China's Impact on the Exports of Other Asian Countries: A Note

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Despite widespread interest in China's growing trade surplus and its impact on other countries, empirical research in these issues is handicapped by the lack of reliable statistics on aggregate import and export prices. Although researchers estimate the trade volumes of China and other East Asian countries using a variety of surrogate price indices, an inappropriate deflator can give rise to a significant bias in econometric analysis. This paper discusses the potential seriousness of this problem by examining recent studies on the export competition between China and other Asian countries.

Keywords: China, East Asia, Trade Price Index, Electronics

JEL classification: F14, F31

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Despite widespread interest in China's growing trade surplus and its impact on other countries, empirical research in these issues is handicapped by the lack of reliable statistics on aggregate import and export prices. Although researchers estimate the trade volumes of China and other East Asian countries using a variety of surrogate price indices, an inappropriate deflator can give rise to a significant bias in econometric analysis. This paper discusses the potential seriousness of this problem by examining recent studies on the export competition between China and other Asian countries.

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1 Introduction

A recent surge in China's exports and trade surplus has spawned a torrent of studies on their determinants and their implications for other countries. Similarly, controversies surrounding China's exchange rate policy have motivated an army of researchers to estimate the equilibrium value of the Renminbi (RMB) and the potential impact of its major revaluation on the export competitiveness of China and its trade partners.

Although the empirical assessment of these issues typically requires data on the *real* trade values of relevant countries, the Chinese government has begun reporting aggregate export and import deflators only very recently. While researchers often estimate the trade volumes of China and other countries using a surrogate price index, an inappropriate deflator can significantly distort econometric analysis. As will be discussed below, this problem relates closely to the facts that the trade of China and several other East Asian countries is increasingly concentrated in electronic products whose trading volume and prices are subject to significant medium-term fluctuations.

The next section discusses this problem in more detail. Section 3 illustrates its quantitative importance by examining recent studies on the competitive relationship between the exports of China and other Asian countries. Section 4 provides a conclusion.

2 The problem

By definition, the aggregate trade volume is the aggregate trade value deflated with a suitably defined aggregate trade price. For example, the export volume ("real exports") of country i in period t is defined as $Q_{i,t}^X = V_{i,t}^X / P_{i,t}^X$, or in logarithmic terms,

$$q_{i,t}^X = v_{i,t}^X - p_{i,t}^X, \tag{1}$$

where $v_{i,t}^X$ and $p_{i,t}^X$ are the logs of the aggregate export value and price. There are a number of formulas for the aggregate price index, which may produce different time series of $p_{i,t}^X$ and hence also of $q_{i,t}^X$. Although price indices derived from establishment price surveys are generally superior to unit value indices based on customs statistics, developing countries often report only the latter because of their resource constraints (Silver 2007).

In China, however, the situation is more serious. The Chinese government does not compile survey-based trade price indices, nor does it report GDP deflators disaggregated by demand and supply components. Although it began reporting unit export and import value indices in 2005, it will be many years until researchers can start using these deflators for time-series research. There area a few other East Asian countries in which consistent trade price indices are not available for a sufficiently long period of time (Table 1).

The lack of official trade price indices may be eschewed in several ways. The crudest but easiest method is simply to use nominal trade values as surrogates for the real values, hoping that doing so would not distort statistical investigation (e.g. Wang et al. 2003). A slightly more sophisticated method is to approximate the volume of trade using a surrogate deflator. For example, Kwack et al. (2007) estimate the real imports of 30 industrial and developing countries by deflating their nominal imports by the CPI of the United States. Similarly, in their assessment of the potential impact of an RMB revaluation on the exports of China, Rahman and Thorbecke (2007) compute the country's real exports by deflating its nominal exports with the US CPI, the US price index for imports from non-industrial countries[1] and the export unit value index of Hong Kong. While a small number of studies calculate their own deflators, these deflators are generally based on relatively aggregated trade statistics and should also be regarded as approximate indicators (e.g. Cerra and Saxena 2003).

Although a few authors voice concern about the use of surrogate deflators (Marquez and Schindler 2007), they fall short of examining how these deflators deviate from the (unknown) genuine deflators and how their discrepancies affect statistical investigation. As discussed below, however, this is an issue that needs to be taken seriously when the focus of research is on China and other East Asian countries.

Let us suppose that the true export price index $p^X_{i,t}$ in (1) is unknown and that the researcher uses a proxy deflator $p^*_{i,t} = p^X_{i,t} - \varepsilon_{i,t}$, where $\varepsilon_{i,t}$ is the discrepancy between the two indices. Then the implicit volume index also deviates from the true real exports:

$$q^*_{i,t} = v^X_{i,t} - p^*_{i,t} = q^X_{i,t} + \varepsilon_{i,t}. \tag{2}$$

Now suppose that the researcher investigates the determinants of the exports of country i. A typical export function has as its arguments a variable representing the business cycle of importer countries (y_t), the relative price or real exchange rate variable ($s_{i,t}$),

[1] While the United States reports export and import deflators disaggregated by partner countries, the series for China became available only in December 2003. Although Rahman and Thorbecke argue that the US import price index (IPI) for non-industrial countries closely matches that for China, this does not appear to be the case.

