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Competition, Labor Intensity, and Specialization: Structural Changes in Postcrisis Asia

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Contents

Abstract

This study documents empirical regularities related to structural changes in the exporting pattern and degree of competitiveness in selected Asian countries in the decade following the 1997 Asian crisis. We conceptually illustrate that the degree of competitiveness is determined by foreign–domestic wage inflation differentials, changes in the relative cost of capital, growth rate of total factor productivity, and foreign–domestic inflation differentials in the import sector. The contribution of these factors to the degree of competitiveness crucially depends on labor intensity and consumption expenditure shares. Hence, rising wage inflation may not result in a loss of competiveness if it occurs in the sectors in which labor intensity is low and the consumption expenditure share is small. We confirm this prediction using data of 98 industries in nine Asian countries. Specifically, although we found that the exporting pattern in Asia and the degree of competitiveness of Asian economies substantially changed, these structural changes were not caused by labor intensity and wage inflation. However, due to data limitation, we cannot conclude whether these structural changes come from changes of the cost of capital or changes in total factor productivity.

I. Introduction

More than a decade has passed since the Asian crisis in 1997. However, structural changes in the Asian economies after the crisis have not been extensively investigated. What are the characteristics of the industries in Asia that have gained competitiveness in the world market? Has the specialization pattern in Asia moved away from labor-intensive goods to capital-intensive goods? How was the exporting pattern in Asia influenced by rising wages? Our study contributes to this debate by documenting empirical regularities concerning structural changes in the degree of competitiveness and the exporting pattern of nine Asian economies in the decade following the 1997 Asian crisis.

First, we outline a partial equilibrium framework that highlights the role of labor costs and the cost of capital as the key determinants of the degree of competiveness. There are multiple sectors, and all goods are produced from capital and labor. There are frictions in the labor market and the capital market. For this reason, the wage and the cost of capital vary across sectors. Goods markets are perfectly competitive, therefore goods prices depend on marginal cost. These goods are bundled with imported goods to be sold to consumers as the final good. We assume two countries and use the real exchange rate (RER) or the relative price level as the measure of competitiveness, as in the standard open-macro literature.

In our framework, the change of the degree of competitiveness is decomposed into the following components: (i) average wage inflation in the exporting country relative to its trading partner; (ii) average increase of the cost of capital relative to its trading partner; (iii) relative growth rate of total factor productivity (TFP); and (iv) foreign-domestic inflation differentials in the import sector. Among these four factors, we are particularly interested in the first one. To be more precise, the effect of the foreign–domestic wage inflation differentials on the degree of competitiveness is positively correlated with sector-specific labor intensity and sector-specific consumption expenditure share. Consequently, wage inflation does not reduce competitiveness if it occurs in capital-intensive sectors or sectors occupying small shares in the consumption expenditure. Since wage inflation is positively correlated with the growth rate of TFP in the long run, then countries can remain competitive if the TFP of capital-intensive sectors grows faster than the TFP of labor-intensive sectors. Besides wage inflation, as previously discussed, the degree of competitiveness depends as well on the cost of capital and the price of imported goods. For these reasons, we argue that the inflationary effect of rising wages may not be large.

Our proposal is related to the Harrod-Balassa-Samuelson (HBS) hypothesis (Balassa 1964, Harrod 1933, Samuelson 1964). According to the HBS hypothesis, in the absence of labor market frictions, the productivity improvement in the export sector increases demand for labor and therefore increases wages in both the export sector and the nontraded sector. As a result, the HBS hypothesis predicts that an expansion of the export volume results in a decline in the degree of competitiveness. To the contrary, we allow for labor market frictions, which cause wage differentials across sectors. Moreover, we do not arbitrarily classify goods into the nontraded goods and the traded goods like in the HBS theory. Having classified goods by labor intensity, we predict that rising wages impair competitiveness only if export goods are labor-intensive goods *and* occupy large shares in the consumption expenditure, all else equal. Hence, in our framework, countries may increase exports following TFP improvements in labor-intensive sectors without experiencing a decline in competitiveness if the export goods occupy small shares in the consumption expenditure.

In the empirical part, we employ the industry data from the Industrial Statistics Database (INDSTAT) of the United Nations Industrial Development Organization (UNIDO), the UNIDO Industrial Demand-Supply Balance Database (IDSB) database, and the International Financial Statistics (IFS) Database of the International Monetary Fund. We focus on the sample of nine Asian countries in the decade after the 1997 Asian crisis, namely the People's Republic of China (PRC), Indonesia, India, Japan, the Republic of Korea, Malaysia, Singapore, Thailand, and Viet Nam. Our dataset classifies industries by the 4-digit level ISIC Revision 3 and covers 98 industries. The sample years for each country vary upon availability of the data. The foreign country is defined as the United States (US), which is the most important trading partner for almost all of our sample countries.

First, we document changes in the exporting pattern. Specifically, we calculate changes in the export share in the world market of each exporter at the industry level using the concept of revealed comparative advantage (RCA) in Balassa (1965). This concept of RCA has been found to be consistent with the pattern of comparative advantage in the 2x2x2 Heckher-Ohlin model and used by Yi (2003). Then we divide the sample industries into two groups. One is the group of industries with a positive change of RCA, and the other is the group of those with a negative change of RCA. Having divided observations into two groups, we compare their distribution of labor intensity and foreign–domestic wage inflation differentials. The measure of labor intensity is the share of wages and salaries in value added. Next, we calculate the degree of competitiveness as the price level relative to the US using the consumer price index (CPI) series and the nominal exchange rate. Finally, we decompose the relative price level into the foreign–domestic wage inflation differentials and the residuals.

There are five main findings as follows. One, for all countries except for the Republic of Korea, the number of industries with a positive change of RCA is found to be larger than

the number of industries with a negative change of RCA. Hence, we can say that after the Asian crisis, almost all of the Asian countries in our dataset have successfully gained competitiveness in the world market.

