



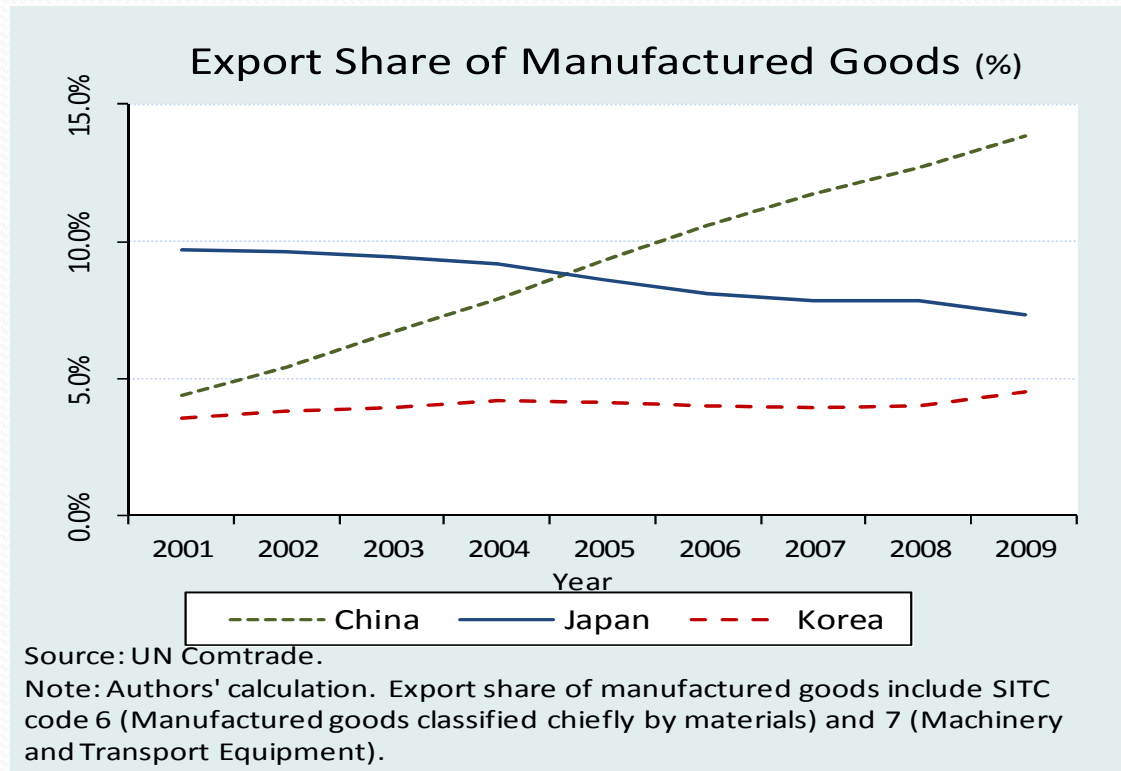
Competitiveness, Productivity, and Industry- Specific Effective Exchange Rate of Asian Industries:

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Vienna Institute for International Economic Studies (wiiw)
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1. Introduction

- Japan is losing ground to China and Korea in export markets (Figure 1).



- Fragmentation of production, technological development and catch-up of emerging Asian countries, various exchange rate regimes in East Asia

1. Introduction --- continued ---

- What are the determinants of export competitiveness?
- Price competitiveness --- reflecting production costs, nominal exchange rate, and markups → Real effective exchange rate (RER), i.e., nominal exchange rate adjusted by relative prices of domestic products versus competitors' products
 - RER based on CPI is available for many countries, but at the macro level. (CPI-based RER is not a good measure of export competitiveness. ← Bayoumi et al. 2011)
 - RER based on PPI or ULC, especially at industry level, is not readily available for most of developing countries. ← Macro-level RER should be very different from industry-level RERs due to large differences in prices across industries (due to different growth rates of productivity or technological development). ← Lewney et al. 2012, Thorbecke and Kato 2012a, 2012b

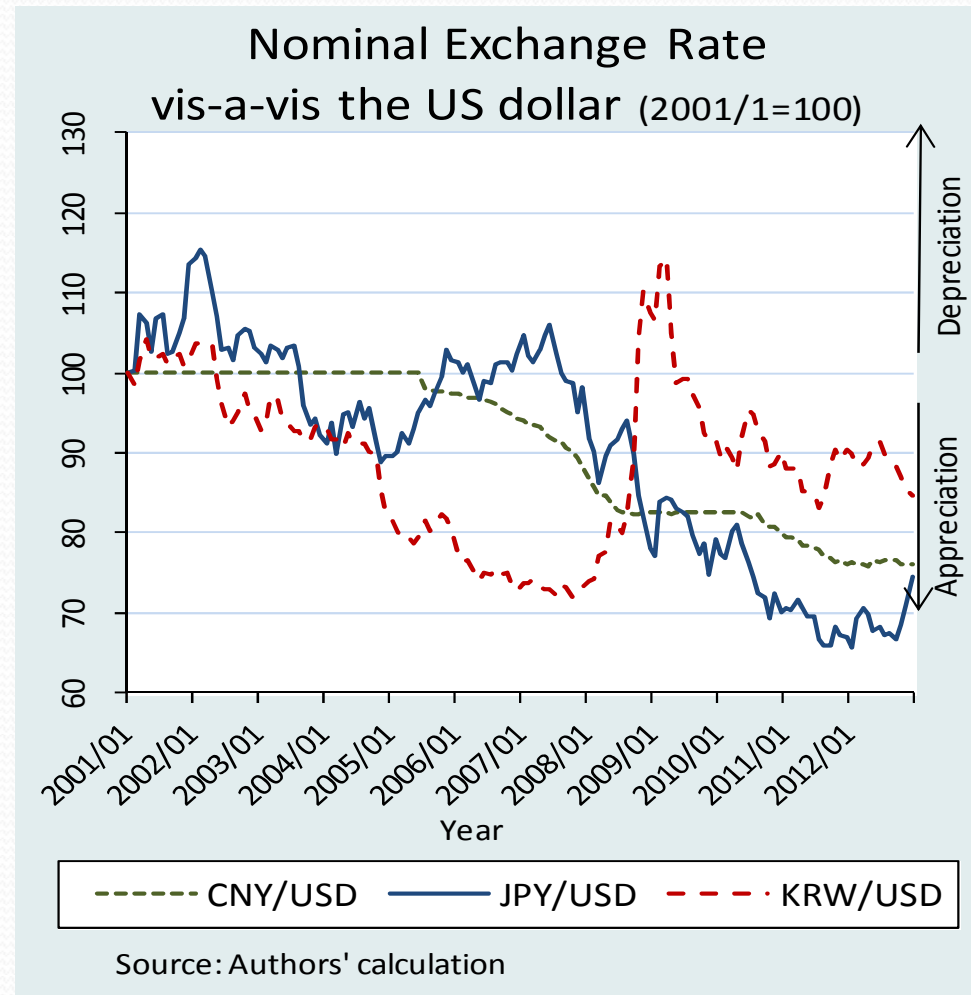
1. Introduction --- continued ---

- Cross-country comparative studies on export competitiveness for Asian countries at disaggregated level are still scarce.
- This study investigates **industry-level** export competitiveness based on ULCs and nominal effective exchange rate (NEER) in Japan, China, and Korea. (12 mfg. industries)
- We try to disentangle complicated effects of nominal exchange rates and cost competitiveness (ULCs) on export competitiveness.