and a vector of other variables ($\mathbf{Z}_{i,t}$),

$$q_{i,t}^X = f\left(y_t, s_{i,t}, \mathbf{Z}_{i,t}\right). \tag{3}$$

If country i is an East Asian country concerned about losing export markets to China, China's exports may enter (3) as an element of $\mathbf{Z}_{i,t}$. If the researcher estimates this equation using the approximate export volume in (2), the empirical model will be

$$q_{i,t}^* = f\left(y_t, s_{i,t}, q_{c,t}^*\right), \tag{4}$$

which is equivalent to

$$q_{i,t}^X + \varepsilon_{i,t} = f\left(y_t, s_{i,t}, q_{c,t}^X + \varepsilon_{c,t}\right), \tag{5}$$

where subscript c denotes China.

As is evident from (5), estimating (4) will not find a correct relationship between $q_{i,t}^X$ and $q_{c,t}^X$ when $\varepsilon_{i,t}$ and $\varepsilon_{c,t}$ are correlated. Will $\varepsilon_{i,t}$ and $\varepsilon_{c,t}$ be correlated? To consider this question, it should be noted first that the exports of several Asian countries, including China, are heavily concentrated in electronic goods whose trading volumes and prices tend to change rapidly (Table 2). Moreover, because of increasing production sharing in the region, their exports and imports include a substantial amount of intermediate electronics whose prices are particularly unstable, such as semiconductors. To the extent that this is the case, when $q_{i,t}^*$ and $q_{c,t}^*$ are computed using the US CPI or PPI, not only will $\varepsilon_{i,t}$ and $\varepsilon_{c,t}$ become numerically large but will also be positively correlated with each other.[2]

In order to assess the importance of this problem, we have computed original unit export value indices for nine Asian countries, including China. Our unit value index is based on detailed product-level trade statistics obtained from the United Nations COMTRADE database and computed as a chained Fisher index so as to minimize an aggregation bias.[3] We have also computed a unit value index for electronic goods that are traded in the international market, including those involving East Asian and other countries, using data from 36 countries and following the same compilation method as

[2] While country i may report its export price index, one would like to use the same type of deflators for country i and China when estimating an equation like (5). This is why the existing literature often adopts the US CPI, PPI, and import/export prices indices as a common deflator when estimating trade equations for a large number of countries.

[3] Kuroko (2007) explains the computation method. Taiwan's data was obtained from country sources.

in the case of the country unit export value index. Figure 1 plots the year-on-year rates of change in the computed unit export value index and the corresponding export volume index for China, ANIES4 (Hong Kong, Korea, Singapore and Taiwan), ASEAN4 (Indonesia, Malaysia, the Philippines and Thailand) and world electronics trade, along with those of the US PPI and the US non-petroleum IPI.

A few findings are worth noting here. First, the export prices of China and other East Asian countries are correlated with each other and appear to be influenced by the international prices of electronic products. Second, although the US PPI and IPI are also correlated with the unit values of the exports of the Asian countries and world electronics trade, the correlation is not perfect, with the latter being much more volatile. Third, not only is the electronics *volume* index positively correlated with the electronic *price* index (not surprising since a slowdown in demand is likely to depress prices), but the former is also correlated with the export *volumes* of the Asian countries. These observations suggest that the adoption of a broad-based proxy deflator such as the US PPI or IPI will not only make $\varepsilon_{i,t}$ and $\varepsilon_{c,t}$ correlated but also strengthen the estimation bias in (4) through their positive correlations with $q^X_{i,t}$ and $q^X_{c,t}$.

It is also worth noticing that the volume of world electronics trade is not driven solely by the business cycles of importer countries. In the upper panel of Figure 2, we replot the growth rate of our electronics volume index along with those of global real GDP and the real GDP of advanced countries. Although their time series are clearly correlated, the former is much more volatile and has occasionally moved in the direction opposite to the latter. This implies that the demand for electronics goods is not merely more income elastic than other types of products but also subject to factors that are specific to this industry. This in turn suggests that the export demand equation (3) should either be estimated separately for electronics and other goods, or explicitly control for the dynamics of the international electronics market, for otherwise the estimated income elasticity would become implausibly large and/or unstable over time. This is indeed what the existing studies report for China and a few other East Asian countries (Aziz et al. 2007).

Let us return to the general export function (3) and suppose that we are now interested in the price elasticity of exports, i.e., the elasticity of $q^X_{i,t}$ to $s_{i,t}$. For the sake of exposition, we define $s_{i,t}$ as follows:

$$s_{i,t} = \sum_j w_{j,t} s^j_{i,t} = \sum_{j \neq i} w_{j,t} \left(e^j_{i,t} + p_{j,t} - p_{i,t} \right), \qquad \sum_{j \neq i} w_{j,t} = 1, \tag{6}$$

where $e^j_{i,t}$ is the nominal bilateral exchange rate (units of country i currency per unit of country j currency), $p_{i,t}$ is the cost of production index (e.g., the unit labor cost or the PPI), and $w_{j,t}$ is the weight attached to the currency of country j. If we rewrite $e^j_{i,t}$ in terms of the exchange rate vis-à-vis the US dollar, (6) becomes

$$s_{i,t} = e^\$_{i,t} - \sum_{j \neq i} w_{j,t} e^\$_{j,t} + \sum_{j \neq i} w_{j,t} p_{j,t} - p_{i,t}, \tag{7}$$

where \$ denotes the United States.

