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<div align="center">学位論文及び審査結果の要旨</div>

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論文の要旨

This thesis empirically examines the impact of exchange rate fluctuations on the exports of East Asian countries. In order to eliminate the bias caused by using aggregated exchange rate, this thesis employs a unique dataset conducted by Sato *et al.* (2012), so called industry-specific real effective exchange rate (I-REER), which takes account of the different movements of real effective exchange rates across industries. Why the impact of exchange rate fluctuation is important for Asian countries? First of all, most of Asian countries heavily rely on exports for their economic growth. Second, the financial markets in most of Asian countries are underdeveloped, which will cause Asian economy more likely affected by exchanger rate fluctuations according to the theory of this literature.

The main objective of the thesis is to understand the impact of exchange rate fluctuations on the exports of East Asian countries. Recently, Asian trade has been remarkably increasing with active investment and trade of foreign multinational firms. Given a rapid progress of economic integration through trade and investment, regional exchange rate stability has gained a growing attention. Especially after the 1997-98 currency crisis, Asian countries have pursued the possibility of a regional monetary and exchange rate coordination. A good understanding of the impact of exchange rate on exports contributes to apply a proper regional cooperation.

For this purpose, this dissertation consists of three chapters that study the impact of exchange rate fluctuations on exports focusing on different issue.

Chapter 1, co-authored with Kiyotaka Sato, Junko Shimizu and Nagendra Shrestha, is to to investigate whether and to what extent the volatility of exchange rate affects intra-regional production and distribution networks, characterized by trade of intermediate goods, in Asia by using a new industry-breakdown dataset of the bilateral real exchange rate.

This study differs from the previous studies in three respects. First, we use more detailed industry-breakdown data. Previous studies typically focus on one industry or aggregated intermediate goods trade. This chapter deals with six industries, general machinery, office machinery, electrical machinery, communication equipment, transport equipment, and precision instruments, based on the 2-digit level of the International Standard Industrial

Classification (ISIC) Rev.3. As argued by Kimura et al. (2007), production and distribution networks of these industries are qualitatively and quantitatively the most important in Asia. Second, we construct a new dataset of the industry-specific bilateral real exchange rate to evaluate whether and how the impact of exchange rate volatility on trade of intermediate goods differs across industries. To our knowledge, this is the first study to employ the industry-specific bilateral real exchange rate. The aggregate exchange rate cannot capture any differences in both price level and inflation across industries. Third, as the final processed exports are destined for countries outside the Asian region, not only the exchange rate but also the world demand for Asian exports of finished goods are considered as a possible driving force in the cross-border fragmentation and processing trade. Following Thorbecke (2008), we include the world's demand for the final processed exports in the regression specification as a possible explanatory variable.

Our novel finding is that, in contrast to the recent studies, the exchange rate volatility has negative and significant effect only on two industries, general machinery and electrical machinery, which are characterized by more differentiated export products, even when taking into account the world's demand for the final processed exports. These findings are supported by various kinds of the exchange rate volatility in the short- and long-run. The different impact of the exchange rate volatility across industries has to do with the characteristics of traded goods in respective industries. It can also be ascribed to an increase in intra-firm trade where exchange rate risk is well managed by the parent company. Thus, as long as the growing cross-border fragmentation and processing trade are driven by intra-firm trade, the effect of real exchange rate volatility will be weaker. This evidence has important policy implications for regional exchange rate arrangements in Asia given deepening regional production network.

Chapter 2, Kiyotaka Sato , Junko Shimizu , Nagendra Shrestha, is to construct a new data set of the industry-specific real effective exchange rate (I-REER), based on the producer price indices, for Japan, China and Korea on a monthly basis from January 2001 to February 2013 in order to provide a better indicator for export price competitiveness.