Two, when we compare the average labor intensity of industries with increasing RCA with that of industries with decreasing RCA, we found that they are not significantly different. In other words, the industries of which the export share in the world market has increased are as labor-intensive as those losing the export share in the world market.

Three, when we compare the average foreign–domestic wage inflation differentials of these two groups, we found that they are not significantly different either. This result implies that the adjustment of wages after the Asian crisis had no impact on structural changes in the exporting pattern in Asia. However, due to data limitations, we cannot specify whether the change of the relative cost of capital is more important than the growth rate of TFP as the determinant for structural change.

Four, based on the change of RER, the PRC, Japan, the Republic of Korea, Malaysia, Singapore, and Thailand have lost competitiveness in the decade after the Asian crisis. To the contrary, India, Indonesia, and Viet Nam have experienced an improvement in their degree of competitiveness.

Finally, for all countries except for India, the structural change of the degree competitiveness as measured by RER depreciation is largely driven by the residuals, not wage inflation differentials. Still, India has gained competitiveness and therefore India is irrelevant to the HBS hypothesis, which focuses on wage inflation as the cause of a loss of competitiveness. For this reason, we conclude that there was no HBS effect in Asia after the Asian crisis.

Our finding that wage inflation had no impacts on both the structural change of the exporting pattern and the structural change of the degree of competitiveness in Asia has an important policy implication. In particular, our result suggests that these Asian economies can implement labor market reforms such as raising minimum wages to improve the standard of living without an inflationary effect from raising wages. However, due to the data limitations we do not know whether the source of declining competitiveness in the PRC, Japan, the Republic of Korea, Malaysia, Singapore, and Thailand is their high cost of capital, or their sluggish improvements of TFP. For this reason, our study cannot make recommendations about policies related to capital markets and investments.

The rest of the paper is organized as follows. The next section explains the conceptual framework. The description of data and results are in Section III. Section IV concludes the paper.

II. Conceptual Framework

A. Goods Prices

The final good *i, i=1,..,I,* is produced from homogeneous capital and sector-specific labor $Y_{it} = A_{it}K_{it}^{1-\alpha_i}L_{it}^{\alpha_i}$,

where A_{it} is the sector-specific TFP, K_{it} is the homogeneous capital stock, and L_{it} is the sector-specific labor. The parameter α_{it} $(0 < \alpha_{it} < 1)$ is the share of labor in value added, which is a measure of labor intensity in the trade literature such as Puzzello (2010). With this production function, the marginal cost is the following:

$$H_{it} = R_t^{1-\alpha_i} W_{it}^{\alpha_i} (A_{it}(1-\alpha_{it})^{1-\alpha_{it}} a_{it}^{\alpha_{it}})^{-1}, \quad (1)$$

where R_t is the economywide rental rate on capital, W_{it} is the sector-specific wage. Suppose the lowercase denotes the natural logarithm and Δ denotes the first difference.

$$\Delta h_{it} = (1-\alpha_{it})\Delta r_t + \alpha_{it}\Delta w_{it} - \Delta a_{it} \quad (2)$$

With perfect competition, the producer price P_{it} is the marginal cost in (2). Therefore,

$$\Delta p_{it} = (1-\alpha_{it})\Delta r_t + \alpha_{it}\Delta w_{it} - \Delta\alpha_{it} \quad (3)$$

B. Consumer Price Indices

Let γ_j be the exogenous expenditure share of Good *j,* where *j=1,…,J* and *J>I.* The set of consumption goods is larger than the set of output goods because some consumption goods are imported. The difference between *I* and *J* is an empirical question in the sense that it depends on the level of disaggregation of the data. Assume the Cobb-Douglas consumption basket. As a result, the consumer price index takes the following form:

$$P_t = \prod_j p_{jt}^{\gamma_j}\gamma_j^{-\gamma_j}.$$

Then, the inflation rate is the weighted sum of product-level inflation:

$$\Delta p_t = \sum_j \gamma_j \Delta p_{jt}. \quad (4)$$

Substituting equation (3) into (4) gives the relationship between the RER, input costs, TFP, and price of imported goods.

$$\Delta p_t = \sum_i \gamma_i (1-\alpha_i)\Delta r_t + \sum_i \gamma_i \alpha_i \Delta w_{it} - \sum_i \gamma_i \Delta a_{it} + \sum_{j \neq i} \gamma_j \Delta p_{jt} \quad (5)$$

C. Real Exchange Rate

Let S_t denote units of home currency per unit of foreign currency. Let the superscript * denote the foreign variables. The bilateral real exchange rate is defined as the foreign price level relative to the home price level, $Q_t = S_t P_t^* / P_t$. Thus,

$$\Delta q_t = \Delta s_t + \Delta p_t^* - \Delta p_t \quad (6)$$

Assume symmetric expenditure share and labor share in value-added across countries. Thus, substituting equation (5) and its foreign analog into (6) yields the following relationship between RER and relative costs.

$$\begin{aligned} \Delta q_t = & \sum_i \gamma_i \alpha_i (\Delta w_{it}^* + \Delta s_t - \Delta w_{it}) + \sum_i \gamma_i \alpha_i (\Delta r_t^* + \Delta s_t - \Delta r_t) - \sum_i \gamma_i (\Delta a_{it}^* - \Delta a_{it}) \\ & + \sum_{j \neq i} \gamma_j (\Delta p_{jt}^* + \Delta s_t - \Delta p_{jt}) \end{aligned} \quad (7)$$

Define the change of the sector-specific relative wage as $\Delta \omega_{it} = \Delta w_{it}^* + \Delta s_t - \Delta w_{it}$. Thus, we can rewrite the change of RER in (7) as follows.

$$\begin{aligned} \Delta q_t = & \sum_i \gamma_i \alpha_i \Delta \omega_{it} + \sum_i \gamma_i \alpha_i (\Delta r_t^* + \Delta s_t - \Delta r_t) - \sum_i \gamma_i (\Delta a_{it}^* - \Delta a_{it}) \\ & + \sum_{j \neq i} \gamma_j (\Delta p_{jt}^* + \Delta s_t - \Delta p_{jt}) \end{aligned} \quad (8)$$

Equation (8) indicates that the RER is driven by the following four components: (i) the bilateral difference of wage inflation adjusted by the nominal exchange rate; (ii) the relative cost of capital adjusted by the nominal exchange rate; (iii) the bilateral difference in TFP growth; and (iv) the import price differentials. Evidently, the effect of wage inflation on the RER is positively correlated with the sector-specific labor intensity *and* the sector-specific expenditure share. Hence, wage inflation does not appreciate the RER or lower competitiveness if it occurs in the capital-intensive sectors. In theory, wage inflation is positively correlated with TFP in the long run, therefore countries can maintain competitiveness if TFP of capital-intensive sectors grows faster than TFP of labor intensive sectors.