Now suppose that country i is China. Since China keeps the nominal RMB/dollar exchange rate very stable, the first term on the right-hand side of (7) is effectively constant. If the cost of production in each country also changes only slowly, (3) would effectively become

$$q^*_{i,t} = q^X_{i,t} + \varepsilon_{i,t} = f\left(y_t, -e^\$_{1,t}, -e^\$_{2,t}, -e^\$_{3,t}, ... \right), \tag{8}$$

where $e^\$_{1,t}, e^\$_{2,t}, ...$ are the exchange rates of the currencies of China's trade partners, including other East Asian countries, vis-à-vis the US dollar. Although certain Asian currencies are pegged to the dollar as tightly as the RMB, others are not. The prime example of the latter is the Japanese yen, which has been subject to large medium-term swings against the dollar during the past three decades. This implies that estimating (3) would not find the correct price elasticity of China's exports if $\varepsilon_{i,t}$ is correlated with the yen/dollar exchange rate. The same argument holds if country i is not China but other Asian countries whose currencies are closely linked to the dollar, such as Hong Kong and Malaysia.

But why should $\varepsilon_{i,t}$ be correlated with the yen/dollar exchange rate? To understand why, first note that Japan is a major exporter of electronics, although its export basket is more diversified than those of other Asian countries.[4] Moreover, since large Japanese electronics firms have extensive production networks in China and Southeast Asia, these firms are responsible for part of the electronics trade of these countries. If the Japanese firms fix their prices in terms of yen or at least do not fully adjust them to exchange

[4] In value terms, however, Japan had long been the largest exporter of electronics in the world, until its position was overtaken by China in 2003.

rate movements, a large yen depreciation will lower their prices measured in dollars. This implies that the nominal yen/dollar exchange rate is negatively correlated with our electronics unit value index and hence also with $\varepsilon_{i,t}$. The lower panel of Figure 2 clearly confirms this expectation.[5]

The previous observation suggests that estimating (8) would make us believe that a yen depreciation exerts very strong competitive pressures on the exporters of China and other dollar-pegging countries, even if this is not true. Although a number of existing studies indeed make such a claim (Ito et al. 1998; Wang et al. 2003), their results are often not robust to changes in deflators and the inclusion of a variable that controls for shocks specific to the electronics industry (Kumakura 2005, 2007a). Note that while it *is* possible that a yen depreciation boosts the price competitiveness of Japanese producers and helps them expand their exports, such effects should unfold gradually, with at least certain time lags. However, the existing studies often find the effect of a yen depreciation on the exports of other countries as immediate and short-lived (e.g., Doraisami 2004).

There are other channels through which the dynamics of the electronics industry can distort the estimated price elasticity of exports. In (8), suppose that $i = 1, 2, 3, ...$ are not Japan but other Asian countries, such as Korea, Singapore and Taiwan, whose currencies are tied to the dollar less tightly than the RMB. These countries rely particularly heavily on the electronics industry and, while not recognized widely, have a tendency to let their currencies depreciate when their export performance deteriorates sharply (Kumakura 2005, 2007a). This implies that when the growth rate of the *value* of world electronics trade decelerates as a result of, say, a collapse of semiconductor prices or a slowdown of the downstream IT industry, falls in $q^X_{i,t}$ and $\varepsilon_{i,t}$ and rises in $e^{\$}_{1,t}$, $e^{\$}_{2,t}$, $e^{\$}_{3,t}$, ... may take place simultaneously, forcing the variables on the right and left sides of (8) to move in the same direction.[6] Since China relies heavily on imported inputs for electronics production, its aggregate exports and imports tend to move together, particularly when the world electronics market becomes turbulent (Kumakura 2006). This implies that if one estimates China's export and import functions without recognizing the dynamics of the electronics industry, the price elasticity of the former may be biased upward while that of the latter may be downwardly biased. A number of existing studies indeed find

[5] The correlation coefficient for the yen/dollar rate and the world electronics price is -0.549.

[6] In the lower panel of Figure 2, the correlation between the composite ANIES/dollar exchange rate and our electronics price and value indices are 0.610 and 0.625, respectively.

an implausibly large price elasticity for China's exports and a small or wrongly-signed price elasticity for its imports (Cheung et al. 2007). Note also that this bias will work in the opposite direction if the country in focus is not China but countries whose currencies tend to depreciate against the dollar when a negative shock occurs to the electronics market.