To consider the impact of exchange rate changes on export performance in the world market, however, it is not the bilateral exchange rate but the effective exchange rate that provides a better measurement of exporting firms' price competitiveness. The Bank for International Settlements (BIS) publishes effective exchange rates of 61 countries in both nominal and real terms. While covering a large number of countries, the BIS effective exchange rates do not provide any information on possible differences in price competitiveness across industries. Even if the nominal exchange rate is common to all industries in a country, the real exchange rate on both bilateral and effective basis can differ across industries. Each industry may face a different competitive environment from others, because the relative movements of the domestic industry-specific price to the corresponding foreign prices are likely to differ, with the result that some industries may lose and others may gain export price competitiveness in the country.

The innovative feature of this study is three folds. First, we construct the industry-specific real effective exchange rate (henceforth, I-REER) for Japan, China and Korea as a new measure of exporting firms' price competitiveness across industries. We have constructed a new data set of industry-specific producer price indices (PPIs) for twenty-seven countries with thirteen industry classifications from January 2001 to February 2013, which is a significant advance from the existing studies. In this study, we present the monthly series of I-REER of the four selected industries (Metal, General Machinery, Electrical Machinery, and Transport Equipment) for Japan, China and Korea. Moreover, we disaggregate the Electrical Machinery industry into three sub-sectors, Office Machinery, Electrical Apparatus and Communication Equipment, for further comparison of export price competitiveness between Japan and Korea.

Second, it is well known that Korean electronics firms such as Samsung and LG

electronics became profitable, while Japanese firms such as Sharp and Panasonic worsened business performance. By conducting factor decomposition analysis of I-REER series, we demonstrate why Korean firms enjoy far better export performance than Japanese ones by investigating cost competitiveness. It is shown that a substantial fall of domestic PPIs during the won appreciation period has enhanced Korean firms' export competitiveness compared to the Japanese one especially in the electric machinery industry. In contrast, Japanese automobile firms do not lose export competitiveness with respect to the Korean counterparts, due to the relative decline of domestic production costs.

Third, we apply the structural vector autoregression (VAR) technique to the relationship between I-REER and export performance (real exports). By decomposing I-REER into domestic and foreign prices as well as the industry-specific nominal effective exchange rate (henceforth, I-NEER), we also conduct the 5-variable structural near-VAR analysis to reveal how real exports respond to various shocks. The results of impulse response function analysis show that the relative cost reduction of Korean electronics firms as well as the nominal depreciation of the won has significant impact on real exports, which supports the conclusion of the factor decomposition analysis.

Our empirical results provide us with the following implications. First, it is useful for exporting firms to monitor I-REER in comparison with competitor's I-REER changes. Aggregate REER will not give us any information on industry difference of export price competitiveness. Second, our empirical results clearly show that the nominal exchange rate changes have significant influences on export performance and competitiveness. The prolonged nominal appreciation of the yen have seriously negative impact on export performance and even firms' business performance, especially when foreign competitors enjoy the nominal depreciation of their currency. Third, it may be necessary to stabilize the regional exchange rate volatility to avoid regional trade imbalances. The yen and won moved in an opposite direction after the Lehman Brothers collapse in September 2008, which caused large difference in export competitiveness. Since exchange rate appreciation has negative impact on export performance, regional exchange rate stability will help to prevent beggar-thy-neighbor policy and facilitate further intra-regional trade.

Chapter 3 is to empirically investigate whether and how financial constraints influence the response of Japanese sectoral exports to the exchange rate shock employing the industry-breakdown data of financial constraints on Japanese firms obtained from Bank of Japan, Tankan (Short-Term Economic Survey of Enterprises in Japan). There are several existing studies suggest that financial constraints is an important factor in determining the effects of exchange rate fluctuations on exports.

