LABOR REALLOCATION, PRODUCTIVITY, AND WAGES IN KOREA
Motivation
Data and Measurement
Stylized Facts
Industry-level Analysis: Does High Reallocation Boost Productivity or Wages?
Plant-Analysis: Did Jobs Increase at More Productive/ High-wage Plants?
Policy Implications
Efficient labor reallocation is a key to growth

Recent concerns: reduced & malfunctioning reallocation

Reduced labor market dynamism (Davis-Haltiwanger 2014)
- Both job and worker reallocation fell in US
- Why concern: close link between employment rate and fluidity
- Particularly important for young and marginal workers

Productivity-enhancing reallocation weakened (Foster-Grim-Haltiwanger 2016)
- Postwar US economy has reallocated labor from less to more productive establishments, and recessions accelerated it
- Such mechanism did not work like before during Great Recession
Research Questions

• Pace of reallocation
  – Has Korean labor market become less fluid?
  – What type of establishments have driven the change?
  – How is reallocation intensity associated with economic outcomes?

• Patterns of reallocation
  – From where to where did labor flow?
  – What does it mean for aggregate productivity and wages?
  – What are policy implications?
• No JOLTS or BED in Korea (yet)
• Annual Mining and Manufacturing Survey
  – Unit: establishment(plant)
  – Period: 2000~2014
  – New industry classification system was introduced in 2008 (so from 2007 survey on)
  – Concordance complete
**Definitions**

- Net employment change at establishment $i$: $NEG_{i,t} = E_{i,t} - E_{i,t-1}$
- Job creation: $JC_t = \sum_{NEG>0} NEG_{i,t}$
- Job destruction: $JD_t = \sum_{NEG<0} |NEG_{i,t}|$
- Job reallocation: $JR_t = JC_t + JD_t$
- Excess job reallocation: $EJR_t = JR_t - |NEG_t|$
- Rates: divide by $(E_t + E_{t-1})/2$

**NEG for new and closed establishments**

- New establishment: $NEG_{i,t} = 2$
- Closed establishment: $NEG_{i,t} = -2$
• JR and excess JR move together, going down until 2010 and then rising
• Reallocation dropped in downturns
• In 2009-10, excess JR dropped while JR went up – role of gov. policy
- Excess JR measures flows across employers after accounting for NEG
- Industry ranking has been stable over time
- In top 5 industries (2-digit level), JR also went down and up around 2010
• Excess JR and NEG have no significant relationship before and after crisis
• This suggests that observed trend is not driven by biz cycle effects
• Excess JR seems to be a good measure of labor fluidity
• Reallocation is usually lower among larger establishments
• However, rebound is strong only among small estb with -20 employees
• Strong rebound among young plants, 5 years old or younger
• This reflects increase in entry/exit rates after 2008 crisis
• Putting together, this should be a good sign
Did High Reallocation Boost Productivity or Wages?

- Labor Market Fluidity Hypothesis (Davis-Haltiwanger 2014)
  - High pace of reallocation helps, esp. marginal workers
  - Use worker reallocation to evaluate its effect on employment rates of various demographic groups
  - Exploits variation across states
  - Tries to isolate “true” reallocation effect, not driven by industry mix

- This analysis
  - Many agree that there are no true local labor market in Korea
  - Conducts industry-level analysis at 3 digit level
    \[ Y_{j,t} = \beta_0 + \beta_1 R_{t,t-1} + \sigma_j + \eta_t + \epsilon_{i,t} \]
  - \( Y_{j,t} \): (value added/workers) for productivity, (wages/workers) for wage
### Did High Reallocation Boost Productivity or Wages?

