Exchange Rate Volatility and MNCs’ Production and Distribution Networks: The Case of Japanese Manufacturing MNCs

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Motivation

• Rapid expansion of MNCs’ activities in the world economy, especially in the forms of trade and FDI

• Important role of MNCs in production and distribution networks in East Asia, which have contributed to economic growth

• Discussions on monetary cooperation (i.e. common currency) in East Asia
Objectives

• Examine the impacts of exchange rate volatility on production and distribution networks of Japanese MNCs, specifically

(1) Examine the impacts of exchange rate volatility on location choice of overseas affiliates by Japanese MNCs

(2) Examine the impacts of exchange rate volatility on intra-firm and inter-firm trade by Japanese MNCs
Previous Studies

• Exchange rate volatility on FDI: negative relationship is found by Kiyota-Urata (2004) using MOF data (reported by MNCs)

• Exchange rate volatility on trade: negative relationship is found by Ito et.al.(1996), Dell’Aricccia (1998), Rose (2000)

• No empirical study on the impacts of exchange rate volatility on intra-firm trade (to the best of our knowledge)
Data on FDI and Intra-firm Trade

- Ministry of Economy, Trade and Industry, Kaigai Jigyo Katsudo Kihon Chosa [Basic Survey of Overseas Activities of Japanese Firms]

- The survey covers all Japanese firms with foreign affiliates (10 percent equity ownership). Response rates approximately 60 percent of Japanese MNCs but the survey covers substantially all of large MNCs

- Comprehensive survey covering intra-firm trade is conducted every three years (i.e. 1995, 1998, and 2001)
Data on Exchange Rate Volatility

- Exchange rate = host country currency / Japanese yen
- Exchange rate volatility = coefficient of variation of monthly exchange rate for the preceding 3 years
Location of Affiliates (Table 1)

- The number of new starts of overseas affiliates of Japanese MNCs was declining from the mid-1990s until recently, but now it is rising as a result of economic recovery.
- China is a major host country.
The Determinants of Affiliate Location (Table 2)

• Economic uncertainty, risk: Exchange rate volatility (-)
• Market size: GDP (+)
• Production cost: per capita GDP, wages (-)
• Production environment: infrastructure (+)
• Business environment: open trade system (+)
Intra-firm Trade (intra-firm trade ratio)

- Intra-firm trade ratio = intra-firm trade / (intra-firm trade + inter-firm trade)

- Measured for affiliates’ output sales and input purchases with Japan (affiliated firms, or parents, and non-affiliated firms)
Some Observations on Exchange Rate Volatility and Intra-firm Trade (Table 3, Figures 1 and 2)

Exchange rate volatility
• Developing countries experience high exchange rate volatility
• Exchange rate volatility declined from 1995 to 1998

Intra-firm trade
• Intra-firm trade ratios range 0.82-1 for sales, and 0.67-1 (excluding 0 for Poland) for purchase → close coordination involving parent firm and affiliates, closed system
• For parent firms, intra-firm export and import ratios are 0.687 and 0.594 for 1998.
• Figures 1 and 2 show no statistical relationship between exchange rate volatility and intra-firm trade ratio → Test the relationship by considering firm specific characteristics
Some More Observations (Table 4)

• Intra-firm output sales and input purchase ratios increased in some industries including chemicals and general machinery ➔ agglomeration of production site in foreign countries?

• Decline in the ratios are found in transportation machinery and precision machinery ➔ expansion of inter-firm network
The Determinants of Intra-firm Trade

• Hypothesis: Affiliates of MNCs experiencing high exchange rate volatility make adjustment inside the MNCs to absorb exchange rate shocks (e.g. through transfer pricing), use intra-firm network to capitalize on investment or sunk cost

• Affiliates of MNCs experiencing stable exchange rate expand inter-firm trade, or expand inter-firm network
Empirical Results (Tables 5-7)

- For 1995 and 1998, panel estimates
- Exchange rate volatility (+, sales)
- Employment size
- Equity holding by the parent
- R&D/Sales ratio (+, sales) internalization element
Concluding Comments

• We found that stable exchange rate promotes FDI and inter-firm trade (inter-firm production and distribution network)

• Recognizing the important contributions of FDI and inter-firm trade on economic growth through transfer of technology and management-know how, governments should adopt policies to achieve and maintain stable exchange rate environment → macroeconomic coordination

• Aim at the establishment of common currency in East Asia in the long run to strengthen regional production and distribution networks