3 An illustration

We next illustrate the quantitative importance of the previous issues in terms of a specific example. In a series of papers, Alan Ahearne, John Fernald and their coauthors assess the competitive impact of China's exports on other Asian countries (Ahearne et al. 2003, 2006; Fernald and Loungani 2004). They do so by estimating the following variant of (4):

$$\Delta q^*_{i,t} = \alpha_i + \sum_{k=0} \beta_k \Delta y_{i,t-k} + \sum_{k=0} \gamma_k \Delta s_{i,t-k} + \sum_{k=0} \lambda_k \Delta q^*_{c,t-k} + ..., \quad (9)$$

where Δ is the first-difference operator, $i = 1, 2, ..., 8$ are ANIES4 and ASEAN4, and α_i is the country fixed effect. Using annual data for 1981 onward, Ahearne et al. estimate this equation for a panel of (a) ANIES4, (b) ASEAN4 and (c) all eight East Asian countries (EA8). In all of these panels, the estimated coefficients on $\Delta q^*_{c,t}$ are positive and highly significant. On the basis of this result, Ahearne et al. (2006) argue that the exports of China and other Asian countries are more complementary than widely believed and have the potential for growing together without hurting each other.

There are doubts about this result, however. Although both Ahearne et al. (2003) and Ahearne et al. (2006) call $q^*_{i,t}$ and $q^*_{c,t}$ "real" exports, the former do not mention how the nominal values are deflated, and the "real" exports in the latter are in fact nominal exports measured in local currency. Moreover, their result contradicts those of other recent studies, such as Eichengreen et al. (2007). According to Eichengreen et al., relatively high-income ANIES4 gain from the export and economic growth of China because their competitive loss in third countries is more than fully compensated for by an increase in their exports to China. In ASEAN4 and other low-income Asian countries, however, the net impact of China's export growth is negative because the former effect dominates the latter.

Nevertheless, the difference between the results of Ahearne et al. (2003, 2007) and Eichengreen et al. (2007) is in fact more apparent than real. To demonstrate this, we first reestimate (9) by computing $q^*_{i,t}$ and $q^*_{c,t}$ by deflating nominal US-dollar export values with the US PPI.[7] $y_{i,t}$ is computed as the weighted average of the real GDP growth rates of the United States, Japan, and the six largest European countries, where the weight is the share of each country in the exports of country i during the previous year. The real effective exchange rate is computed against the currencies of 24 trade partner countries using each country's PPI as $p_{i,t}$. The currency weight $w_{j,t}$ takes account of export competition in third countries and trade in intermediate products that may be re-exported to third countries as part of final or more advanced intermediate goods.[8] We only use annual data for 1987-2005 due to the lack of disaggregated trade data for earlier years. Following Ahearne et al. (2006), we also consider specifications that allow the coefficient on China's exports to change after 2001, so as to examine the possibility that its competitive pressures on other Asian countries have strengthened after its entry into the WTO.

The result of this estimation, presented in Table 3, is qualitatively similar to those of Ahearne et al. (2003, 2006). In particular, the coefficients on Chinese exports are positive and highly significant, except when different coefficients are permitted for 1987-2000 and 2001-2005 in the panel of ASEAN4. This result is robust to the inclusion of a lagged regressand and a dummy variable for the period of the Asian crisis.

In Table 3, however, there are a few anomalies. First, most of the estimated coefficients on $y_{i,t}$ range between 2 and 3 which, albeit not implausible, appear rather large. Second, the coefficients on the real exchange rate variables have the wrong sign, although they are generally statistically insignificant.

We next conduct the same estimation by replacing $\Delta q^*_{i,t}$ and $\Delta q^*_{c,t}$ with the growth rates of the export values deflated with our unit value indices. The result is presented in Table 4 and differs considerably from that in Tables 3. First of all, the coefficients on the exchange rates are of the expected sign and (close to being) statistically significant at the ten percent level. Second, the coefficients on China's exports are estimated more imprecisely, with much smaller point estimates. Most importantly, the general fit of the model is substantially poorer than in Table 3, suggesting that the previous regressions

[7] Deflating dollar-denominated export values with the US CPI or IPI, or deflating local-currency export values with the home-country CPI or PPI, does not materially change the following result. All variables used below pass standard panel unit root tests with flying colors.

[8] The former adjustment utilizes the method of the Federal Reserve Board as in Ahearne et al. (2006). The latter adjustment is described in Kumakura (2007b). We also follow Ahearne et al. and conduct adjustment for China's pre-1994 dual exchange rates.

were to a large extent spurious. These findings are consistent with our discussion in Section 2.

Nevertheless, if there is a merit in our previous discussion, (9) is still misspecified because it does not take account of shocks specific to the electronics industry. Since the exposure to the electronics market varies across countries, we define the following control variable

$$\Delta q_{i,t}^{el} = (\text{Share of electronics in the total exports of country } i \text{ in year } t-1) \times \Delta q_t^{el}, \tag{10}$$

where Δq_t^{el} is the log first difference of our volume index for the global electronics trade. We next add this variable and reestimate (9).[9]

The result is presented in Table 5. The electronics variable is indeed highly significant in all regressions. When this variable is included, moreover, the estimated coefficients on the foreign income variable range in the neighborhood of unity, suggesting large differences in the income elasticities between electronics and other products.[10] Second, the coefficients on Chinese exports are even smaller than in Table 4 and have a negative sign for ASEAN4. Although the Chinese variables are statistically significant only in a few cases, there is now little qualitative difference from what is reported by Eichengreen et al. (2007).[11]

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[9] Since the Asian countries collectively account for a sizable share of the world electronics trade, Δq_t^{el} is strictly speaking not exogenous to the regressand in (9). To address this issue, we have created an alternative variable by computing Δq_t^{el} in terms of the rate of change in the real global shipment of semiconductors, which includes each country's domestic sales and should be less susceptible to the endogeneity problem. Using this variable in the computation of $\Delta q_{i,t}^{el}$ only strengthens the following result.

