The economic and social effects of real exchange rate
— Evidence from the Chinese provinces

Ping HUA
CERDI, CNRS-Université d’Auvergne, France
The importance of the topic

• To justify why China can not quickly revalue the renminbi

The primary minister Wen argued that
“forcing Beijing to revalue its currency would lead to a disaster for the world, because many of exporting companies would have to close down, migrant workers would have to return to their villages. If China saw social and economic turbulence, then it would be a disaster for the world.”
The importance of the topic (cont)

The worries are understanding because

- the literature finds
  * a negative growth impact of overvaluation, particularly for developing countries
  * trade is main channel

- While China wants to keep a high economic growth (>8%) to maintain employment and to reduce poverty to build a harmonious society.
The importance of the topic (cont)

- Growth has been central to reduce China's poverty
  - lifted over 200 million people out of $1 per day poverty in the past three decades
  - the poverty rate declined from 65% in 1981 to 4% in 2007 (World Bank, 2009).
The importance of the topic (cont)

The slowdown of economic growth since the economic crisis yielded higher unemployment in China.

The brunt of job loss was particularly borne by rural migrants and university graduates.

- Some 3 to 5 per cent of 150 million migrants may have been jobless in 2009.
- Approximately 3 million university graduates were jobless in 2009, of whom 2 million were newly unemployed as a result of the crisis.

Source: G20 Statistical update, International labour office
Plan

1. Stylised facts
2. Objectives
3. Theoretical argumentation
4. Econometric investigation
5. Conclusion
1. Stylised facts

- Real GDP per capita growth is very rapid in China since 1978 (9.4% on average)
- on average, it accelerates since 1994 relative to the previous period (from 8.0% to 10.7%)
1. Stylised facts (continue)

- Exchange rate policy, central element of Chinese macro-economic policy
- Radically different before and after 1994: rapid real depreciation, then appreciation or stabilisation
1. Stylised facts (continue)

- Real exchange rate appreciation and economic growth in China, 1987-2009
1. Stylised facts (continue): negative effect, higher in coastal than in inland provinces
2. Objectives

1) What is the impact of a real appreciation on economic growth?

2) Besides trade, are there other channels of RER growth impact?

3) Is there different impact in backward inland provinces and in coastal provinces?
3. Theoretical argumentation

The determinants of growth identified in literature:

• Production factors (capital/labour ratio, employment, education) (traditional arguments)

• Size of tradable sector (Trade, industry and FDI, expansion of private sector) (traditional arguments)

→ RER may indirectly affect economic growth via its impact on these traditional variables, but also directly via efficiency improvement (rarely studied)
3. Theoretical argumentation (cont)

3.1. Direct positive effects of a real exchange rate appreciation

Appreciation, a rise of relative non tradable price, improves labour remuneration by stimulating workers’ efforts (Leibenstein, 1957, 1966) and managers’ efforts in monopoly or oligopoly context (Krugman, 1989)
Appreciation stimulates workers’ efforts:

Leibenstein stressed that in developing countries
- a too weak remuneration of labour might spoil workers’ health and their working capacity
- the motivation of workers acts on their efficiency, what he called the “X-efficiency”
3. Theoretical argumentation (cont)

Appreciation stimulates managers’ effort:

With more competition of foreign enterprises, managers choose a higher level of effort
- because this behaviour may increase the profit in the short run,
- but also because the decrease of costs dissuades competitors from producing and thus avoids fall in the price.

Due to this long run strategic yield, there exists an additional benefit induced by the effort which may push management effort near to its optimum.
3. Theoretical argumentation (cont)

3.2. Indirect positive effects of a real exchange rate appreciation

• Rise in capital intensity due to the drop of the cost of imported capital relative to labour remuneration
• Progress in education due to the rise of its benefit and less brain-drain
• Capital intensity and education are supposed to be favourable to economic growth
3. Theoretical argumentations (cont)

3.3. Indirect negative effects of a real exchange rate appreciation

- slows down trade and financial openness, thus destructs employment
- disfavours employment because of its induced capital deepen-led growth model et efficiency improvement,
- However, openness and employment are supposed to be favourable to economic growth
3. Expected impacts of real exchange rate appreciation on economic growth

<table>
<thead>
<tr>
<th></th>
<th>Positive effects</th>
<th>Negative effects</th>
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</thead>
<tbody>
<tr>
<td><strong>Direct effects</strong></td>
<td>Work efforts of workers and managers</td>
<td></td>
</tr>
<tr>
<td><strong>Indirect effects</strong></td>
<td>Capital/labour intensity</td>
<td>Development of tradable sector (exports and import substitution, FDI)</td>
</tr>
<tr>
<td>Education level</td>
<td>employment</td>
<td></td>
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</table>
3. Expected impacts of real exchange rate appreciation on economic growth

• The sign of the direct effect of real exchange rate appreciation is expected to be positive,

• While the sign of the total growth effects of real exchange rate is theoretically ambiguous

• Only an empirical analysis can reveal it.
4. econometric investigation

- Panel data estimation with 29 provinces over 1987-2008.
- GMM-System
4. econometric investigation (cont)

- **First step, basic equation**

\[
\ln y_{it} = a_0 + a_1 \ln REER_{it} + a_2 \ln KL_{it} + a_3 \ln EM_{it} + a_4 \ln EDU_{it} + a_5 \ln X_{it} + a_6 \ln IN_{it} + a_7 \ln FI_{it} + a_8 \ln SOE_{it} + (1+a_9)\ln y_{it-1} + a_{10}C + a_{11} \ln REER_{it} * C + \eta_i + \gamma_t + \epsilon_{it}
\]