2. An Overview of Factors Explaining Countries' International Competitiveness (1)

NEER and ULCs for the mfg. sector for China, Japan, and Korea

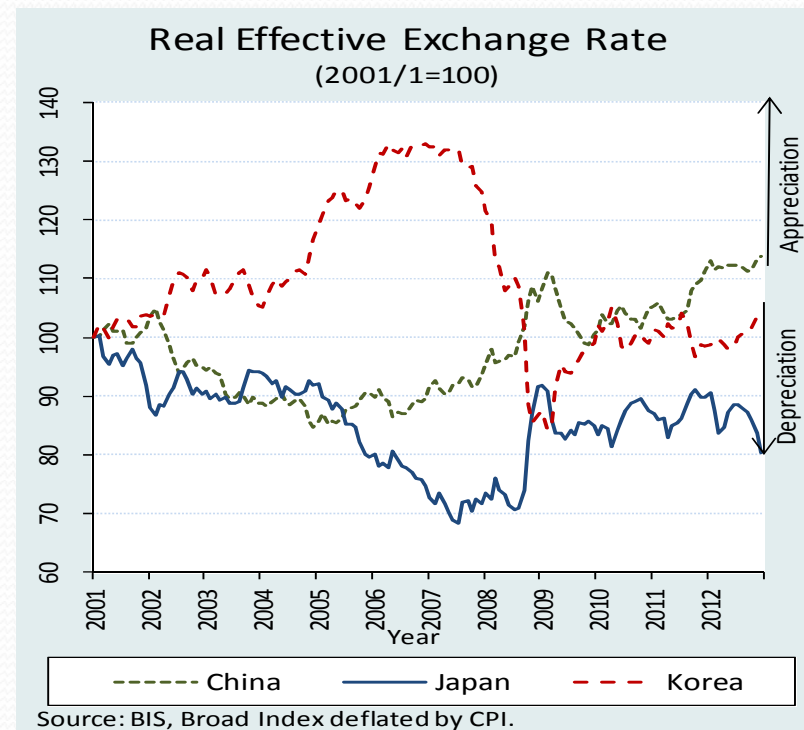
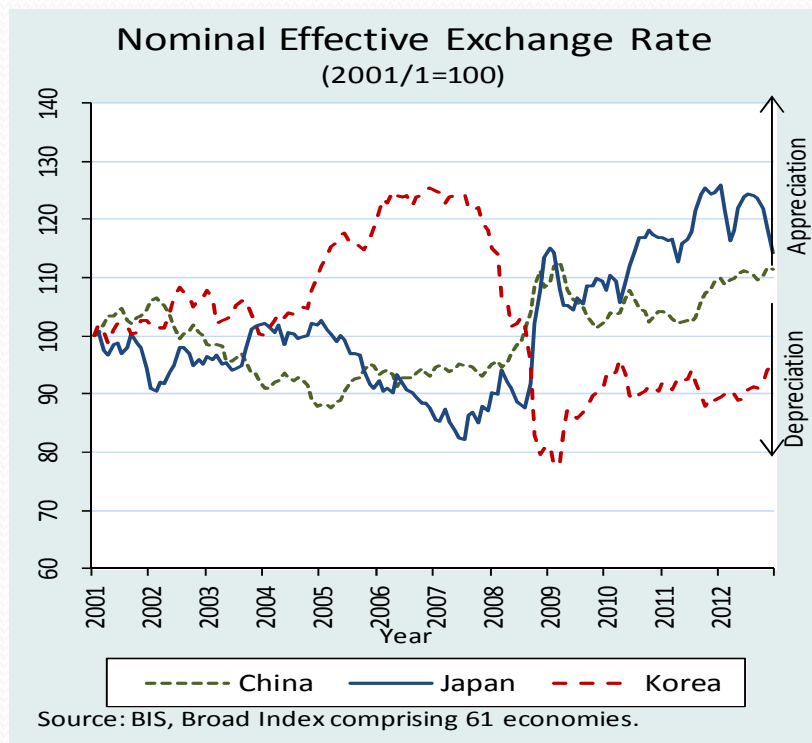
- In the last decade, one of the most volatile movements was observed between Japanese yen and Korean won.
- Chinese RMB was pegged to USD until July 2005, but started to appreciate gradually since then.



2. An Overview of Factors Explaining Countries' International Competitiveness (2)

--- BIS NEER & REER ---

- The effective exchange rate that provides a better measurement of exporting firms' price competitiveness in the global market than the bilateral nominal exchange rate.



2. An Overview of Factors Explaining Countries' International Competitiveness (3)

--- Unit Labor Costs ---

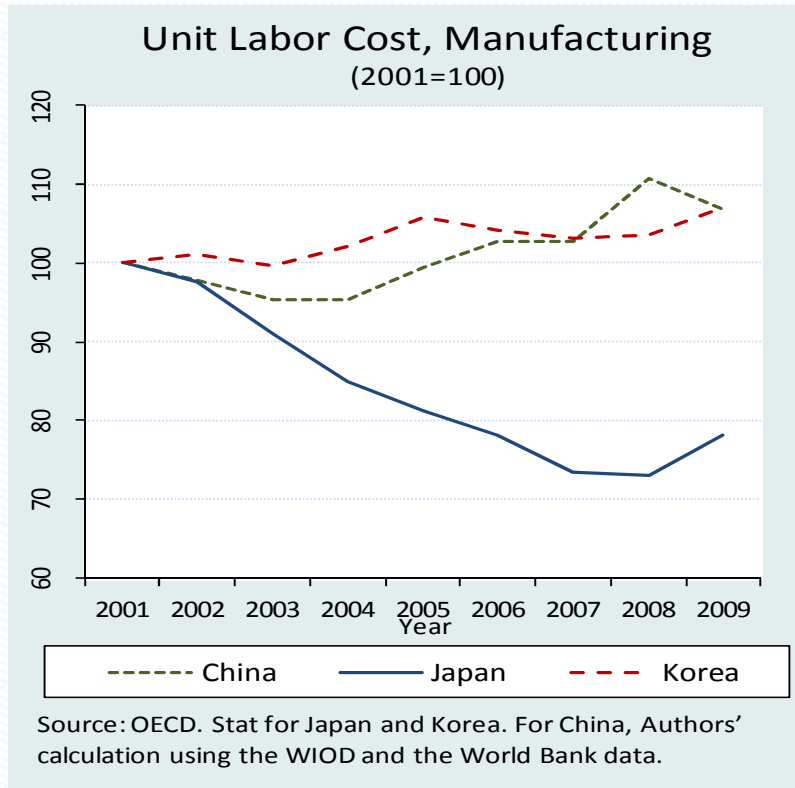
- A widely used measure of such cost competitiveness is the ULCs.
- ULCs are calculated as the ratio of total labor compensation in nominal terms to real output. The ULCs also equal to the ratio of a worker's compensation to labor productivity.

$$ULC = \frac{w_n L}{Y} = \frac{w_n}{\frac{Y}{L}}$$

- Increases (decreases) in ULCs indicate that workers nominal compensation grew faster (slower) than labor productivity.

2. An Overview of Factors Explaining Countries' International Competitiveness (4)

--- Unit Labor Costs (OECD & WIOD)---



CHN & KOR: Cost competitiveness has been deteriorated.