[10] The weak significance of $y_{i,t}$ in Table 5 reflects its correlation with the electronics variable. However, the fact that only the latter is significant in most cases suggests that the dynamics of the world electronics market have more direct impact on the export performance of (at least some) East Asian countries.

[11] As far as we understand, the result of Eichengreen et al. (2007) differs from that of Ahearne et al. not because the former use a correct price index but because they estimate their model using an instrumental variable (IV) method. More specifically, Eichengeen et al. estimate the following augmented gravity equation

$$q_{ij,t}^* = \alpha_i + \beta y_{i,t} + \gamma y_{j,t} ... + \lambda q_{cj,t}^* + ...,$$

where $q_{ij,t}^*$ and $q_{cj,t}^*$ refer to the exports of country i and China to country j. Eichengreen et al. instrument $q_{cj,t}^*$ with the distance between China and country j to control for its potential endogeneity with $q_{ij,t}^*$. While this time-invariant instrument seems rather inefficient, it makes considerable difference in the estimated coefficient on $q_{cj,t}^*$ (Eichengreen et al. 2007: 213). However, Eichengreen et al. deflate all bilateral trade with the US CPI for all urban consumers, which is unlikely to be a sensible choice. Moreover, although they also estimate an import equation for China, they do not employ the IV method for this equation.

4 Conclusion

This paper has discussed the problems arising from the use of a surrogate price index for research in the trade of China and other East Asian countries. An inappropriate deflator causes a serious estimation bias because of the heavy dependence of a number of Asian countries on electronic products, the distinct dynamics of the electronics industry, and their subtle interaction with the exchange rates of certain Asian currencies. Although the estimation in Section 3 did not directly examine China's trade dynamics, the result raises questions about the existing literature on this subject as well.[12]

Now the question is: what should we do then? Since our unit value indices are only available at the annual frequency, they are of limited use for detailed time-series analysis.[13] Ideally, therefore, the governments of China and a few other countries should be prodded to extend their unit export and import value indices to at least the mid-1990s and make them publicly available at the monthly or quarterly frequencies. Given the known difficulties of unit trade value indices (Silver 2007), the Chinese government should also start considering the compilation of aggregate price indices based on establishment price surveys.

Until this is done, researchers will have to continue relying on proxy deflators. Nevertheless, our analysis suggests that broad-based price indices, such as the CPI, PPI, or a general import or export price index of a particular foreign country, are unlikely to provide a good substitute. One possibility would be to first generate industry-specific approximate deflators using the disaggregated price indices of a large number of foreign countries and aggregate them in accordance with the composition of the export and import baskets of China and other countries for which the relevant price indices are lacking (Aziz and Li 2007). Another possibility would be to estimate trade functions separately for electronics and other products, although one must recognize the fact that intermediate electronic goods are now used increasingly widely as an input to other industries as well. Lastly, it would also be useful, as is done in this paper, to make prior conjectures about various biases arising from the use of a particular proxy deflator and to carefully examine the estimation result in light of such conjectures.

[12] See Kumakura (2006: Appendix) for an analysis of the recent dynamics of China's imports and exports and their relationship between the condition of the electronics industry.

[13] This is the only frequency at which product-level trade statistics are compiled by the United Nations and other international agencies.

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Table 1. Availability of aggregate export and import deflators (1987-)

Country	Unit value index			Price index [1)]
	IMF [2)]	UN [3)]	WTO [4)]	IMF [2)]
China	×	×	×	×
Indonesia	○	○	×	×
Hong Kong	○	○	○	×
Japan	○	○	○	○
Korea	○	○	○	○
Malaysia	△	△	×	×
Philippines	△	△	○	△
Singapore	○	○	○	○
Taiwan	×	×	○	×
Thailand	○	○	○	×

(Notes) ○ = Available. △= Available for some years. ×= Not available. [1)] Survey-based aggregate price indices. [2)] International Financial Statistics (CD-ROM). [3)] Online Common Database (http://unstats.un.org/unsd/cdb/cdb_help/cdb_quick_start.asp). [4)] Online Statistical Database (http://stat.wto.org/StatisticalProgram/WSDBStatProgramHome.aspx?Language=E).