This paper differs from the existing studies in three respects. First, in contrast to the previous studies, the effect of both external and internal financial constraints is empirically investigated for the first time. By fully utilizing the financial data from Bank of Japan, Tankan (Short-Term Economic Survey of Enterprises in Japan) Database, the effect of external financial constraints and internal financial constraints on the relationship between exchange rate fluctuations and Japanese exports are separately and jointly estimated to compare the difference in the response of Japanese exports to exchange rate shock across different level of financial constraints. Second, it takes a different approach by focusing on the difference in the short-run effect of exchange rate shock on exports when exporters facing different level of financial constraints both internally and externally, while the existing studies investigate to what extent the financial constraints can affect the impact of exchange rate fluctuation on exports (Dekle and Ryoo, 2007; Stress, 2013). Third, the industry-specific real effective exchange rate of the yen developed by Sato et al. (2012) is employed to take account of the heterogeneity in exchange rate movements across industries as shown in Figure 2. As pointed out by Byrne et al. (2008), the estimates from sectoral studies may be biased by using

aggregated exchange rate. It is industry-specific exchange rate which can eliminate this bias.

There are three main findings in this paper: firstly, Japanese exports negatively and significantly respond to exchange rate shock. Second, financial constraints (internal financial constraints and external financial constraints) have significant influences on Japanese exports in response to the exchange rate changes. Japanese exporters with either lower internal or external financial constraints are less affected by exchange rate shocks. Third, lowering external financial constraints can help exporters with relatively higher internal financial constraints less affected by exchange rate shocks. This result suggests that accommodative financial environment can help Japanese exporters alleviate the impact of yen appreciation on their exports, when they are facing some difficulties to finance internally.

審査結果の要旨

本論文は、産業別実質実効為替レートという新しい競争力指標を用いて、為替レートが輸出に及ぼす影響を計量的に分析している。これまでどの国際機関や統計局等も産業別の実質実効為替レートのデータを構築・公表していなかった。この産業別のデータベースを新たに構築し、実証分析に応用している点が本論文の最大の貢献である。

第 1 章は、アジア域内で活発に展開される中間財貿易に対して、域内諸国間の産業別の実質為替レートの変動と、域外諸国への産業別の最終財輸出がどのような影響を及ぼしているかを分析している。2002 年から 2012 年までのパネル分析の結果、産業別実質為替レートのボラティリティは一般機械および一部の電気機械産業の中間財貿易においてのみ有意に負の影響を与えている。すべての機械産業で有意に負の影響を確認している先行研究と比較して、産業の違いによって為替レートの影響が異なるという新しい分析結果を提示している点で、本章は一定の貢献をしていると評価できる。

第 2 章は、日中韓の産業別実質実効為替レートを計算し、3 か国（特に日韓）の輸出価格競争力を産業別に考察している。産業別実質実効為替レートを国内外の価格要因と名目為替レート要因に分解して分析した結果、①韓国の電気機械産業が競争力を高めた要因は、ウォン高が進行した 2006 年頃から自国の生産者物価を大きく引き下げた点にある。②韓国の輸送用機器産業が競争力を高めたのは、リーマン・ショック後の急激なウォン安が主要因であり、2012 年末からの円安転換によって、韓国企業は日本と比較して輸出価格競争力を失っている。以上の分析結果は VAR モデルによるインパルス応答関数の推定結果によって実証的に支持されている。日中韓の産業別の輸出価格競争力を新しいデータを用いて分析したオリジナルな研究として、本章は高く評価できる。

第 3 章は日本の産業別実質実効為替レートと産業レベルの輸出データ、そして日本銀行の短観データを用いて、為替レートの輸出に及ぼす影響が企業の金融制約（手元流動性比率および金融機関の貸出態度）によってどのように異なるかを Panel VAR で分析している。分析の結果、①金融制約の大きい産業ほど為替レート・ショックによって実質輸出が有意に減少するのに対して、②金融制約が小さい産業の場合は、為替レート・ショックに対して実質輸出が有意に反応しないことを明らかにした。このように為替レートが日本の輸出に及ぼす影響を新たな視点から分析し、大きな金融制約に直面する企業にとって、民間金融機関の貸出態度を改善させる政策対応が為替レード変動の影響を緩和する上で有効であるという政策的含意も導きだしている点は高く評価できる。

以上のことから、本論文審査委員一同は、本研究科の博士号審査基準①に照らして、章沙娟氏の学位請求論文 "Exchange Rate Fluctuations and Trade in East Asia" が博士（経済学）の学位を授与するに値するものと判断する。