According to the HBS hypothesis, in the absence of labor market frictions, productivity improvement in the export sector increases demand for labor and therefore increases wages in both the export sector and the nontraded sector. As a result, the HBS hypothesis predicts that an expansion of the export volume coincides with a decline in the degree of competitiveness. But our work assumes labor market frictions, which

cause wage differentials across sectors. Moreover, we classify goods by labor intensity. As explained above, we predict that wage inflation impairs competitiveness only if export goods are labor-intensive goods *and* occupy large shares in the consumption expenditure, all things equal. Hence, in our framework countries may increase exports following TFP improvements in labor-intensive sectors without experiencing a decline in competitiveness if the export goods occupy small shares in the consumption expenditure.

III. Empirics

A. Databases

We employ three databases: INDSTAT, the ISDB database, and the IFS database. The INDSTAT database provides the series of wages and industry value added in 4-digit level ISIC Revision 3. The ISDB database provides the series of output, export, and consumption in 4-digit level ISIC Revision 3. The nominal exchange rate, CPI, and total private consumption expenditure are from the IFS. Our dataset features 98 industries in nine Asian countries from 1998 to 2007, although the exact coverage varies upon countries. The list of industries and their ISIC codes are in the appendix.

1. Variable of Interest: Competitiveness at the Industry Level—Revealed Comparative Advantage

The most ideal measure for competitiveness at the industry level is the price of the good relative to that in the trading partner country. However, we do not observe good prices. An alternative measure for competitiveness at the industry level is the change in revealed comparative advantage (RCA) proposed by Balassa (1965). Define $\Delta\lambda_{c1}$ as the change of RCA of country *c* in sector *i*, where the RCA in a particular year is calculated as:

$$\lambda_{ci} = \frac{X_{ci} / X_c}{X_{wi} / X_w},$$

X_{ci} is the export value in sector *i* from country *c*, X_c is the total export value from country *c*, X_{wi} is the total world export value in sector *i*, and X_w is the total world export value. The RCA was found to reveal comparative advantage in a classic 2x2x2 Heckscher-Ohlin model. It has widely been used to rank comparative advantage of industries (see Yi 2003, for example).

2. Other Variable of Interest: Real Exchange Rate and Its Components

Let the subscript *c* index the country.

α_{ci} = wage and salaries/value added from the UNIDO database in the beginning year

γ_{ci} = consumption at the sector level from the UNIDO database/total private consumption from the national income account in the IFS database in the beginning year

$\Delta\omega_{ict}$ = change in wage in sector *i* in country *c* + depreciation of currency *c* – change in wage in sector *i* in the US

Δq_{ct} = nominal exchange rate x CPI in the US/CPI in country *c*

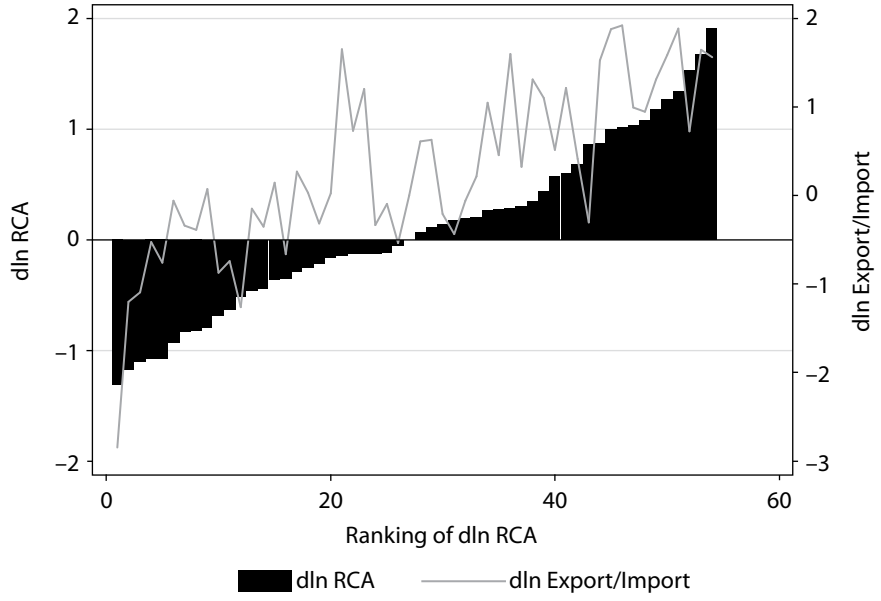
$$\sum_i \gamma_{ci}(\Delta a^*_{cit} - \Delta a_{cit}) + \sum_i \gamma_i \alpha_i (\Delta r^*_t + \Delta s_t - \Delta r_t) + \sum_{j \neq i} \gamma_{cj}(\Delta p^*_{cjt} + \Delta s_{ct} - \Delta p_{cjt}) = \Delta q_{ct} - \sum_i \gamma_{ci}\alpha_{ci}\Delta\omega_{cit}$$