Table 2. Share of electronics in the exports of East Asian countries

Country	All electronics [1]			Parts and components [2]		
	1987	1995	2005	1987	1995	2005
China	3.0	12.0	32.8	0.6	5.4	12.6
Hong Kong [3]	15.8	23.7	21.4	8.6	21.1	13.6
Indonesia	0.1	5.4	9.8	0.1	1.8	4.4
Japan	25.0	27.7	20.1	9.7	17.7	14.8
Korea	19.8	28.2	32.9	7.6	19.0	19.5
Malaysia	21.6	46.7	48.6	17.9	29.9	29.9
Philippines [4]	8.8	17.1	60.8	8.3	12.1	49.5
Singapore	32.8	57.8	53.1	16.5	31.6	39.7
Taiwan	20.1 [5]	32.6	39.4 [6]	8.7 [5]	21.2	28.1 [6]
Thailand	6.9	23.4	25.4	6.7	13.7	13.6

(Notes) [1] SITC (Rev.2) 75, 76, 771, 772, 774 and 776. [2] SITC 759, 7649, 771, 772 and 776. [3] Excludes re-exports. [4] Excludes consignment exports recorded on SITC 9310. [5] 1989. [6] Vale for 2003.
(Source) UN COMTRADE, Monthly Statistics of Exports and Imports in Taiwan Area, R.O.C.

Table 3. Impact of China's exports on other East Asian countries (1)

Explanatory variable	EA8			ANIES4			ASEAN4		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Δy_i	2.525***	3.179***	1.834***	2.543***	2.944***	2.124**	2.485***	3.239***	1.592*
	(0.651)	(0.788)	(0.668)	(0.935)	(0.997)	(0.975)	(0.922)	(1.177)	(0.922)
Lag 1		- 1.699*			- 2.226*			- 1.082	
		(0.882)			(1.167)			(1.296)	
Δs_i	- 0.158*	- 0.119	- 0.183**	- 0.201	- 0.280	- 0.203	- 0.113	- 0.106	- 0.161
	(0.096)	(0.101)	(0.093)	(0.175)	(0.168)	(0.174)	(0.119)	(0.132)	(0.113)
Lag 1		- 0.016			0.269			- 0.159	
		(0.102)			(0.176)			(0.134)	
Δq_c^*	0.409***	0.277***		0.562***	0.399***		0.252***	0.107	
	(0.063)	(0.104)		(0.081)	(0.124)		(0.094)	(0.162)	
Lag 1		0.061			0.179**			- 0.045	
		(0.065)			(0.077)			(0.100)	
Δq_c^*			0.485***			0.605***			0.362***
[1987-2000]			(0.066)			(0.086)			(0.097)
Δq_c^*			0.242***			0.462***			0.023
[2001-2005]			(0.081)			(0.107)			(0.118)
D.W.	1.656	1.693	1.875	2.111	2.073	2.262	1.415	1.397	1.698
R^2 (adj.)	0.388	0.328	0.425	0.550	0.542	0.557	0.153	0.076	0.241

(Notes) Panel estimation with country fixed effects. The dependent variable and Δq_c* are the year-on-year growth rate of each country's nominal exports deflated by the US PPI. Common and country-specific intercepts are not reported. *, **, *** denote significance at 10, 5, and 1 percent, respectively. Exports of Hong Kong exclude re-exports.

Table 4. Impact of China's exports on other East Asian countries (2)

Explanatory variable	EA8			ANIES4			ASEAN4		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Δy_i	2.081**	2.460**	1.802**	2.431**	2.941**	2.375*	1.975	1.896	1.513
	(0.887)	(1.048)	(0.929)	(1.182)	(1.296)	(1.244)	(1.337)	(1.666)	(1.393)
Lag 1		- 0.783			- 2.452			0.698	
		(1.243)			(1.593)			(1.946)	
Δs_i	0.219*	0.316**	0.208	0.349	0.260	0.348	0.200	0.285	0.173
	(0.131)	(0.139)	(0.132)	(0.224)	(0.222)	(0.225)	(0.173)	(0.195)	(0.174)
Lag 1		0.229*			0.356			0.153	
		(0.138)			(0.231)			(0.192)	
Δq_c	0.209**	0.209		0.389***	0.164		0.028	0.206	
	(0.094)	(0.165)		(0.113)	(0.193)		(0.150)	(0.270)	
Lag 1		0.044			0.140			- 0.062	
		(0.098)			(0.113)			(0.152)	
Δq_c			0.238**			0.394***			0.080
[1987-2000]			(0.098)			(0.118)			(0.156)
Δq_c			0.129			0.374**			- 0.118
[2001-2005]			(0.124)			(0.149)			(0.196)
D.W.	2.099	2.177	2.128	2.250	2.161	2.256	2.061	2.133	2.107
R^2 (adj.)	0.176	0.189	0.176	0.341	0.360	0.332	0.033	0.004	0.037