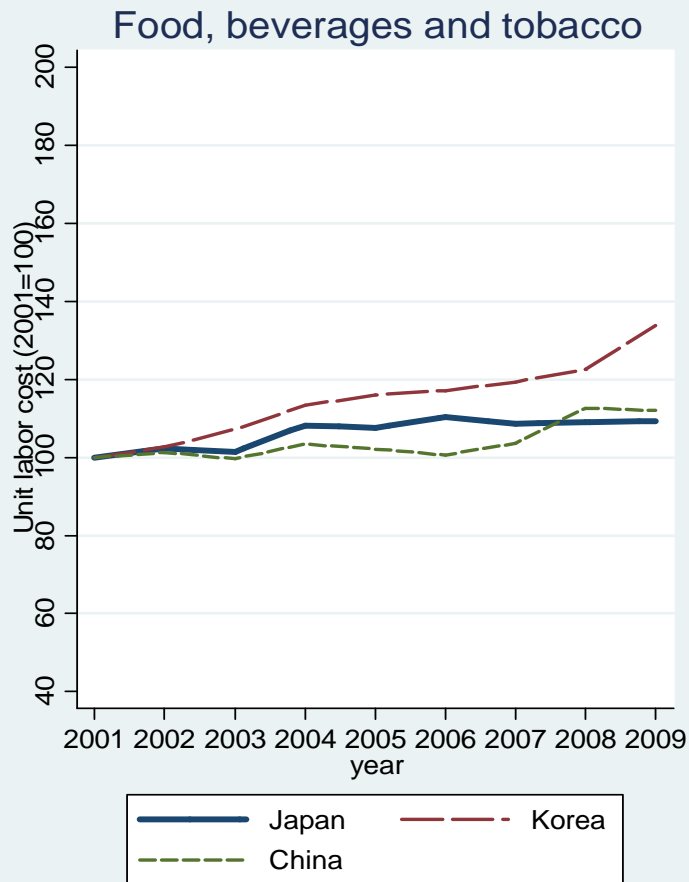
- Japan has been gaining international competitiveness by reducing production costs compared with other two countries if the nominal exchange rate does not change.

2. An Overview of Factors Explaining Countries' International Competitiveness (5)

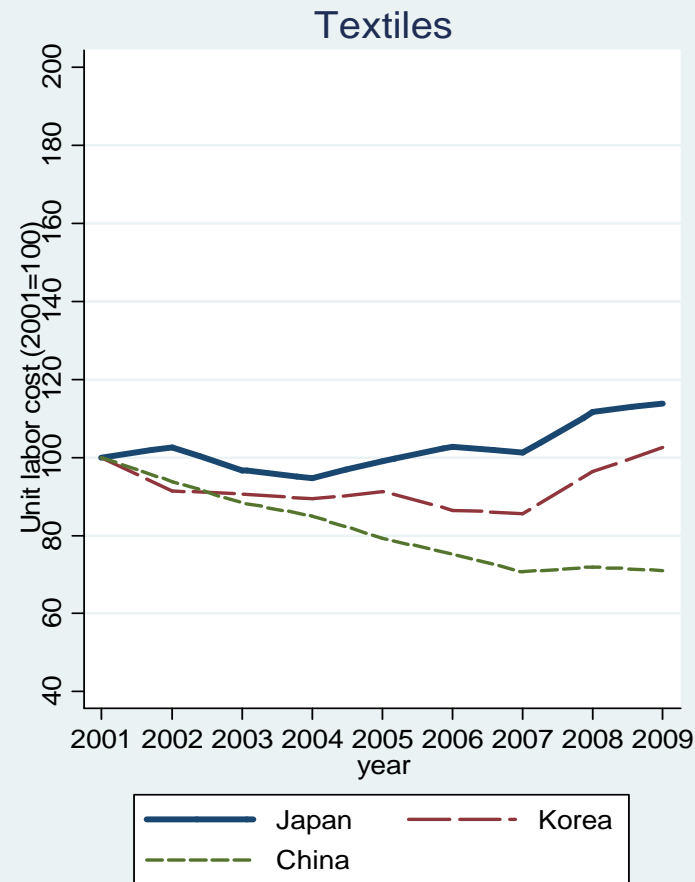
Industry-Level ULCs and NEERs

- Trend of the ULCs must be very different across industries, given the fact that a speed of technological development largely differs across industries.
- Utilizing the industry-level data taken from the WIOD, we construct annual series for ULCs for the 12 manufacturing countries for the period 2001-2009.
- We calculate industry-level ULCs using the data on labor compensation and real output in local currency.

Figure 5. Unit Labor Costs by Industry (2001=100, calculated based on the local currency)

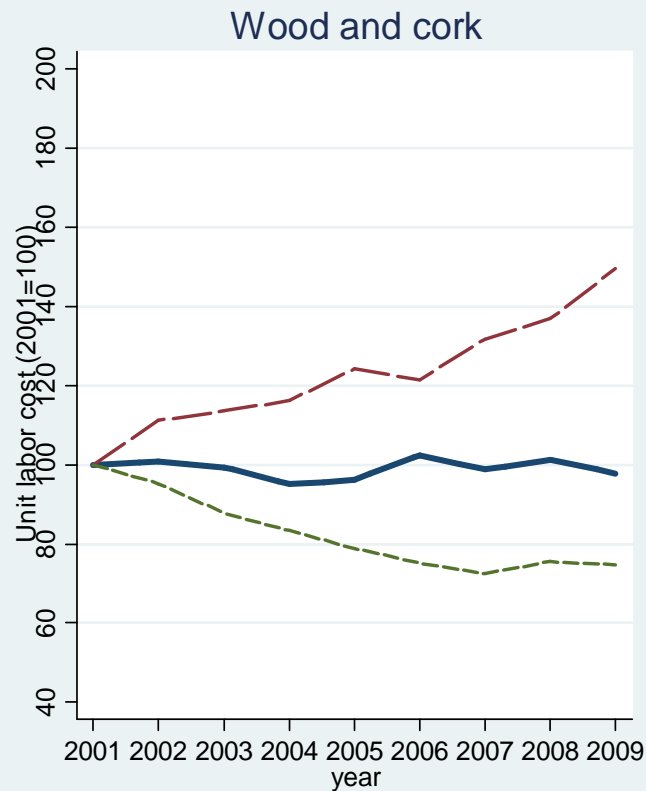


Source: Authors' calculation based on data taken from the WIOD

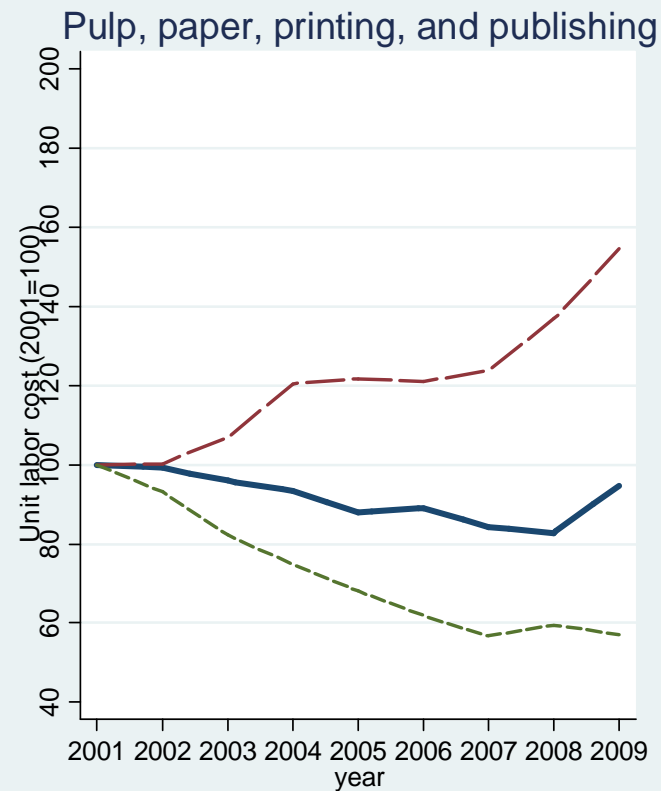


Source: Authors' calculation based on data taken from the WIOD

Figure 5. Unit Labor Costs by Industry (2001=100, calculated based on the local currency)