= Residuals

B. Results

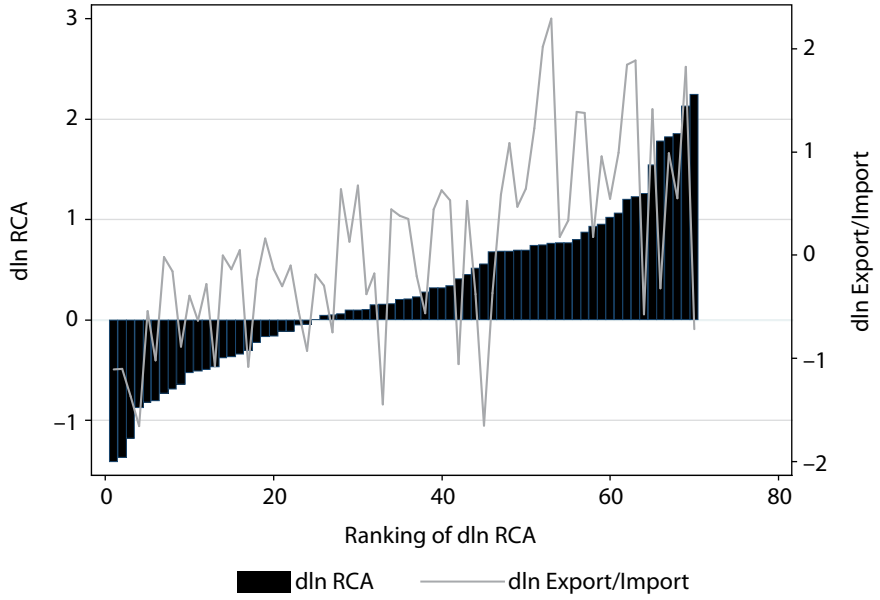
Figures 1.1–1.9 display the change of RCA and the net export growth of each country by ranking the change of RCA from low to high. For all countries, the change of RCA ranges from a negative value to a positive value. In other words, every country in our sample gained competitiveness in some industries and lost competitiveness in other industries at the same time. The other important characteristic in these figures is the strong correlation between the change of RCA and net export growth, which is explicitly summarized in Table 1. This correlation offers a consistency check in the sense that an increase in RCA should reflect an increase in competitiveness and a period of export booms. In Table 1, the correlation is positive for all countries as expected, and it is higher than 0.50 for every country except for Malaysia. Note that the sample period is different across countries due to data limitations.

Figure 1: Change of RCA and Net Export Growth in the PRC, 2003–2007



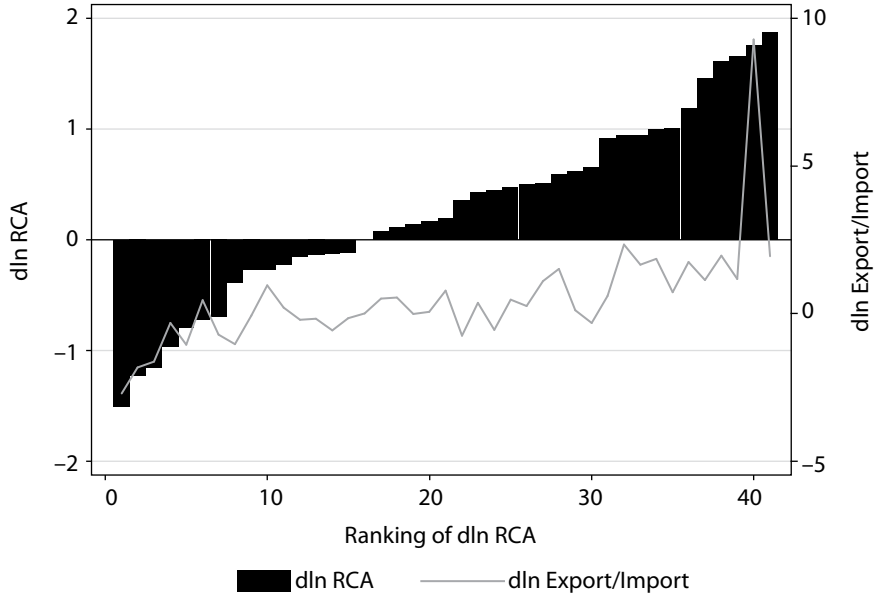
dln = first difference of natural logarithm or percentage change, RCA = revealed comparative advantage.
Sources: UNIDO IDSB Database and UNIDO INDSTAT Database.

Figure 2: Change of RCA and Net Export Growth in India, 1998–2005



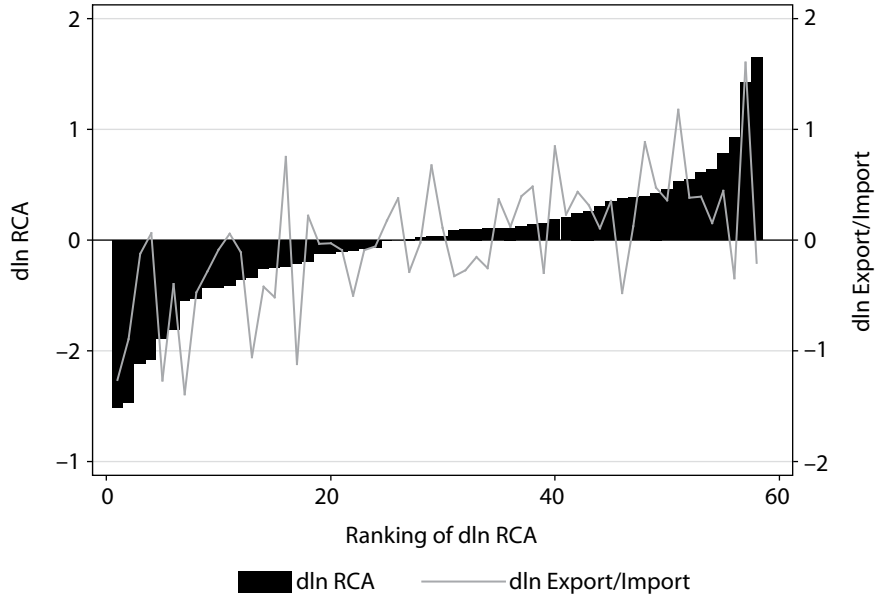
dln = first difference of natural logarithm or percentage change, RCA = revealed comparative advantage.
Sources: UNIDO IDSB Database and UNIDO INDSTAT Database.

