chi_i + \beta_3 \chi_i \times t + \beta_4 X_{it}
\]

Object of interest: \( \beta_3 \). How much do wage, employment and output trajectories differ for HP and non-HP plants?

<table>
<thead>
<tr>
<th>( \hat{\beta}_3 )</th>
<th>Growth above non-HP plants annually 1982-2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \log w )</td>
<td>0.0057*** 0.1% 2.9%</td>
</tr>
<tr>
<td>(0.0006)</td>
<td></td>
</tr>
</tbody>
</table>
How do HP plants do it?

One can lower labor share $\gamma = \frac{wL}{y}$ by ...

... cutting wages $w$

... cutting employment $L$

... growing value added $y$

Run panel regression: $\log w_{it} = \beta_0 + \beta_1 t + \beta_2 x_i + \beta_3 x_i \times t + \beta_4 x_{it}$

Object of interest: $\beta_3$. How much do wage, employment and output trajectories differ for HP and non-HP plants?

<table>
<thead>
<tr>
<th>$\hat{\beta}_3$</th>
<th>Growth above non-HP plants</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\log w$</td>
<td>0.0057*** 0.1% 2.9%</td>
</tr>
<tr>
<td></td>
<td>(0.0006)</td>
</tr>
<tr>
<td>$\log L$</td>
<td>0.0075*** 0.15% 4.0%</td>
</tr>
<tr>
<td></td>
<td>(0.002)</td>
</tr>
</tbody>
</table>
How do HP plants do it?

One can lower labor share $\gamma = \frac{wL}{y}$ by ...

... cutting wages $w$

... cutting employment $L$

... growing value added $y$

Run panel regression: $\log w_{it} = \beta_0 + \beta_1 t + \beta_2 \chi_i + \beta_3 \chi_i \times t + \beta_4 X_{it}$

Object of interest: $\beta_3$. How much do wage, employment and output trajectories differ for HP and non-HP plants?

<table>
<thead>
<tr>
<th></th>
<th>Growth above non-HP plants annually 1982-2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\hat{\beta}_3$</td>
<td></td>
</tr>
<tr>
<td>$\log w$</td>
<td>0.0057*** 0.1% 2.9% (0.0006)</td>
</tr>
<tr>
<td>$\log L$</td>
<td>0.0075*** 0.15% 4.0% (0.002)</td>
</tr>
<tr>
<td>$\log y$</td>
<td>0.185*** 3.7% 250%! (0.0014)</td>
</tr>
</tbody>
</table>
Fall in manufacturing labor share: which mechanism?

1. Equipment (Karabarbounis/Neimann (2014))? ⇒ Doubtful.

2. Import competition (Sahin et al. (2013))? ⇒ Doubtful.

3. Geography/Right to work states (new?)? ⇒ Maybe.

4. Concentration in labor markets (new?)? ⇒ Doubtful.

5. Firm diversification into non-manufacturing (new?)? ⇒ Maybe.
1. Price of capital

Karabarbounis/Neimann (2014): Fall in LS if...

1. Downward trend in price of capital (uncontroversial)
2. Elasticity of substitution b/w L and K < 1 (doubtful)

Do HP plants grow their capital more than non-HP plants?

\[ \log K_{it} = \beta_0 + \beta_1 t + \beta_2 \chi_i + \beta_3 \chi_i \times t + \beta_4 X_{it} \]
1. Price of capital

Karabarbounis/Neimann (2014): Fall in LS if...

1. Downward trend in price of capital (uncontroversial)
2. Elasticity of substitution b/w $L$ and $K < 1$ (doubtful)

Do HP plants grow their capital more than non-HP plants?

$$\log K_{it} = \beta_0 + \beta_1 t + \beta_2 \chi_i + \beta_3 \chi_i \times t + \beta_4 X_{it}$$

$\hat{\beta}_3$ Growth above non-HP plants annually 1982-2007
1. Price of capital

Karabarbounis/Neimann (2014): Fall in LS if...