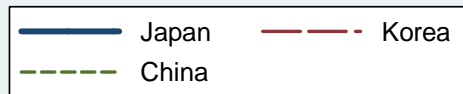
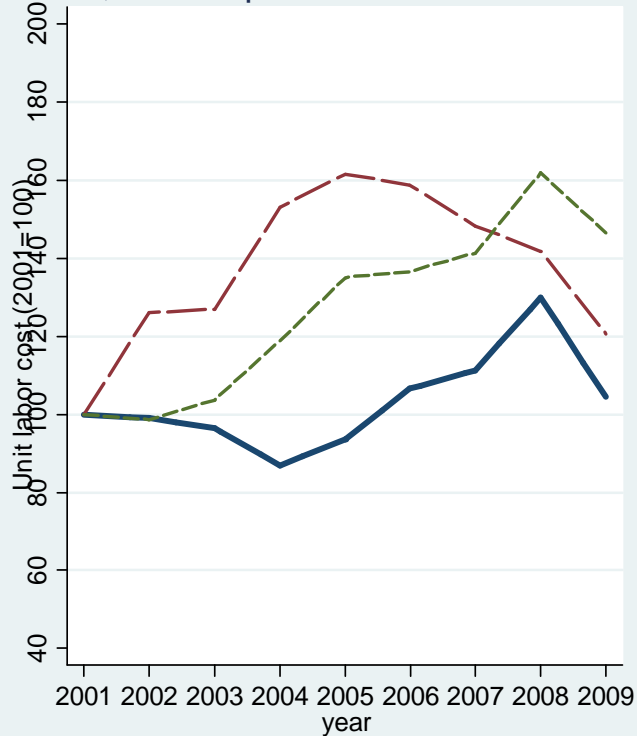
Source: Authors' calculation based on data taken from the WI



Source: Authors' calculation based on data taken from the WIOD

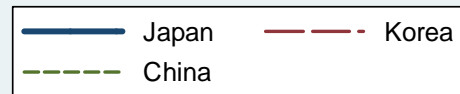
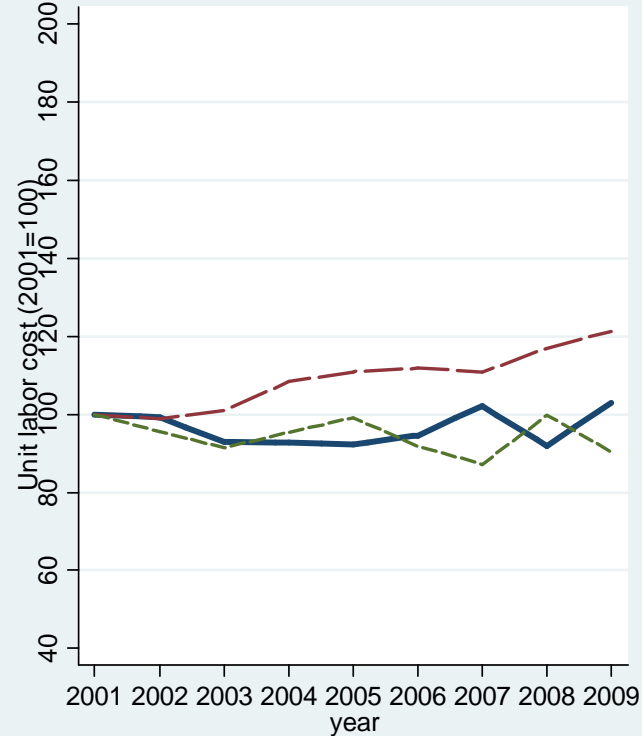
Figure 5. Unit Labor Costs by Industry (2001=100, calculated based on the local currency)

Coke, refined petroleum and nuclear fuel



Source: Authors' calculation based on data taken from the WIOD

Chemicals



Source: Authors' calculation based on data taken from the WIOD

Figure 5. Unit Labor Costs by Industry (2001=100, calculated based on the local currency)