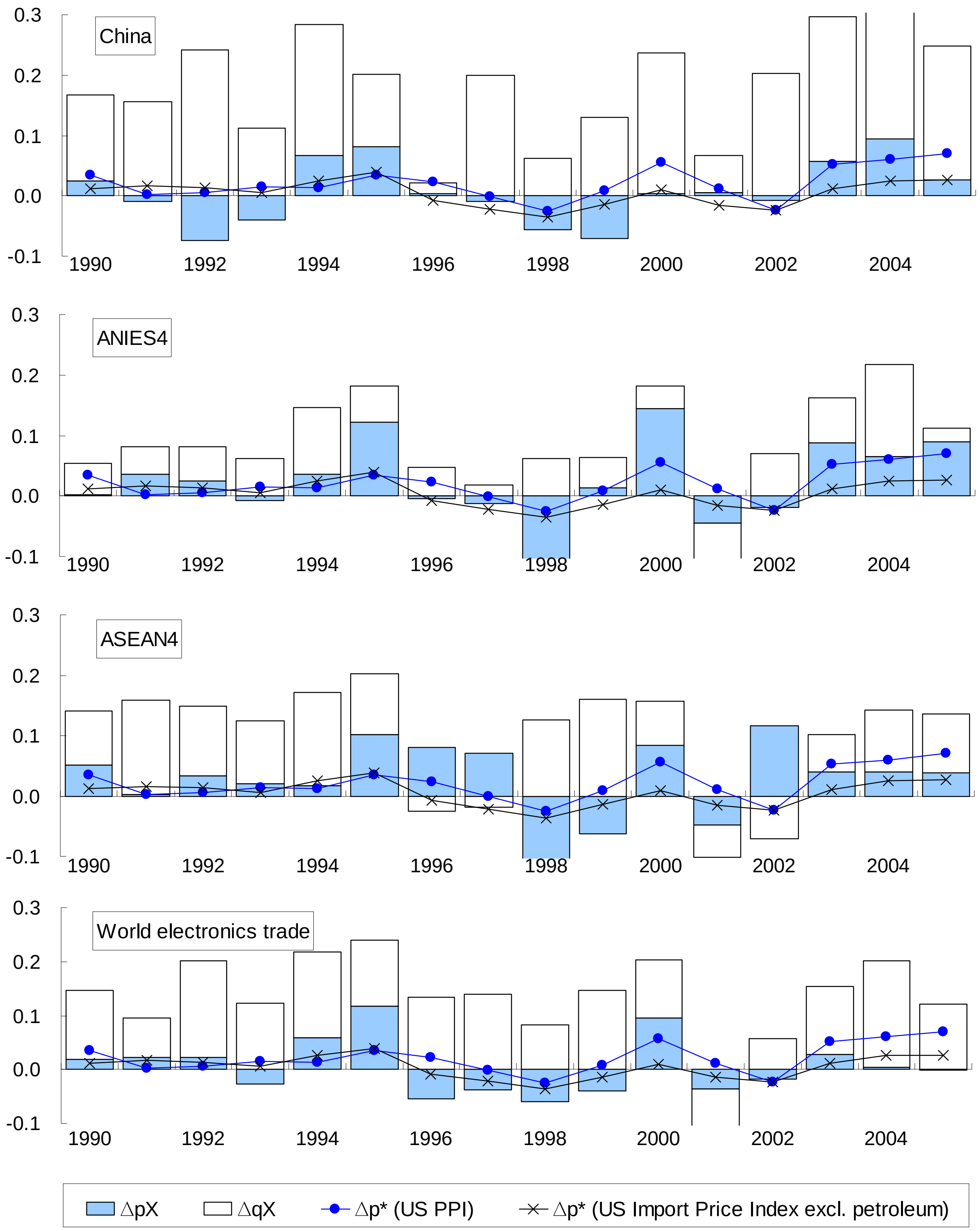
(Notes) See Table 3. The dependent variable and Δq_c are the year-on-year growth rate of each country's nominal exports deflated with our unit export value index.

Table 5. Impact of China's exports on other East Asian countries (3)

Explanatory variable	EA8				ANIES4				ASEAN4			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Δy_i	1.486*	1.269	0.690	0.714	1.592	1.060	1.068	0.782	1.552	1.450	0.561	0.651
	(0.897)	(0.960)	(0.962)	(0.998)	(1.234)	(1.337)	(1.350)	(1.406)	(1.339)	(1.440)	(1.407)	(1.475)
Δq_i^{el}	0.974***	1.097**	1.272***	1.252***	0.975**	1.208*	1.164**	1.278**	0.956*	1.040	1.355**	1.297**
	(0.370)	(0.450)	(0.392)	(0.454)	(0.494)	(0.622)	(0.532)	(0.634)	(0.546)	(0.669)	(0.573)	(0.670)
Δs_i	0.192	0.250*	0.158	0.230*	0.297	0.256	0.281	0.247	0.175	0.210	0.118	0.172
	(0.129)	(0.136)	(0.128)	(0.135)	(0.221)	(0.221)	(0.221)	(0.222)	(0.171)	(0.191)	(0.170)	(0.188)
Lag 1		0.182		0.185		0.385*		0.393*		0.070		0.060
		(0.134)		(0.133)		(0.223)		(0.224)		(0.188)		(0.185)
Δq_c	0.161*	0.070			0.340***	0.125			- 0.019	- 0.047		
	(0.094)	(0.150)			(0.113)	(0.181)			(0.150)	(0.250)		
Δq_c			0.208**	0.167			0.365***	0.166			0.053	0.107
[1987-2000]			(0.095)	(0.157)			(0.116)	(0.192)			(0.152)	(0.258)
Δq_c			- 0.031	- 0.048			0.234	0.073			- 0.296*	- 0.247
[2001-2005]			(0.129)	(0.162)			(0.159)	(0.198)			(0.204)	(0.267)
D.W.	2.048	2.097	2.108	2.153	2.159	2.036	2.189	2.045	2.031	2.057	2.125	2.176
R^2 (adj.)	0.210	0.226	0.229	0.241	0.368	0.369	0.367	0.363	0.061	0.052	0.098	0.088