1. Downward trend in price of capital (uncontroversial)
2. Elasticity of substitution b/w $L$ and $K < 1$ (doubtful)

Do HP plants grow their capital more than non-HP plants?

$$\log K_{it} = \beta_0 + \beta_1 t + \beta_2 \chi_i + \beta_3 \chi_i \times t + \beta_4 X_{it}$$

\[ \hat{\beta}_3 \] 
Growth above non-HP plants annually 1982-2007

<table>
<thead>
<tr>
<th>$\log K$</th>
<th>0.0071***</th>
<th>0.14%</th>
<th>3.5%</th>
</tr>
</thead>
<tbody>
<tr>
<td>(0.0013)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
1. Price of capital

Karabarbounis/Neimann (2014): Fall in LS if...

1. Downward trend in price of capital (uncontroversial)
2. Elasticity of substitution b/w $L$ and $K < 1$ (doubtful)

Do HP plants grow their capital more than non-HP plants?

$$\log K_{it} = \beta_0 + \beta_1 t + \beta_2 \chi_i + \beta_3 \chi_i \times t + \beta_4 X_{it}$$

<table>
<thead>
<tr>
<th></th>
<th>$\hat{\beta}_3$</th>
<th>Growth above non-HP plants annually</th>
<th>1982-2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\log K$</td>
<td>0.0071***</td>
<td>0.14%</td>
<td>3.5%</td>
</tr>
<tr>
<td></td>
<td>(0.0013)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\log K^{str}$</td>
<td>-0.0865***</td>
<td>-1.73%</td>
<td>-43%</td>
</tr>
<tr>
<td></td>
<td>(0.0131)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
1. Price of capital

Karabarbounis/Neimann (2014): Fall in LS if...

1. Downward trend in price of capital (uncontroversial)
2. Elasticity of substitution b/w $L$ and $K < 1$ (doubtful)

Do HP plants grow their capital more than non-HP plants?

$$\log K_{it} = \beta_0 + \beta_1 t + \beta_2 x_i + \beta_3 x_i \times t + \beta_4 X_{it}$$

<table>
<thead>
<tr>
<th>$\hat{\beta}_3$</th>
<th>Growth above non-HP plants annually</th>
<th>1982-2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\log K$</td>
<td>0.0071***</td>
<td>0.14%</td>
</tr>
<tr>
<td></td>
<td>(0.0013)</td>
<td></td>
</tr>
<tr>
<td>$\log K^{str}$</td>
<td>-0.0865***</td>
<td>-1.73%</td>
</tr>
<tr>
<td></td>
<td>(0.0131)</td>
<td></td>
</tr>
<tr>
<td>$\log K^{eq}$</td>
<td>-0.0191***</td>
<td>-0.38%</td>
</tr>
<tr>
<td></td>
<td>(0.0099)</td>
<td></td>
</tr>
</tbody>
</table>
2. Import competition

Did outsourcing and off shoring of labor intensive activities lower the US labor share?

Industry evidence:

- those hit hardest by import competition (Textiles, Apparel, Primary metals) experience little aggregate LS decline!
  - almost no distinction between HP and non-HP plants
2. Import competition

Did outsourcing and offshoring of labor intensive activities lower the US labor share?

Industry evidence:

- those hit hardest by import competition (Textiles, Apparel, Primary metals) experience little aggregate LS decline!
  - almost no distinction between HP and non-HP plants

- Industries with strongest LS decline (Chemicals, Oil, Food & Beverage) have had less competition from abroad and have been growing
3. Geography

Did (lack of) labor laws affect the ability of firms to retain high labor productivity instead of paying it out as wage?

Run probit of being a HP plant on dummy if was located in "right-to-work" state in year \( t \),

\[
Pr(\chi = 1 | X, \eta_t)
\]

Marginal effect is positive, significant and considerably large: 1.9% more likely to become a HP plant when in RTW state (baseline probability is 7.7%).

⇒ Some potential; needs to be investigated further
3. Geography

Did (lack of) labor laws affect the ability of firms to retain high labor productivity instead of paying it out as wage?

Run probit of being a HP plant on dummy if was located in “right-to-work” state in year $t$

$$Pr(\chi = 1|X, \eta_t)$$
3. Geography

Did (lack of) labor laws affect the ability of firms to retain high labor productivity instead of paying it out as wage?

Run probit of being a HP plant on dummy if was located in “right-to-work” state in year $t$

$$Pr(\chi = 1|X, \eta_t)$$

Marginal effect is positive, significant and considerably large: 1.9% more likely to become a HP plant when in RTW state (baseline probability is 7.7%).