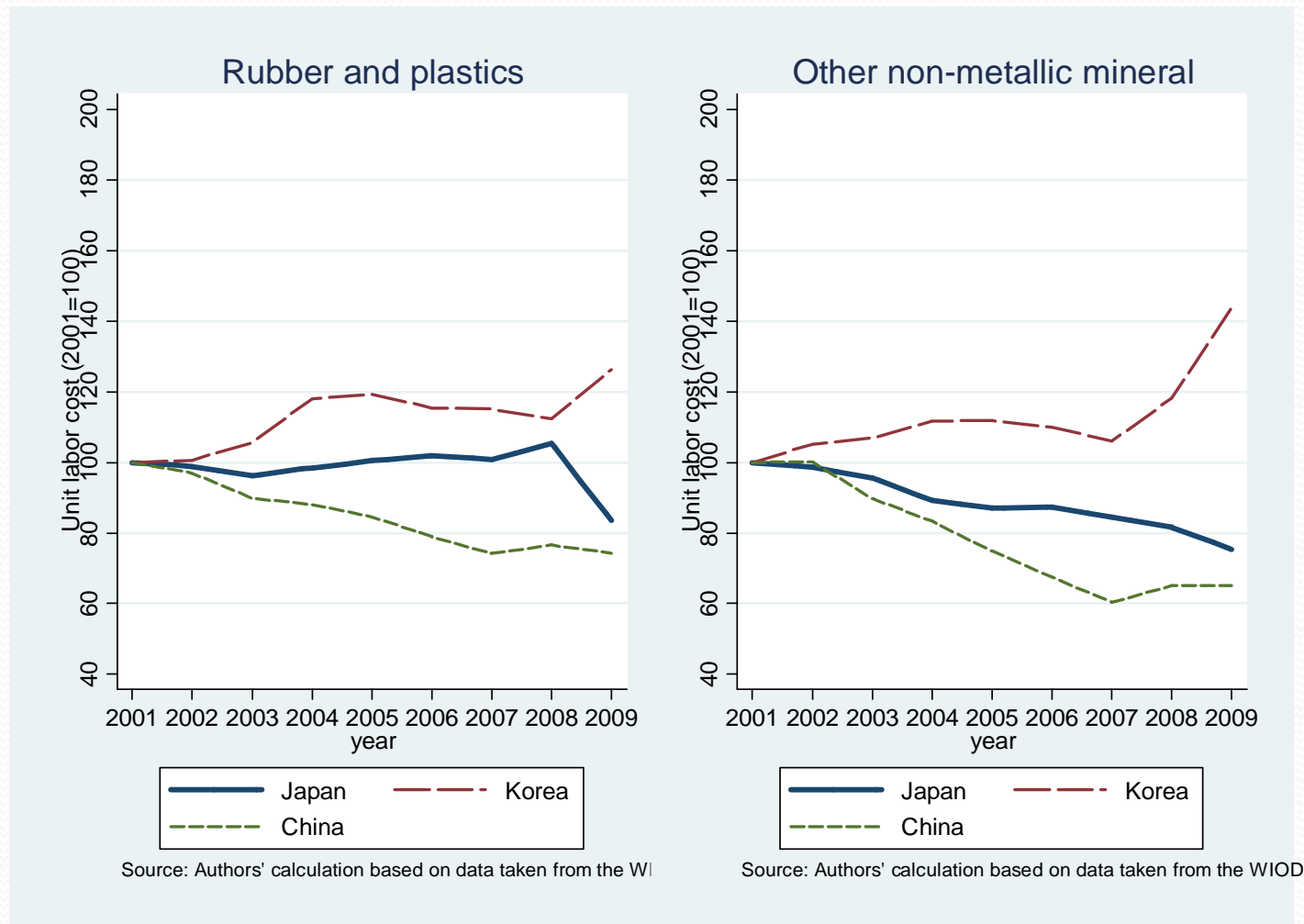
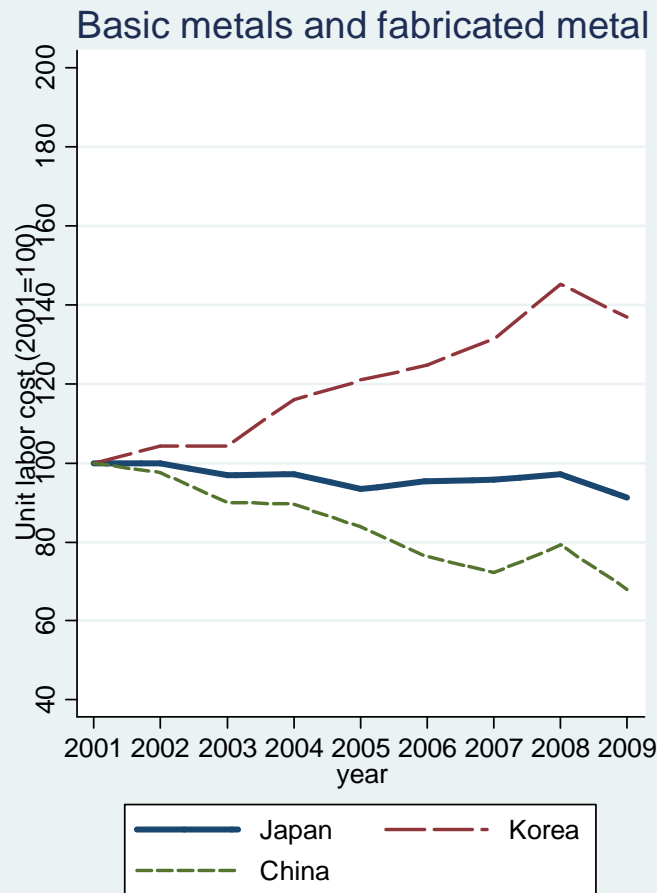
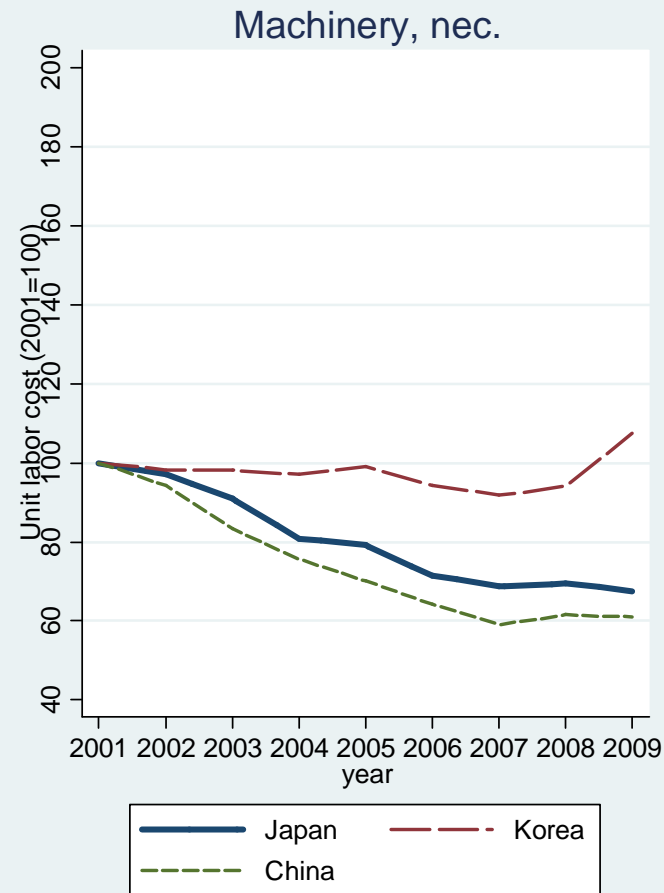


Figure 5. Unit Labor Costs by Industry (2001=100, calculated based on the local currency)

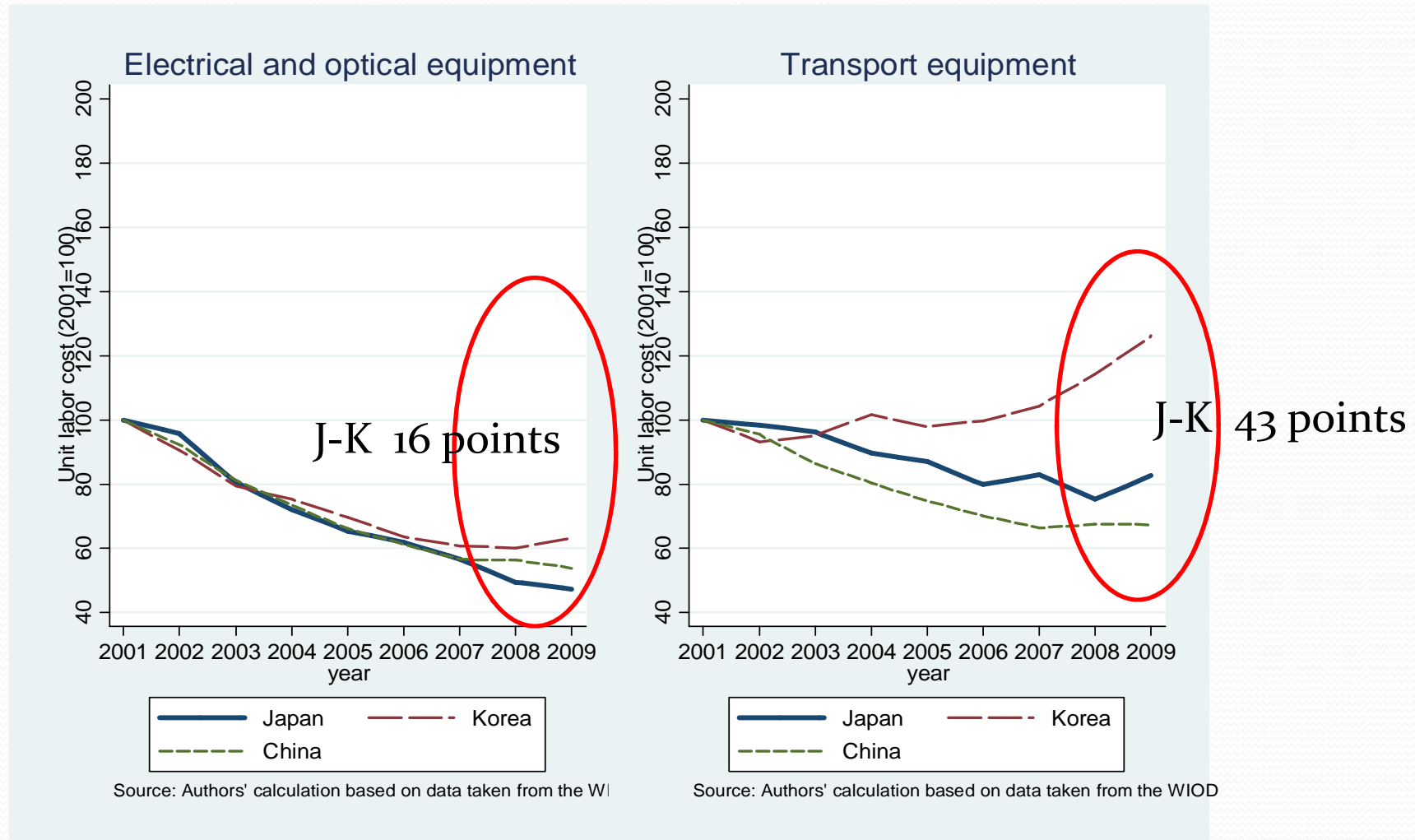


Source: Authors' calculation based on data taken from the WI



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Figure 5. Unit Labor Costs by Industry (2001=100, calculated based on the local currency)