- Real GDP per capita is explained by
  - real effective exchange rate (REER)
  - other identified variables (capital-intensity ratio, education, trade, FDI, importance of SOE, employment)
  - lagged GDP per capita

→ REER coefficient captures only its direct growth effects
4. econometric investigation (cont)

- Second step:
  - Five variables (Trade, FDI, capital/labour ratio, employment and education) which are transmission channels of REER are purged of its impact
  - The purged variables are introduced into the basic equation
  \[ \text{the coefficient of REER captures now its total growth effects} \]
4. econometric investigation (cont)

In each step,

- we introduced a coastal dummy variable and a interaction term: REER * dummy to see if REER impact is different according to the geographical position of provinces

- All explanatory variables are lagged one period against the risk of simultaneity and endogeneity
Main econometric results

• All traditional factors of economic growth are significant with the expected sign

• Lagged economic growth acts positively on its growth → convergence effect between provinces
Main econometric results (cont)

• Appreciation decreases economic growth, stronger in coastal than in inland provinces
  → decrease coastal-inland gap of real GDP per capita
• Trade is the most important channel of growth effect of real appreciation
• Real appreciation disfavours employment
Main econometric results: direct and total effects of real exchange rate on real GDP per capita: 1987-2008

<table>
<thead>
<tr>
<th></th>
<th>Direct</th>
<th>Total</th>
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<tbody>
<tr>
<td>Per capita real GDP lagged one period</td>
<td>0.66***</td>
<td>0.66***</td>
</tr>
<tr>
<td>Real exchange rate</td>
<td>0.08*</td>
<td>-0.03**</td>
</tr>
<tr>
<td>Real exchange rate* coastal provinces</td>
<td>-0.08**</td>
<td>-0.08**</td>
</tr>
<tr>
<td>Capital intensity</td>
<td>0.13**</td>
<td>0.13**</td>
</tr>
<tr>
<td>Employee/population</td>
<td>0.20**</td>
<td>0.20**</td>
</tr>
<tr>
<td>Education</td>
<td>0.34***</td>
<td>0.34***</td>
</tr>
<tr>
<td>Exports/GDP</td>
<td>0.07***</td>
<td>0.07***</td>
</tr>
<tr>
<td>Industrial production share</td>
<td>0.04*</td>
<td>0.04*</td>
</tr>
<tr>
<td>FDI/GFCF</td>
<td>0.01*</td>
<td>0.01*</td>
</tr>
<tr>
<td>SOEs’ investment ratio</td>
<td>-0.09***</td>
<td>-0.09***</td>
</tr>
</tbody>
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Estimation of the channelling variables of real exchange rate to economic growth: 1987-2008

<table>
<thead>
<tr>
<th></th>
<th>Capital intensity</th>
<th>Employment</th>
<th>Education</th>
<th>Export ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>RER</td>
<td>0.15***</td>
<td>-0.11***</td>
<td>0.08***</td>
<td>-1.27***</td>
</tr>
<tr>
<td>Costal</td>
<td>0.59***</td>
<td>0.07*</td>
<td>0.22**</td>
<td>1.48***</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Industrial share</th>
<th>FDI ratio</th>
<th>SOEs’ investment ratio</th>
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<tbody>
<tr>
<td>RER</td>
<td>-0.05*</td>
<td>-2.36***</td>
<td>0.75***</td>
</tr>
<tr>
<td>Costal</td>
<td>0.29***</td>
<td>1.94***</td>
<td>-0.32*</td>
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Direct and indirect effects of real exchange rate on economic growth

<table>
<thead>
<tr>
<th></th>
<th>In inland provinces</th>
<th>0.08</th>
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<tr>
<td></td>
<td>In coastal provinces</td>
<td>0.00</td>
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<tr>
<td>Direct effects</td>
<td></td>
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<tr>
<td>In inland provinces</td>
<td>0.08</td>
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<tr>
<td>In coastal provinces</td>
<td>0.00</td>
<td></td>
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<tr>
<td>Indirect effects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>via capital intensity</td>
<td>0.02</td>
<td></td>
</tr>
<tr>
<td>via employment ratio</td>
<td>-0.02</td>
<td></td>
</tr>
<tr>
<td>via education</td>
<td>0.03</td>
<td></td>
</tr>
<tr>
<td>via exports/GDP</td>
<td>-0.09</td>
<td></td>
</tr>
<tr>
<td>via industrial production share</td>
<td>-0.002</td>
<td></td>
</tr>
<tr>
<td>via FDI/GFCF</td>
<td>-0.02</td>
<td></td>
</tr>
<tr>
<td>via SOE’s investment ratio</td>
<td>-0.07</td>
<td></td>
</tr>
<tr>
<td>Total effects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>In coastal provinces</td>
<td>-0.16</td>
<td></td>
</tr>
<tr>
<td>In inland provinces</td>
<td>-0.08</td>
<td></td>
</tr>
</tbody>
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5. Brief conclusion

• While the pressure in favour of the renminbi revaluation is insistent, it is topic to know that, if the overvaluation may decrease the coastal/inland GDP inequality, it slows down trade expansion and destructs jobs.

• It is thus pertinent to keep a progressive revaluation policy while trade is slowed down by the revaluation and economic growth mainly depends on outside-oriented industry sector.

• This step by step policy would be allowing the induced growth by productivity improvement and human capital to compensate the loss of international competitiveness and the job creation in non tradable (service) sector by shifting the Chinese growth model to go towards a domestic consumption-led one.