Competitivesness In Electronics Export - Does China Dominate?

Summary

- *Data show that China continues to be a big player in the electronics sector, as pace of outsourcing and offshoring continued rapidly in recent years.*
- *However, by just looking at these headline data does not explain adequately the extent of China's dominance in the sector.*
- *A widely used metric called revealed comparative advantage (RCA), which measures sector specialization, suggests that China has strengthened its competitiveness in the labour-intensive consumer electronics arena.*
- *On the other hand, in the technology-intensive electronics components sector, China still lags behind traditional exporters such as Singapore and Taiwan.*
- *However, RCA shows clear shifts in trade patterns and China could come to dominate electronics components market in the years ahead.*

Rising Global Electronics Production

As outsourcing and offshoring activities intensified, coupled with increased demand for electronics goods, Asia's dependence on electronics production and exports has risen rapidly over the years. Available data show that since 2002, global electronics sector production has risen by more than 25% to US$1.3tn at end-2005.

Worldwide Electronics Production 2002-2005

(in US$ mn)	2002	% change	2003	% change	2004	% change	2005F
Europe	220,439	12.3%	247,539	12.7%	279,072	2.4%	285,805
Americas	317,620	-1.1%	314,137	6.4%	334,255	2.3%	341,882
Japan	162,400	11.0%	180,190	9.8%	197,807	2.3%	202,307
Asia Pacific	343,119	12.8%	386,875	16.0%	448,767	9.8%	492,684
Rest of the world	13,177	8.2%	14,255	10.4%	15,733	3.1%	16,216
Total:	**1,056,755**	**8.2%**	**1,142,996**	**11.6%**	**1,275,634**	**5.0%**	**1,338,894**

Source: Global Electronics Report, Scottish Enterprise, March 2006; UOB calculations

Asia Pacific Electronics Production 2002-2005

(in US$ mn)	2002	% change	2003	% change	2004	% change	2005F
China	120,214	22.6%	147,410	20.2%	177,130	18.7%	210,297
Hong Kong	5,548	-19.4%	4,469	0.4%	4,487	-4.1%	4,303
India	5,424	14.3%	6,200	12.9%	7,001	8.3%	7,585
Indonesia	9,446	-5.3%	8,941	5.7%	9,454	3.0%	9,734
Malaysia	38,571	7.1%	41,318	11.1%	45,905	3.3%	47,435
Philippines	11,332	0.7%	11,415	10.4%	12,597	6.6%	13,426
Singapore	36,383	8.3%	39,396	11.9%	44,101	3.1%	45,477
South Korea	62,361	18.3%	73,752	22.4%	90,285	6.3%	95,979
Taiwan	36,564	-5.3%	34,628	3.6%	35,865	-1.2%	35,448
Thailand	15,728	12.4%	17,675	13.7%	20,096	4.9%	21,074
Vietnam	1,548	7.9%	1,671	10.5%	1,846	4.3%	1,926
Total:	**343,119**	**12.8%**	**386,875**	**16.0%**	**448,767**	**9.8%**	**492,684**
% Share of Global Electronics	**32.5%**		**33.8%**		**35.2%**		**36.8%**

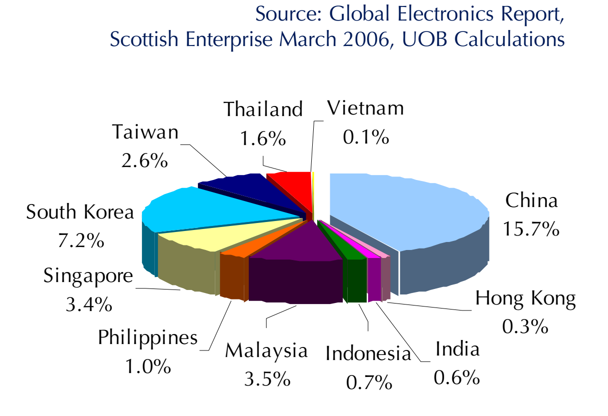
Source: Global Electronics Report, Scottish Enterprise, March 2006; UOB calculations

In terms of Asia Pacific countries' shares of global electronics, the size has risen a disproportionately large 44% since 2002, to US$492bn at end-2005. This means Asia Pacific countries represent a sizeable 37% share of global electronics sector, up from 33% in 2002.