2. An Overview of Factors Explaining Countries' International Competitiveness (6)

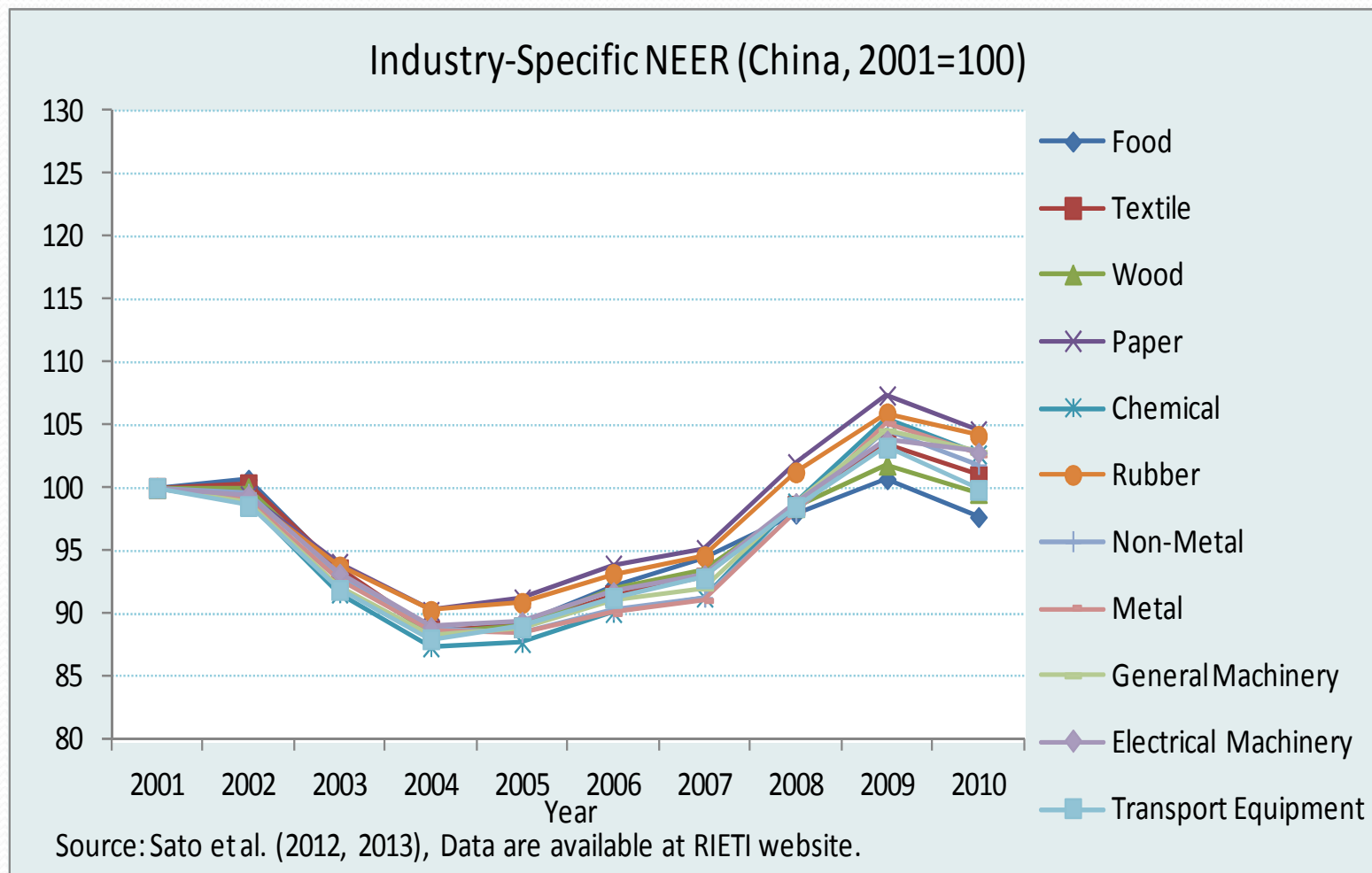
Industry-Level ULCs and NEERs

- Trends of ULCs largely differ not only across countries but also across industries.
- Japan's ULCs are relatively stable or declining in most industries while the ULCs of Korea tend to show an upward trend in many industries. As for China, the ULCs are declining in most industries though they do not further decline since 2007.
- Korea's ULCs show the largest increase among the three countries in a majority of industries. The electrical machinery is one of the few exceptions.

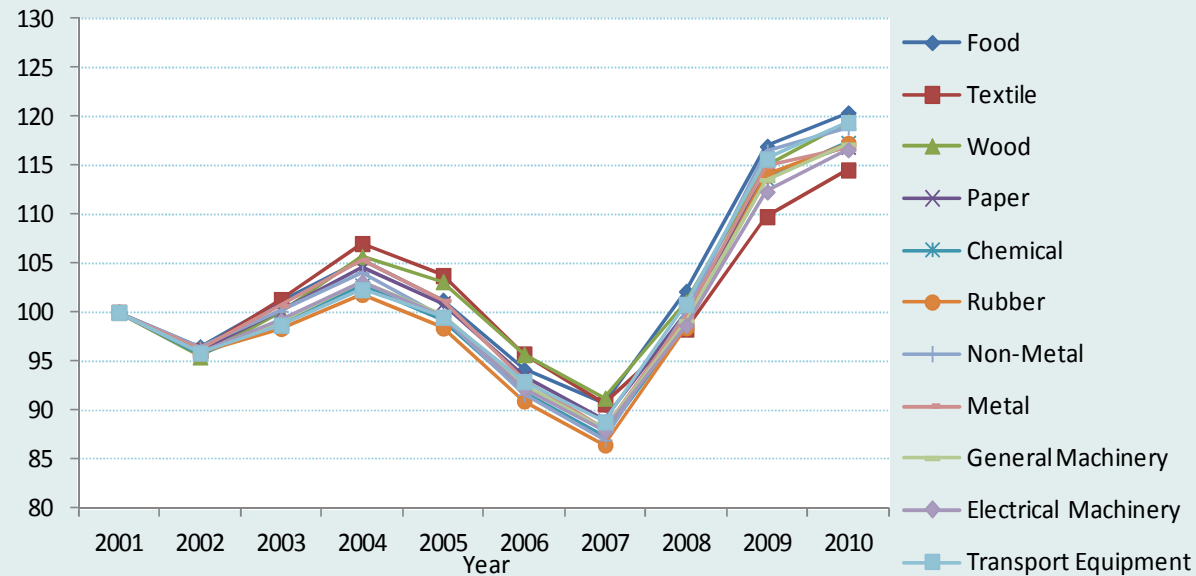
2. An Overview of Factors Explaining Countries' International Competitiveness (7)

Industry-Level ULCs and NEERs

- We also calculate the industry-level NEER, using the export shares as weights.
- Although the overall trend is similar to that indicated by the BIS' NEER data, we confirm that there are some differences in the level of NEERs across industries.