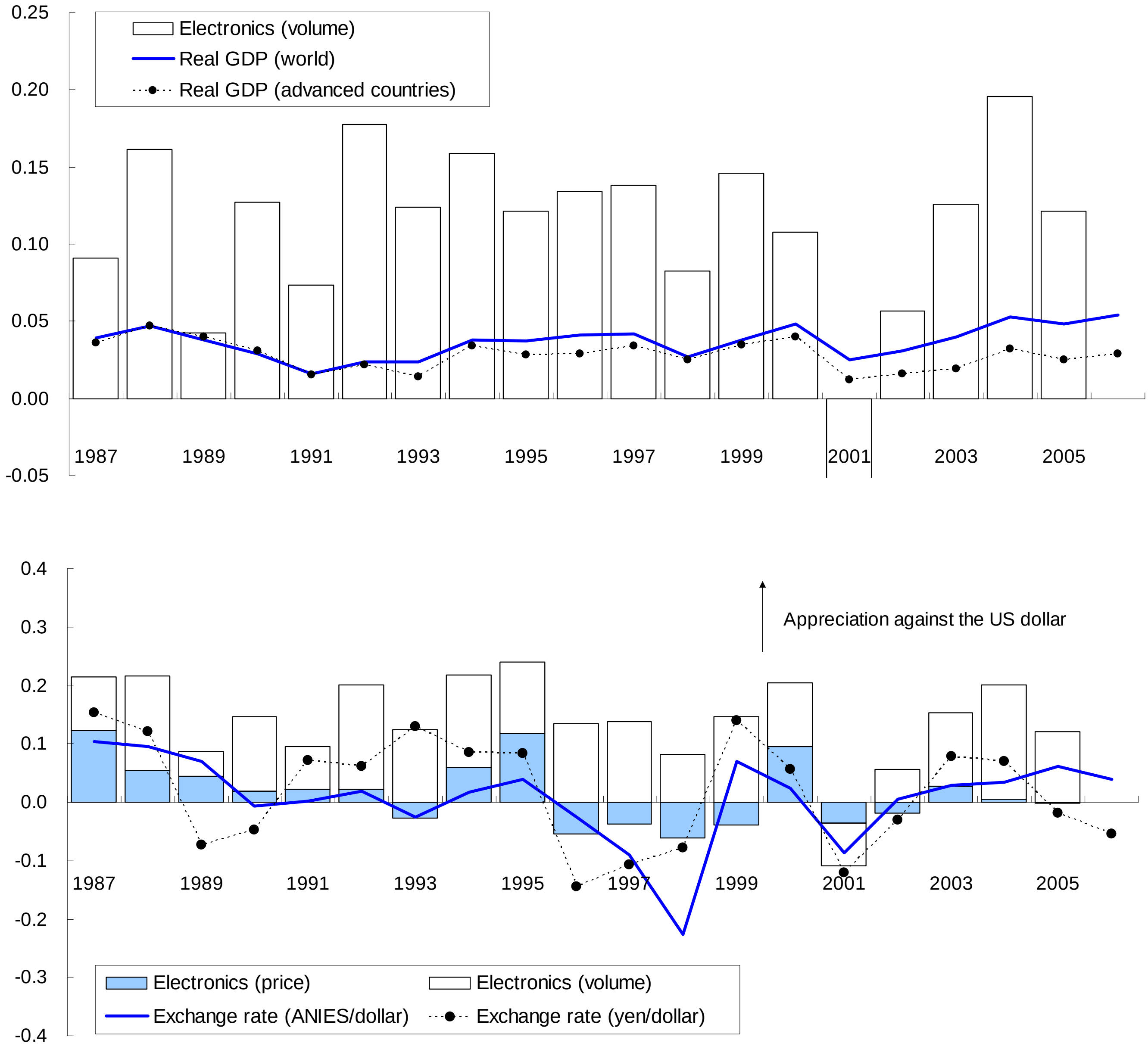
(Notes) See Table 3. See text for the definition of Δq_i^{el}.

Figure 1. Exports of East Asian countries and global trade in electronics



(Notes) All values are measured in terms of the rate of change over the previous year. The top three panels concern the aggregate exports of the respective (group of) countries. The series for ANIES4 and ASEAN4 are computed as the weighted average of those of individual countries, where the weight is the relative size of their exports in the previous year. The bottom panel plots changes in the unit value and volume indices for world trade in electronic products (SITC 75, 76, 771, 772, 774, 776).
(Source) IMF International Financial Statistics, UN COMTRADE and Taiwan customs data.

Figure 2. World electronics trade and Asian currencies



(Notes) All values refer to the rate of change over the previous year. Exchange rate (ANIES/dollar) is the rate of change in the weighted average of the nominal exchange rates vis-à-vis the US dollar of the Korean won, the Singapore dollar and the Taiwan dollar, where the weight is the relative size of the exports of each country in the previous year. Positive values in the exchange rate series indicate an appreciation vis-à-vis the US dollar.
(Source) IMF IFS, CEIC Asia Database, UN COMTRADE and Taiwan customs data.