Figure 3: Change of RCA and Net Export Growth in Indonesia, 1998–2006



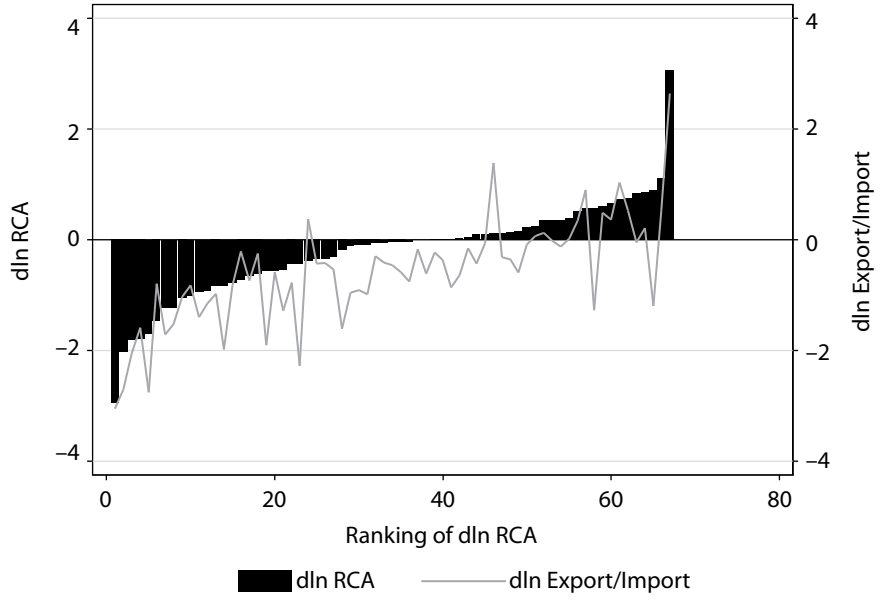
dln = first difference of natural logarithm or percentage change, RCA = revealed comparative advantage.
Sources: UNIDO IDSB Database and UNIDO INDSTAT Database.

Figure 4: Change of RCA and Net Export Growth in Japan, 1998–2005



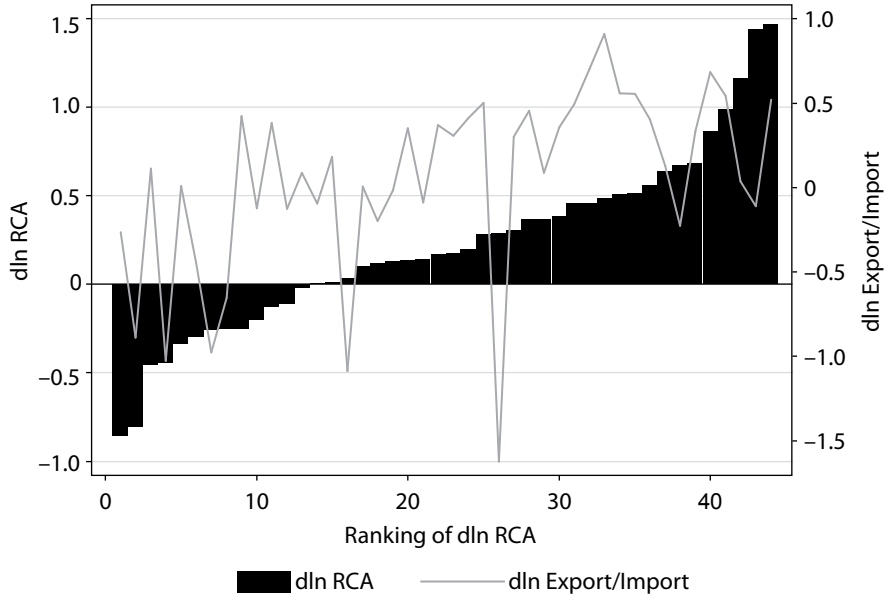
dln = first difference of natural logarithm or percentage change, RCA = revealed comparative advantage.
Sources: UNIDO IDSB Database and UNIDO INDSTAT Database.

Figure 5: Change of RCA and Net Export Growth in the Republic of Korea, 1998–2006



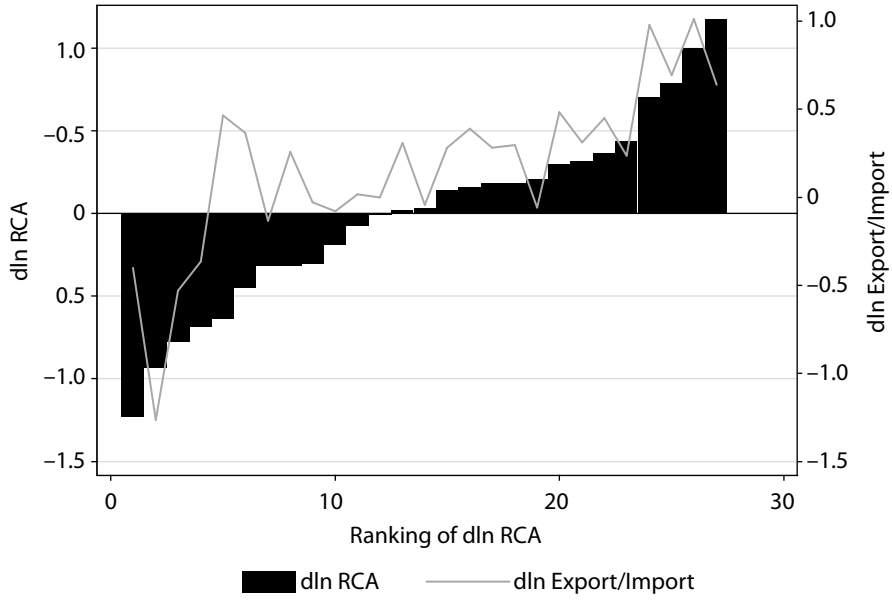
dln = first difference of natural logarithm or percentage change, RCA = revealed comparative advantage.
Sources: UNIDO IDSB Database and UNIDO INDSTAT Database.