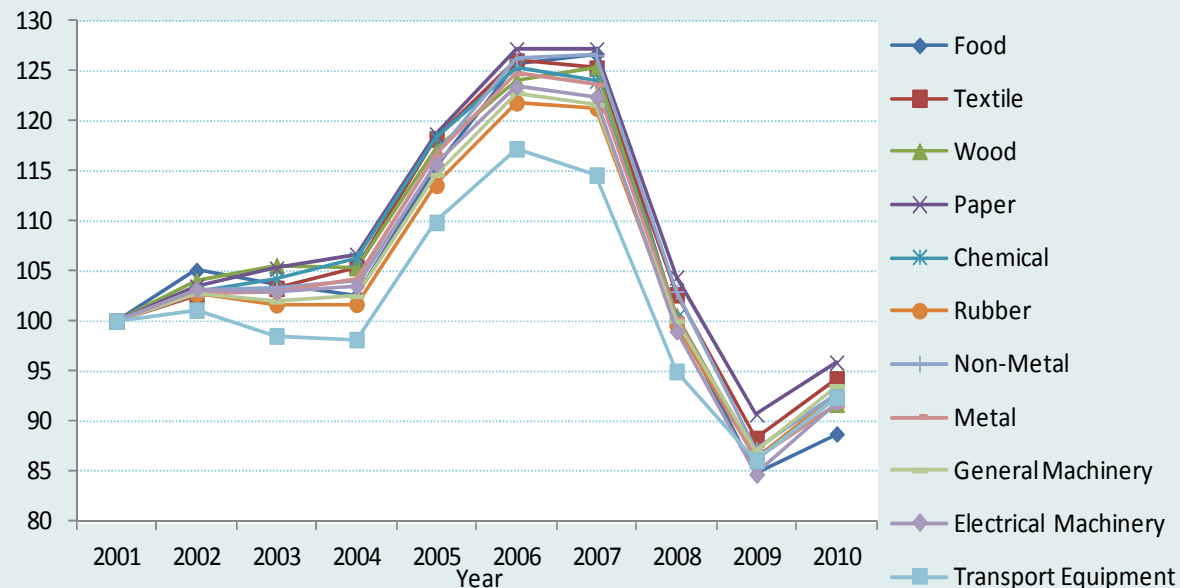


Industry-Specific NEER (Japan, 2001=100)



Source: Sato et al. (2012, 2013), Data are available at RIETI website.

Industry-Specific NEER (Korea, 2001=100)



Source: Sato et al. (2012, 2013), Data are available at RIETI website.

2. An Overview of Factors Explaining Countries' International Competitiveness (8)

Industry-Level ULCs evaluated by foreign currencies

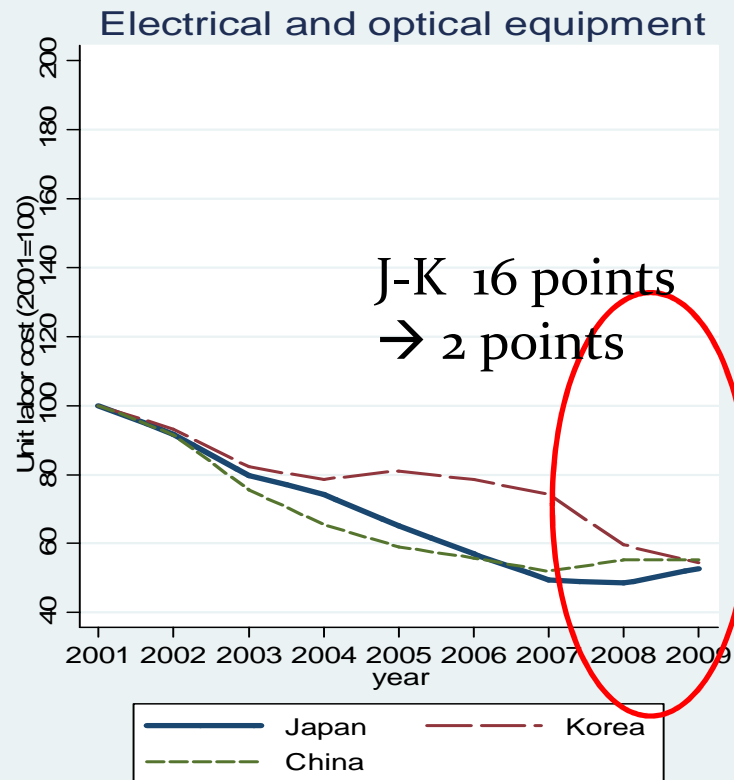
- NEER has been fluctuating a lot for Japan and Korea while China's NEER has been relatively stable
- Japan and China have been gaining cost competitiveness in many industries by reducing ULCs while Korea's ULCs do not decline in most industries except the electrical machinery industry.
- These observations may imply that Japan's cost advantage will be offset if Japan faces a large appreciation of home currency while Korea's cost disadvantage will be offset if Korea faces a large depreciation of home currency.

2. An Overview of Factors Explaining Countries' International Competitiveness (9)

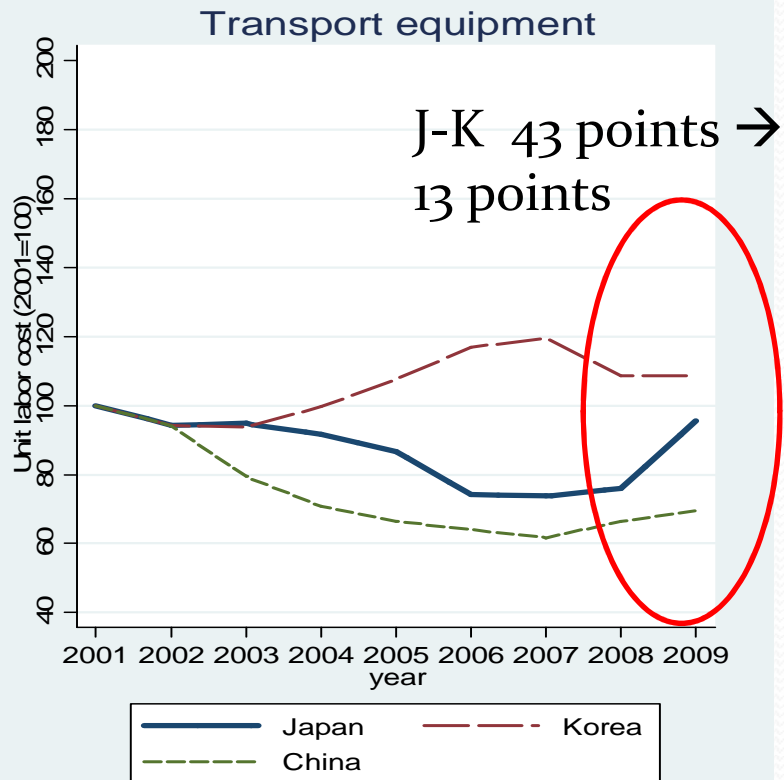
Industry-Level ULCs evaluated by foreign currencies

- To examine the effect of nominal exchange rates on cost competitiveness, we evaluate the ULCs in foreign currencies using the industry-specific NEER.
- China's ULCs are remained relatively low in most industries in most years
- Korea's ULCs increased a lot during the period of the won appreciation (the mid-2000s), but Korea's ULCs declined sharply in 2008 and 2009 thanks to the rapid won depreciation.
- Japan's ULCs increased sharply in 2008 and 2009 due to the yen appreciation. → Japan's efforts for the cost reduction were more than offset by the yen appreciation.