<table>
<thead>
<tr>
<th>Time coverage</th>
<th>Dependent Variable</th>
<th>2000-12</th>
<th>2000-08</th>
<th>2009-12</th>
<th>2000-12</th>
<th>2000-08</th>
<th>2009-12</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ln(labor productivity)</td>
<td></td>
<td></td>
<td></td>
<td>ln(wage)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td></td>
<td>(4)</td>
<td>(5)</td>
<td>(6)</td>
</tr>
<tr>
<td>Job reallocation rate</td>
<td>-0.109 (0.0867)</td>
<td>-0.086 (0.0886)</td>
<td>-0.0403 (0.125)</td>
<td>0.123 (0.127)</td>
<td>0.183 (0.237)</td>
<td>-0.0759* (0.0384)</td>
<td></td>
</tr>
<tr>
<td>Observations</td>
<td>988</td>
<td>657</td>
<td>331</td>
<td></td>
<td>1162</td>
<td>664</td>
<td>498</td>
</tr>
<tr>
<td>R-square</td>
<td>0.934</td>
<td>0.956</td>
<td>0.979</td>
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<td>0.935</td>
<td>0.956</td>
<td>0.980</td>
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<tr>
<td></td>
<td>(7)</td>
<td>(8)</td>
<td>(9)</td>
<td></td>
<td>(10)</td>
<td>(11)</td>
<td>(12)</td>
</tr>
<tr>
<td>Excess Job reallocation rate</td>
<td>-0.262** (0.0915)</td>
<td>-0.150 (0.0949)</td>
<td>-0.175 (0.118)</td>
<td>0.0289 (0.136)</td>
<td>0.0540 (0.255)</td>
<td>-0.0156 (0.0405)</td>
<td></td>
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<tr>
<td>Observations</td>
<td>988</td>
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<td>498</td>
</tr>
<tr>
<td>R-square</td>
<td>0.935</td>
<td>0.956</td>
<td>0.980</td>
<td></td>
<td>0.888</td>
<td>0.875</td>
<td>0.968</td>
</tr>
</tbody>
</table>

Industry and year fixed effects are included in all columns.

* Significant at 5% ** at 1%

- At industry level, pace of reallocation intensity did not affect outcomes
- What matters may be not whether workers move more but where workers move
Patterns of reallocation: Plant-level Analysis

• Cleansing effect of labor reallocation (Foster et al. 2016)
  – Tests whether labor was reallocated from less to more productive
  – Regress net employment growth(t-1,t) on TFP(t-1)
  – TFP ranking is measured for each (industry, year) cell
  – Finds “more jobs from more productive plant” pattern
  – Implies productivity-enhancing reallocation (allocative efficiency ↑)
  – However, it weakens during Great Recession

• This analysis
  – Use normalized (z-scored) labor productivity \( z(a)_{i,t-1} \), instead of TFP
  – Do not differentiate extensive (plant closure) and intensive margins

\[
JR_{i,t,t-1} = \beta_0 + \beta_1 z(a)_{i,t-1} + X_{i,t-1}\Theta + \sigma_j + \eta_t + \varepsilon_{i,t}
\]
Patterns of reallocation: Plant-level Analysis

• Steps
  – Calculate labor productivity \( a_{i,t} = \frac{vadd_{i,t}}{E_{i,t}} \)
  – Exclude extreme values: top and bottom 1%
  – Normalize \( a_{i,t} \) for each (industry, year) cell, obtain z-scores \( z(a)_{i,t} \)
  – Confirm that productivity ranking is highly persistent (corr≈0.67)
  – Run the regression
  – Repeat the same for wages: put wages in place of productivity
Patterns of reallocation: Plant-level Analysis

<table>
<thead>
<tr>
<th>Dependent Variable: Net Employment Growth</th>
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<tbody>
<tr>
<td>(1)</td>
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<td>(2)</td>
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<td>(3)</td>
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<tr>
<td>(4)</td>
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<tr>
<td>Productivity z-score</td>
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<td>(0.0010)</td>
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<tr>
<td>Productivity z-score x post-2009</td>
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<tr>
<td>(0.0020)</td>
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<tr>
<td>ln(plant wage)</td>
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<tr>
<td>(0.0024)</td>
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<tr>
<td>ln(plant wage) x post-2009</td>
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<tr>
<td>(0.0041)</td>
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<tr>
<td>Observations</td>
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<td>R-square</td>
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<td>0.055</td>
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Log plant size (employment), industry and year fixed effects are included in all columns. Errors are clustered at the plant level.

* Significant at 5% ** at 1%

- In general, labor reallocation was productivity- and wage-enhancing
- The effect is stronger among small estb (-300 employees, not reported)
- Since 2009, pace of reallocation increased; not so much did p- and w-enhancing effect
Making labor market more flexible and fluid has been one of major policy goals of Korea government
  – They worked mostly on “rigid” labor institutions, assuming that
  – more flexibility & fluidity would bring higher productivity

Gains were not as much as expected
  – Pace of labor reallocation actually increased after global financial crisis
  – However, it did not improve productivity- and wage-enhancing mechanism much (it did not make it worse, either)
  – High job flow itself may not be the right policy target

This analysis: not between- but within-industry reallocation
  – Within-industry reallocation is sound in manufacturing
  – Low-productivity and low-wage problems stand out in service industry
Thank You!
Any Questions?