Figure 6: Change of RCA and Net Export Growth in Malaysia, 2000–2006



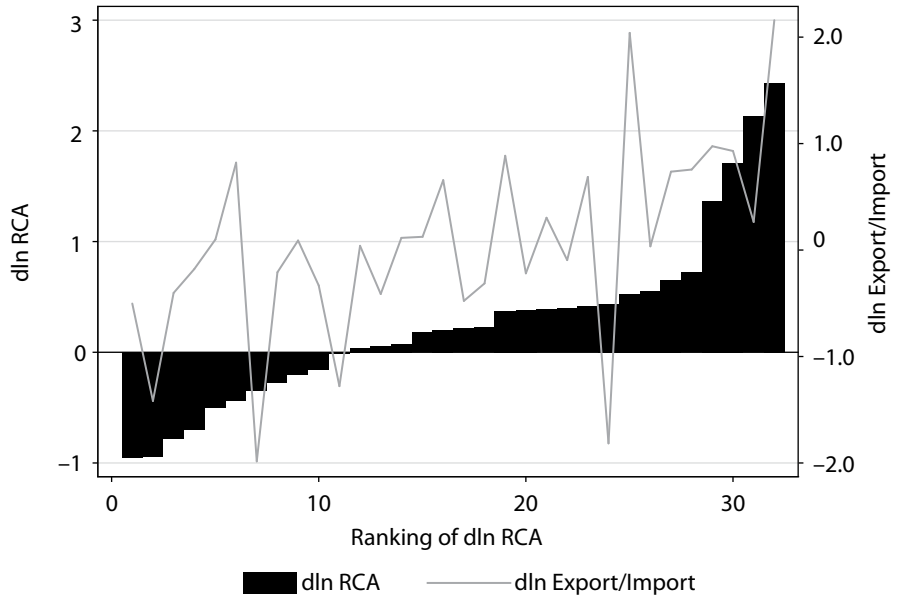
dln = first difference of natural logarithm or percentage change, RCA = revealed comparative advantage.
Sources: UNIDO IDSB Database and UNIDO INDSTAT Database.

Figure 7: Change of RCA and Net Export Growth in Singapore, 1998–2006



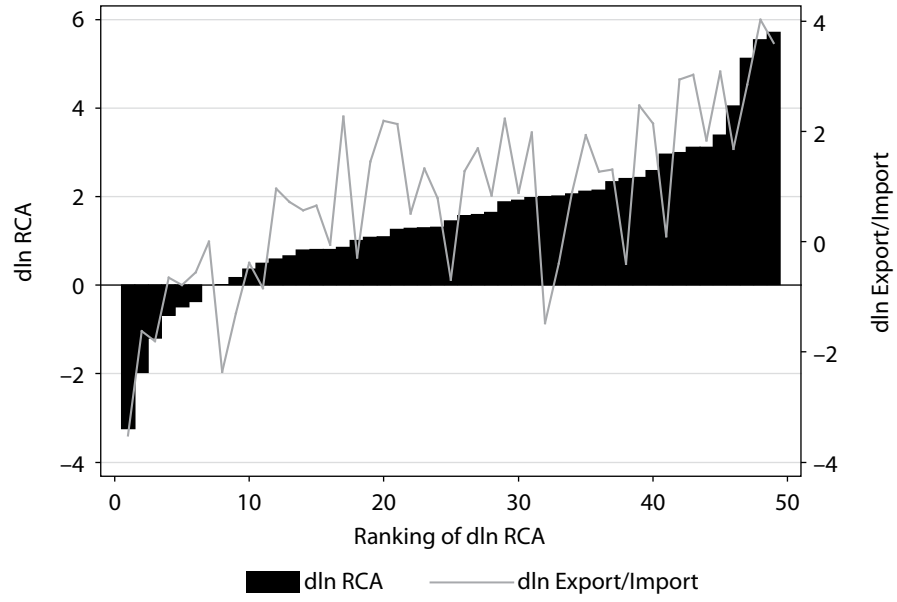
dln = first difference of natural logarithm or percentage change, RCA = revealed comparative advantage.
Sources: UNIDO IDSB Database and UNIDO INDSTAT Database.

Figure 8: Change of RCA and Net Export Growth in Thailand, 1998–2006



dln = first difference of natural logarithm or percentage change, RCA = revealed comparative advantage.
Sources: UNIDO IDSB Database and UNIDO INDSTAT Database.

Figure 9: Change of RCA and Net Export Growth in Viet Nam, 1998–2000



dln = first difference of natural logarithm or percentage change, RCA = revealed comparative advantage.
Sources: UNIDO IDSB Database and UNIDO INDSTAT Database.

Table 1: Cross-industry Correlation between the Change of Revealed Comparative Advantage and the Net Export Growth

Country	Correlation	Period	Number of Industries
China, People's Rep. of	0.78	2003–2007	54
India	0.59	1998–2005	70
Indonesia	0.71	1998–2006	41
Japan	0.58	1998–2005	58
Korea, Rep. of	0.81	1998–2006	67
Malaysia	0.45	2000–2006	44
Singapore	0.79	2001–2007	27
Thailand	0.56	1998–2006	32
Viet Nam	0.79	1998–2000	49

Source: UNIDO IDSB Database and UNIDO INDSTAT Database.