⇒ Some potential; needs to be investigated further
4. Market power?

- Recall: Plants do not change employment relative to non-HP plants, yet increase VA a lot
4. Market power?

- Recall: Plants do not change employment relative to non-HP plants, yet increase VA a lot

- Do HP plants charge a high markup? ⇒ need work on that.
4. Market power?

- Recall: Plants do not change employment relative to non-HP plants, yet increase VA a lot.

- Do HP plants charge a high markup? \( \Rightarrow \) need work on that.

- Are HP plants monopolists in labor markets?

\[
H_{erfindahl_t} = \sum_j \left( \frac{L_{jt}}{L_t} \right)^2
\]
4. Market power?

- Recall: Plants do not change employment relative to non-HP plants, yet increase VA a lot.

- Do HP plants charge a high markup? ⇒ need work on that.

- Are HP plants monopsonists in labor markets?

\[
Herfindahl_t = \sum_j \left( \frac{L_{jt}}{L_t} \right)^2
\]

- Herfindahl index (and other concentration measures) barely change over time.

- Labor market concentration doesn’t matter for HP plant status or its growth in value added.
5. Firm factors

- Do firm characteristics matter?
  - Number of industries the firm is active in
  - Number of plants the firm operates
  - Non-manufacturing employment in the rest of the firm

Results:
- 1.1% more likely to be a HP plant when the firm lowers the employment share in manufacturing by 10%.
- Number of plants seems irrelevant
- No impact of expenditures for advertising, consulting and intangibles

5. Firm factors

- Do firm characteristics matter?
  - Number of industries the firm is active in
  - Number of plants the firm operates
  - Non-manufacturing employment in the rest of the firm

- Results:
  - 1.1% more likely to be a HP plant when the firm lowers the employment share in manufacturing by 10%.
  - Number of plants seems irrelevant
  - No impact of expenditures for advertising, consulting and intangibles
Conclusion

- Documented large LS decline in US manufacturing
- Vast differences at micro level and bulk of decline in aggr. LS due to reallocation among incumbent plants
Conclusion

- Documented large LS decline in US manufacturing
- Vast differences at micro level and bulk of decline in aggr. LS due to reallocation among incumbent plants
- Most proposed explanations are not supported at this point
  - Capital-embodied technical change
  - Import competition
  - Entry/exit, mergers and acquisitions
  - Maybe labor laws (right-to-work states)
Conclusion

- Documented large LS decline in US manufacturing
- Vast differences at micro level and bulk of decline in aggr. LS due to reallocation among incumbent plants
- Most proposed explanations are not supported at this point
  - Capital-embodied technical change
  - Import competition
  - Entry/exit, mergers and acquisitions
  - Maybe labor laws (right-to-work states)
- So far, the cause for the LS decline remains a puzzle
Adjustment, between- and within-firm reallocation

Decomposing the “Change of incumbents” term

- A traditional approach (Baily, Hulten and Campbell (1992)):

\[
\Delta \gamma_{inc}^t = \sum_i \Delta \omega_{it} \gamma_{it-1} + \sum_i \omega_{it-1} \Delta \gamma_{it} + \sum_i \Delta \omega_{it} \Delta \gamma_{it}
\]

- Reallocation
- Adjustment
- ???

- Turns out the last term dominates everything mechanically.
Reallocation between firms – M&A versus relative growth

- Adjustment and reallocation come in two forms:
  1. Sales/Acquisitions of plants between firms
  2. relative growth differences

- Plants that change ownership typically lower their LS; plants that stay within the same firm typically maintain the LS

- Acquired plants see their LS change by ...
  - ... $-0.6\%$ pre 1982,
  - ... $-10.2\%$ post 1982.

- The same numbers for stayers are $+5.5\%$ and $-4.9\%$, resp. Significant difference! Does it matter?

⇒ Break up “Change” margin into M&A component and a between-firm adjustment/reallocation component.

\[
\Delta \gamma_t^{inc} = \alpha_t^{M&A} \left( Adj_t^{M&A} + Reall_t^{M&A} \right) \\
+ (1 - \alpha_t^{M&A}) \left( Adj_t^{Stayers} + Reall_t^{Stayers} \right) + \text{Interact. terms...}
\]
Contributions of various margins

Figure: Contributing margins