China a Leading Electronics Producer

From the data above, due to such obvious advantages as land and labour costs, tax structure and others, China is the largest producer among the Asian countries. In 2005, China is estimated to have produced US$210bn worth of electronics product, the largest in Asia (followed by Japan's US$202bn) and second largest in the world compared to US$275bn for the US. As shown in the chart below, China's share in global electronics sector is close to 16%, more than twice the next largest producer (South Korea's 7.2%).

Asia Pacific Electronics Production, 2005

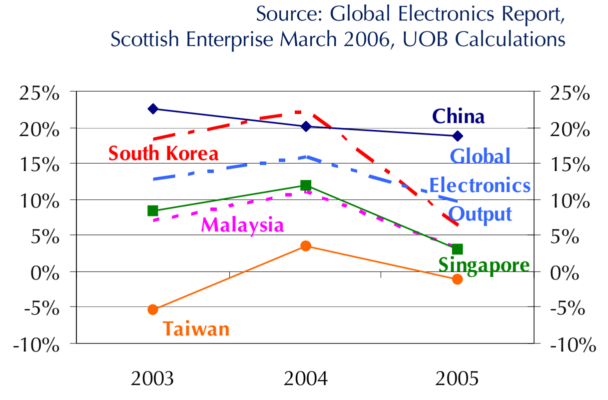


One reason for the rise in China's share is the increased moving of production, not just from more developed countries, but also from traditional electronics manufacturing centres such as Singapore, Malaysia, and Taiwan, in recent years.

As shown in the chart below, China's electronics output growth has been maintained consistently at double-digit growth rates over the past 3 years and also above the overall industry's growth rate, while other countries have moderated. In particular, Taiwan's electronics output has actually shrunk in 2005 compared to 2002, a reflection of increased prowess of China's manufacturing sector.

This raises the concerns of China's dominance in electronics production and whether there is room for other traditional electronics producers, such as Singapore and Taiwan.

Asia Pacific Electronics Production
Annual Growth Rates: 2002-2005



Measuring Competitiveness Using RCA

The data above show that China is a dominant force in the electronics sector, in terms of absolute size and pace of growth. However, sheer volume itself may not translate to exports competitiveness, as the issue is more complex than just the constant shifting of production to low wage countries.

To get a clearer picture, we turn to a widely used measure called revealed comparative advantage (RCA)[1] , which measures the comparative advantage of a nation's sector (electronics in this case) against other nations', for instance in the substitution between labour-intensive and capital/technology-intensive activities. This is normally measured on the basis of a country's specialization in (net) exports relative to the world. A variant of the RCA formula is presented in the Appendix.

An RCA value of greater than 1 suggests that the country has comparative advance in that sector (electronics in this case) vs. others, and the higher the figure, the greater comparative advantage it has.

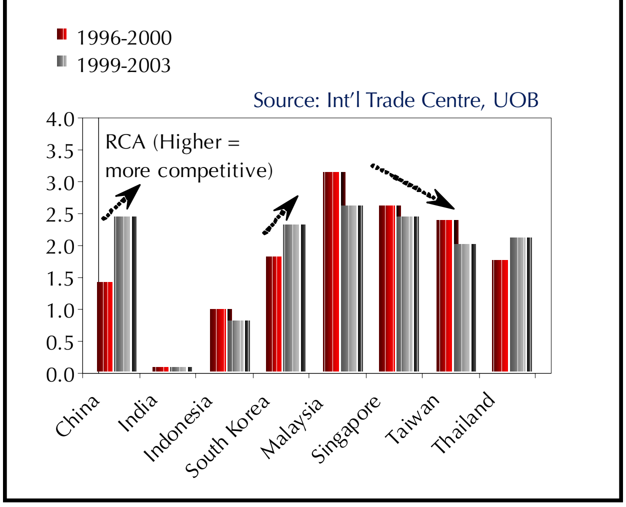
[1] RCA was pioneered by Bela Balassa in 1965. See for example B Balassa, (1965) "Trade Liberalization and 'Revealed' Comparative Advantage", The Manchester School of Economic and Social Studies, 33: 99-123; B. Balassa (1979) "The Changing Pattern of Comparative Advantage in Manufactured Goods", Review of Economics and Statistics, 61 (May): 259-266.

China's Competitiveness Rising in Consumer Electronics

Drawing on data in consumer electronics and electronics components from the International Trade Centre (www.intracen.org), an agency of the United Nations Conference on Trade and Development (UNCTAD) and the World Trade Organization (WTO), China indeed has seen a sharp improvement in comparative advantage in the consumer electronics sector in recent years.