Table 2 reports the summary statistics of changes of RCA. Since the change of RCA varies from a negative to a positive value for all countries, we divide the sample into two groups. One is the group of industries with a positive change of RCA or increasing RCA. The other is the group of industries with a negative change of RCA or decreasing RCA. For all countries except for the Republic of Korea, the number of industries with increasing RCA is larger than the number of industries with decreasing RCA. On average, the increase in RCA of Viet Nam is the largest, and is high as 152%. The average change of RCA for Japan and Singapore is virtually 0. For other countries except for the Republic of Korea, the average change of RCA varies from 22% to 28%. The Republic of Korea is the only country that experiences a decline in the RCA on average. Consistent with Figures 1.1–1.9, the standard deviation of changes of RCA indicates that the change of RCA is quite heterogeneous across industries.

Table 2: Summary Statistics of the Change of Revealed Comparative Advantage

Country	Period	Range	Number of Industries with Positive Change	Number of Industries with Negative Change	Average	Std. Dev
China, People's Rep. of	2003–2007	[–1.31,1.91]	27	26	0.10	0.78
India	1998–2005	[–1.41,2.25]	46	24	0.28	0.79
Indonesia	1998–2006	[–1.51,1.88]	25	15	0.26	0.84
Japan	1998–2005	[–1.52,1.65]	32	26	0.00	0.58
Korea, Rep. of	1998–2006	[–2.96,3.07]	29	38	-0.20	0.87
Malaysia	2000–2006	[–0.85,1.47]	31	13	0.22	0.51
Singapore	2001–2007	[–1.23,1.18]	15	12	0.00	0.58
Thailand	1998–2006	[–0.96,2.43]	21	11	0.25	0.79
Viet Nam	1998–2000	[–3.24,5.71]	42	6	1.52	1.71

Sources: UNIDO IDSB Database and UNIDO INDSTAT Database.

Table 3 describes the summary statistics of labor intensity in the beginning year. Labor intensity of some industries in Indonesia, Malaysia, and Singapore is so high that it

exceeds 97%. In theory, one may argue that the difference in the beginning year across countries may contribute to large discrepancies when we compare labor intensity across countries. However, empirically the time series variation of labor intensity is quite small. On average, Singapore is the most labor-intensive country and the PRC is the least labor-intensive country. Their average labor intensivity is 61% and 18%, respectively. The average labor intensity for the remaining countries varies from 24% to 35%. That the PRC is the least labor-intensive on average may sound striking at first. However, it is important to note that these Asian countries have a quite heterogeneous exporting pattern beyond what can be captured by the standard deviation of labor intensity. Out of the sample of 98 industries, these Asian countries share only two common exporting industries. The cross-country comparison of labor intensity for the common industries is in Table 4. In "Corrugated paper and paperboard", the PRC and Indonesia are the least labor-intensive, because of their low wages. On the contrary, Singapore is the least labor-intensive country in "Pharmaceuticals, medicinal chemicals, etc."

Table 3: Summary Statistics of the Labor Intensity in the Beginning Year

Country	Year	Number of Industries	Range	Average	Std. Dev
China, People's Rep. of	2003	54	[0.05,0.43]	0.18	0.08
India	1998	70	[0.04,0.85]	0.31	0.13
Indonesia	1998	41	[0.06,0.99]	0.24	0.16
Japan	1998	58	[0.08,0.52]	0.24	0.10
Korea, Rep. of	1998	67	[0.04,0.42]	0.25	0.09
Malaysia	2000	44	[0.09,1.00]	0.34	0.15
Singapore	2001	27	[0.06,0.97]	0.61	0.17
Thailand	1998	32	[0.10,0.62]	0.28	0.12
Viet Nam	1998	49	[0.06,0.77]	0.35	0.16

Source: UNIDO INDSTAT Database.

Table 4: Comparison of Labor Intensity in Common Industries

Country	ISIC Code: 2102 Corrugated Paper and Paperboard	ISIC Code: 2423 Pharmaceuticals, Medicinal Chemicals, etc.
China, People's Rep. of	0.15	0.16
India	0.31	0.20
Indonesia	0.15	0.22
Japan	0.26	0.14
Korea, Rep. of	0.24	0.11
Malaysia	0.29	0.32
Singapore	0.61	0.06
Thailand	0.24	0.34
Viet Nam	0.44	0.44

Source: UNIDO INDSTAT Database.

To understand the influence of labor intensity on competitiveness at the industry level, we compare labor intensity of the industries with increasing RCA and that of the industries with decreasing RCA in Table 5. We found that labor intensity of these two groups is not significantly different for all countries. In other words, the industries in which these Asian countries gained competitiveness are on average as labor-intensive as the industries in which they lost competitiveness. Hence, labor intensity itself had no impacts on the structural change of the exporting pattern in Asia.

Table 5: Comparison of Labor Intensity: Industries with Increasing RCA versus Industries with Decreasing RCA

	Average Labor Intensity		Std. Deviation of Labor Intensity	
Country	**Increasing RCA**	**Decreasing RCA**	**Increasing RCA**	**Decreasing RCA**
China, People's Rep. of	0.19	0.16	0.05	0.10
India	0.33	0.27	0.12	0.15
Indonesia	0.26	0.21	0.18	0.10
Japan	0.25	0.23	0.10	0.10
Korea, Rep. of	0.27	0.23	0.09	0.09
Malaysia	0.33	0.34	0.16	0.12
Singapore	0.59	0.62	0.19	0.15
Thailand	0.27	0.30	0.11	0.13
Viet Nam	0.35	0.30	0.16	0.17

RCA = revealed comparative advantage.
Sources: UNIDO IDSB Database and UNIDO INDSTAT Database.

Next, we turn our attention to the role of labor costs. Table 6 describes the summary statistics of changes in the US domestic wage inflation differentials. Positive wage inflation differentials indicate that the US wage inflation is higher than the domestic wage inflation after adjusting for nominal depreciation of the US dollar. One caveat of a cross-country comparison here is that the sample period is different across countries. Given the constraint on the sample period, unlike other countries, the PRC's wage inflation differentials are positive in all industries. In other words, the PRC is the only country in which wage inflation has been lower than that in the US in all industries. A meaningful comparison is possible within two subgroups of which the sample period is identical. First, wage inflation has been lower in India than Japan in 1998–2005. Secondly, wage inflation has been lower in Indonesia than in the Republic of Korea and Thailand in 1998–2006.