Unit Labor Costs by Industry (2001=100, calculated based on foreign currencies using the nominal effective exchange rate)



Source: Authors' calculation based on data taken from the WI



Source: Authors' calculation based on data taken from the WIOD

3. Model for Relative Prices and Competitiveness (1)

- Log Real exchange rate (q) is defined:

$$q_t \equiv s_t - p_t + p_t^*$$

- where s is the log exchange rate, p is the log price. $*$ denotes the foreign country.
- If we focus on the export competitiveness, the relative price of tradable goods is important.

$$q_t^2 = q_t^T \equiv (s_t - p_t^T + p_t^{T*})$$

- A related concept is cost competitiveness. Consider a markup (μ) model of pricing:

$$p_t^T = \log \left[(1 + \mu_t) \left(\frac{W_t}{A_t} \right) \right]$$

**ULC = Wage rate /
Productivity**

3. Model for Relative Prices and Competitiveness (2)

- Assuming that markups are constant:

$$q_t^3 = \left[s_t - (w_t - a_t) + (w_t^* - a_t^*) \right] - \ln(1 + \mu) + \ln(1 + \mu^*)$$

log nominal
exchange rate

log ULC
home

log ULC
foreign

constant

- Equation to be estimated:

REER

$$\ln EXP_{ijt} = \theta_1 \ln EXP_{RoW}_{ijt} + \theta_2 \ln NEER_{ijt} + \theta_3 \ln ULC_{ijt} + \theta_4 \ln FULC_{ijt} + \mu_{ij} + \tau_t + \epsilon_{ijt}$$

Real export value from
country *i* to the world in
industry *j* (*WIOD industry
output deflators used*)

Nominal export
value from Rest of
the world in
industry *j*

Two out of
China, Japan,
Korea → TO BE
IMPROVED

4. Empirical Analysis (1)

Baseline Results (Eq. 1 & 4 in Tables 1 & 2)

Dependent variable: D.ln(real export value in local currency)

	Table 1		Table 2	
	(1)	(4)	(1)	(4)
	ULC	ULC	UMFC	UMFC
D.lnEXPRoW	0.373*** [0.102]	0.385*** [0.107]	0.327*** [0.111]	0.482*** [0.126]
D.lnULC or UMFC	-0.529*** [0.118]	-0.526*** [0.118]	-0.253* [0.146]	-0.187 [0.147]
D.lnNEER	-0.418*** [0.095]	-0.416*** [0.095]	-0.420*** [0.104]	-0.364*** [0.105]
D.lnFULC or UMFC		-0.060 [0.155]		-0.496** [0.194]
Observations	312	312	312	312
F-statistic	22.597	20.499	19.759	18.883
R-squared	0.429	0.429	0.396	0.409

Expected
sign

Negative?

4. Empirical Analysis (2)

Differences across countries (Eq. 2 & 5 in Tables 1 & 2)

Dependent variable: D.ln(real export value in local currency)

	Table 1		Table 2	
	(2) ULC	(5) ULC	(2) UMFC	(5) UMFC
D.lnEXPRoW	0.479*** [0.099]	0.514*** [0.106]	0.371*** [0.110]	0.548*** [0.126]
D.lnULC	-1.239*** [0.202]	-1.346*** [0.228]	0.342 [0.289]	0.511 [0.354]
D.lnNEER	0.361 [0.362]	0.372 [0.362]	0.132 [0.376]	0.181 [0.373]
JPN*D.lnULC	1.225*** [0.260]	1.422*** [0.291]	-0.296 [0.351]	-0.393 [0.426]
KOR*D.lnULC	0.519* [0.278]	0.638** [0.306]	-1.138*** [0.313]	-1.280*** [0.421]
JPN*D.lnNEER	-1.359*** [0.374]	-1.310*** [0.375]	-0.923** [0.385]	-1.000** [0.390]
KOR*D.lnNEER	-0.502 [0.448]	-0.499 [0.448]	-0.647 [0.475]	-0.593 [0.475]
D.lnFULC		0.099 [0.239]		-0.647** [0.281]
JP*D.lnFULC		-0.503 [0.351]		0.107 [0.382]
KR*D.lnFULC		-0.166 [0.353]		0.182 [0.497]

**ULC: Largest
negative impact
on China**

**UMFC:
Largest
negative
impact on
Korea**

**NEER: Largest
negative impact
on Japan**

4. Empirical Analysis (3)

Differences across industries (Eq. 3 & 6 in Tables 1 & 2)

Dependent variable: D.ln(real export value in local currency)

	Table 1		Table 2	
	(3) ULC	(6) ULC	(3) UMFC	(6) UMFC
D.lnEXPRoW	0.315*** [0.103]	0.229** [0.111]	0.290** [0.116]	0.357*** [0.138]
D.lnULC	-0.280** [0.135]	-0.247* [0.134]	-0.132 [0.169]	-0.136 [0.165]
D.lnNEER	-0.343*** [0.104]	-0.336*** [0.103]	-0.347*** [0.117]	-0.338*** [0.115]
GM*D.lnULC	-0.951** [0.423]	-0.946* [0.508]	0.026 [0.720]	0.367 [0.721]
EL*D.lnULC	-0.842** [0.329]	0.597 [0.667]	-0.686 [0.487]	0.088 [0.510]
TR*D.lnULC	-1.043** [0.445]	-1.023** [0.442]	-0.603 [0.616]	-0.531 [0.601]
GM*D.lnNEER	-0.151 [0.355]	-0.158 [0.354]	-0.068 [0.388]	0.013 [0.379]
EL*D.lnNEER	-0.311 [0.363]	0.096 [0.393]	-0.384 [0.420]	0.052 [0.421]
TR*D.lnNEER	-0.665* [0.380]	-0.532 [0.391]	-0.63 [0.427]	-0.485 [0.452]
D.lnFULC		0.388** [0.184]		-0.095 [0.229]
GM*D.lnFULC		-0.465 [0.563]		-1.797* [0.919]
EL*D.lnFULC		-2.026*** [0.686]		-2.440*** [0.640]
TR*D.lnFULC		-1.122* [0.584]		-0.434 [0.750]

ULC: Larger negative impact in machinery industries ← Relocation within the production network?

FULC, FUMFC: Negative impact in machinery industries ← Complimentarities among East Asian countries?

5. Summary

- Both ULCs and NEERs have a negative impact on exports
- ULCs have a larger negative impact in machinery industries, implying that production locations are easily moved in response to cost competitiveness
- NEERs have a larger negative impact on Japan's exports ← Cost reduction in Japan is offset by nominal exchange rate appreciation. Japan's pass-through may be larger while China and Korea are more likely to keep foreign-currency price and export volume unchanged (PTM).
- Among East Asian countries, increases in ULCs/UMFCs in neighboring countries lead reductions in home exports in machinery industries. → These countries play a complementary role with each other in production networks.



Remaining issues ---Robustness checks

- Distinguish between intermediate goods and final goods (or control for the share of intermediate goods in industry exports)
- Calculate ULC-based REERs by industry and use them as an international competitiveness measure
- Including data after 2009 onwards if possible



Thank you and comments welcome!