At the same time, traditional electronics exporters such as Singapore and Taiwan saw competitiveness deteriorating in this area of electronics exports, as production moved to China. The more obvious decline is observed in Malaysia, which dropped its RCA reading from 3.0 to about 2.5. This reaffirms views of China's strengths in labour-intensive activities.

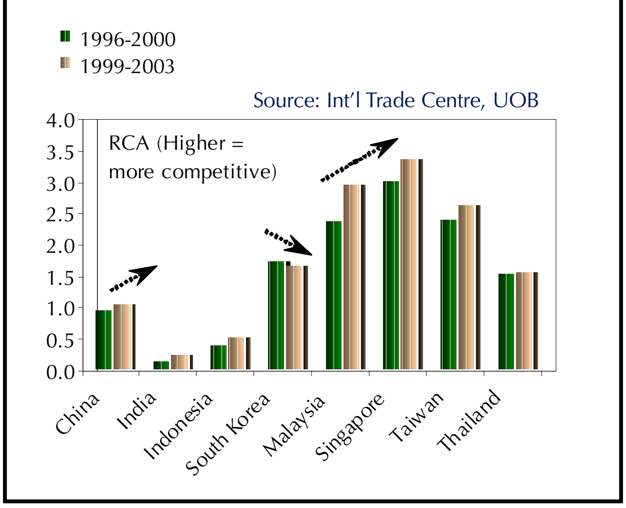
Revealed Comparative Advantage: Consumer Electronics



But Picture Changes in Electronics Components

On the other hand, the picture changes once we look at the electronics components segment of the industry. In this case, China saw only marginal improvement and stayed barely above 1, while traditional exporters such as Singapore and Taiwan continued to gain ground. Overall, Singapore still retains its lead in competitive edge in this segment and one key driver is the continued move up the value added chain and move away from labour intensive activities. Nevertheless, with China's inherent advantages (in land and labour), it will surely catch up with the other countries.

Revealed Comparative Advantage: Electronic Components



Conclusion

While the global electronics data appear to show China dominating in electronics sector, the revealed comparative advantage (RCA) measurement suggests the dominance is not across the board.

In particular, RCA shows shifting of competitive trends in favour of China in the area of consumer electronics. However, in the more technology-intensive electronics components segment, China still lags behind traditional exporters such as Singapore, which has had a headstart in the electronics sector.

One reason for traditional exporters such as Taiwan and Singapore still holding a comparative advantage is due to industrial/economic policy that encourages the sector (such as tax incentives, grants/credits, etc), but also the exploiting of existing advantages (e.g. skilled labour force, efficiency). For instance, the recent announcement that Seagate will invest an additional S$1.3bn to build its third recording media plant in Singapore by 2008, reaffirming the key in leveraging existing advantages, such as skill sets. All in, Singapore-based facilities of Seagate, Showa Denko and Hoya mean that Singapore produced in 2005 about 25% of global hard disk recording media, a sophisticated component of hard disk drives.

This suggests that for now, there may still be room to accommodate other players in Asia's electronics sector, although the window may be closing in the years ahead. This is because, China, faced with a gradual appreciation of the RMB, rising labour and land costs, and change in government policy (as reflected in the recent restructuring in export rebates which favour higher value added activities), is also forced to move up the same value added chain.

A Variant of the Formula for Revealed Comparative Advantage (RCA)

Source: Li, Kui-wai and Bender, Siegfried; "Relative Advantage of Manufacture Exports Among World Regions: 1981-1999", March 2003, City University of HK

$$RCA_i = \frac{\left\{ \dfrac{X_{ij}}{\left[\left(\sum_i X_{ij} \right) - X_{ij} \right]} \right\}}{\left\{ \dfrac{\left(\left(\sum_j X_{ij} \right) - X_{ij} \right)}{\left[\left(\sum_j \sum_i X_{ij} - \left(\sum_j X_{ij} \right) \right) - \left(\left(\sum_i X_{ij} \right) - X_{ij} \right) \right]} \right\}}$$

where

X_{ij} = exports of sector i in country j

$\sum_i X_{ij}$ = total exports of country j

$\sum_j X_{ij}$ = world exports of sector i

$\sum_j \sum_i X_{ij}$ = total world exports