Table 6: Summary Statistics of US-domestic Wage Inflation Differentials

Country	Period	Number of Industries	Range	Average	Std. Dev
China, People's Rep. of	2003–2007	54	[0.00,1.10]	0.41	0.20
India	1998–2005	70	[–0.17,1.04]	0.44	0.23
Indonesia	1998–2006	41	[–0.51,2.14]	0.75	0.58
Japan	1998–2005	58	[–0.66,0.10]	–0.21	0.12
Korea, Rep. of	1998–2006	67	[–0.20,0.38]	0.03	0.13
Malaysia	2000–2006	44	[–0.55,0.24]	–0.04	0.16
Singapore	2001–2007	27	[–0.60,0.04]	–0.21	0.16
Thailand	1998–2006	32	[–0.55,1.45]	–0.17	0.32
Viet Nam	1998–2000	49	[–0.27,0.44]	0.07	0.14

Sources: UNIDO IDSB Database, UNIDO INDSTAT Database, and IMF International Financial Statistics.

Table 7 compares the US domestic wage inflation differentials of industries with increasing RCA and industries with decreasing RCA. We found that the wage inflation differentials are not significantly different for all countries. This finding illustrates that wage inflation does not matter to the structural change of exporting pattern in Asia. An alternative interpretation is that the inflationary effect of rising wage in Asia has been limited and has not contributed to a rise or a fall of the export share in the world market.

Table 7: Comparison of US-domestic Wage Inflation Differentials: Industries with Increasing RCA versus Industries with Decreasing RCA

	Average Wage Inflation Differentials		Std. Dev. of Wage Inflation Differentials	
Country	**Increasing RCA**	**Decreasing RCA**	**Increasing RCA**	**Decreasing RCA**
China, People's Rep. of	0.37	0.46	0.15	0.22
India	0.44	0.43	0.24	0.22
Indonesia	0.73	0.82	0.59	0.57
Japan	–0.24	–0.17	0.12	0.11
Korea, Rep. of	0.05	0.02	0.11	0.14
Malaysia	–0.04	–0.03	0.17	0.13
Singapore	–0.18	–0.24	0.11	0.20
Thailand	–0.13	–0.25	0.38	0.15
Viet Nam	0.07	0.10	0.14	0.09

Sources: UNIDO IDSB Database, UNIDO INDSTAT Database, and IMF International Financial Statistics.

To make the same point regarding the irrelevance of wage inflation to the change of competitiveness, we decompose changes of the relative price level or the RER into the wage inflation differentials and the residuals in Table 8. Positive changes of the RER indicate an improvement of competitiveness or real depreciation. To the contrary, negative changes of the real exchange rate imply a loss of competitiveness or real appreciation. Because the sample period is different across countries, a cross-country comparison of changes of RER is not useful. The point of Table 8 is not about a cross-country comparison of the real depreciation, but rather the decomposition of the real depreciation into the wage inflation differentials and residuals. Evidently, for all countries except for India, wage inflation differentials do not drive changes of the RER. However, we do not observe the sector-specific capital stock and thus we do not know whether the RER depreciation is driven by changes of the relative cost of capital or the relative growth rate of TFP. In any case, Table 8 further substantiates the finding from Table 7 that the inflationary effect of rising wage on the degree of competitiveness is quite small in Asia.

Table 8: Decomposition of Real Exchange Rate Depreciation

Country	Period	Real Depreciation	Wage Inflation Differentials	Residuals
China, People's Rep. of	2003–2007	–0.17	0.07	–0.24
India	1998–2005	0.03	0.02	0.01
Indonesia	1998–2006	0.55	0.03	0.52
Japan	1998–2005	–0.10	–0.02	–0.08
Korea, Rep. of	1998–2006	–0.37	0.00	–0.37
Malaysia	2000–2006	–0.10	–0.00	–0.10
Singapore	2001–2007	–0.25	–0.03	–0.22
Thailand	1998–2006	–0.12	–0.03	–0.09
Viet Nam	1998–2000	0.20	0.01	0.19

Sources: UNIDO IDSB Database, UNIDO INDSTAT Database, and IMF International Financial Statistics.

IV. Concluding Remarks

Our finding that labor intensity and wage inflation had no impacts on both the structural change of the exporting pattern and competitiveness in post-crisis Asia contradicts the HBS hypothesis, which emphasizes the importance of wages in the long-run determination of RER. As illustrated in our theoretical framework, the difference between our finding and the HBS hypothesis comes from two assumptions. The first assumption is about the classification of goods, and the second one is about labor mobility. We demonstrate, using both theory and empirics, that our departure from the exogenous traded–nontraded dichotomy and the assumption of perfect labor mobility in the HBS theory yields quite different results. One caveat is that our result may be caused for the short sample period, particularly for the PRC, Malaysia, Singapore, and Viet Nam. A future study using data over a longer period is required.

Our work has an important policy implication. Specifically, our result suggests that Asian economies can implement labor market reforms such as raising minimum wages to improve the standard of living without raising concerns about the inflationary effect of rising wages. However, since we do not know whether the source of the structural change of competitiveness is the change in the relative cost of capital or the TFP growth, consequently, we cannot make recommendations about policies related to capital markets and investments.

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About the Paper

Yothin Jinjarak and Kanda Naknoi find that the exporting pattern in Asia and the degree of competitiveness of Asian economies substantially changed in the decade after the Asian crisis. These structural changes were not caused by labor intensity and wage inflation. However, due to data limitations, the authors cannot conclude whether these structural changes come from changes in the cost of capital or changes in total factor productivity.

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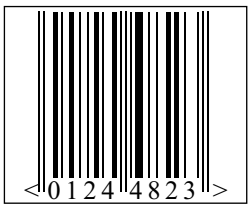

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