Surfing the Waves of Globalization: Perspectives from Trade

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Introduction

- The world economy is in turmoil.
- Protectionism in the U.S. is exploding.
- Competition between Asian economies is fierce.
- How can Japan and Asia navigate through these shoals ?

Overview

- I want to draw lessons from Asia's flagship industry, electronics, to help answer this question.
- I will take a historical perspective, starting with the rise of the Japanese electronics industry after World War II and continuing to the explosion of electronics exports from China.
- I will consider how Asia can fight protectionism and how Japan can face intense competition and technological change.

How Japan assimilated technologies

- To grow after World War II, Japan needed to assimilate new technologies.
- America's Bell Labs invented the transistor in 1946, and within three months the Japanese government–sponsored Electro-Technical Laboratory assembled a group led by Makoto Kikuchi to study transistors. When new issues of *Physics Review*, the *Journal of Applied Physics,* and other scientific publications arrived at the library for U.S. armed forces, these and other researchers would study and copy by hand articles on transistors and related technologies (Johnstone, 1999).
- As a result of an antitrust ruling, Bell Labs provided transistor technology to interested companies. Tadashi Sasaki from Kobe Kogyo visited the transistor's inventor at Bell Labs in 1951, learning about the technology and receiving geranium that could be used to make transistors. His company then signed a licensing agreement with RCA that gave it access to knowhow and in 1953 it became the first Japanese company to mass produce transistors.

Sony

- In 1953 Totsuko (later renamed Sony), signed a licensing agreement with Western Electric to make transistors. Totsuko formed a study group on transistors and sent Kazuo Iwana on a study tour of U.S. factories and laboratories. As he took copious notes, researchers at Totsuko studied the Bell Labs manual entitled *Transistor Technology*. In 1954 they succeeded in manufacturing their first transistor. They used these to make radios that could compete with radios made using conventional parts.
- As Sony succeeded in making transistor radios, other Japanese companies imitated them. In 1959 Japan exported 6 million radios to the U.S. To escape the cutthroat competition, Sony produced high-end radios and in 1960 used transistors to manufacture black and white TVs.
- In 1968 Sony patented the aperture-grille technology and used it to make Trinitron color televisions. The picture quality was bright, and Sony was able to charge a premium. Sony's patents protected it for the next 20 years from strenuous price competition in the TV market.

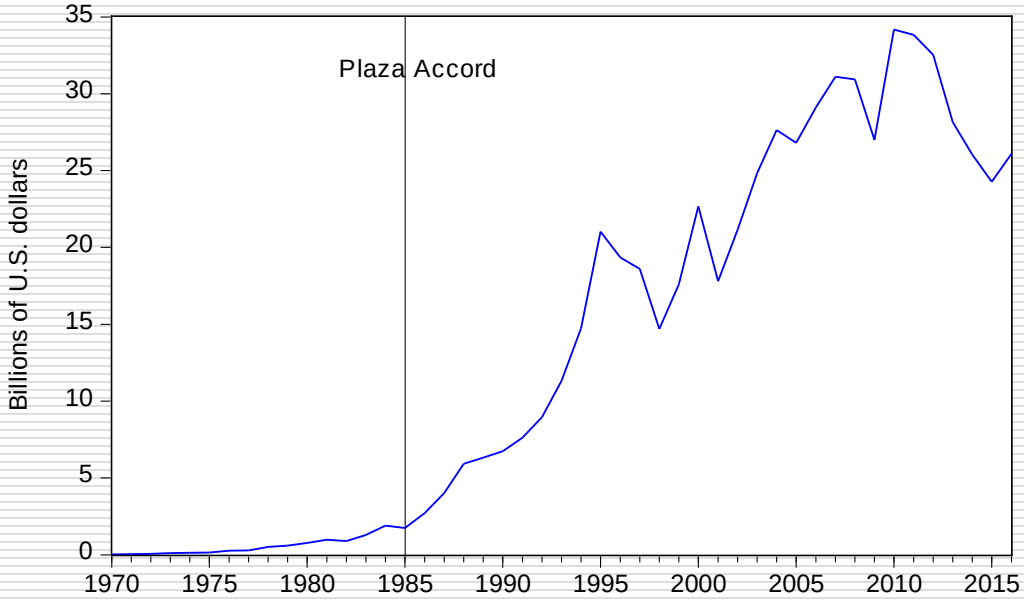
Japanese engineers

- Transistors and semiconductors helped Sony succeed in radios and TVs. In 1973 semiconductor research at Sony was dying and Iwana told Sony engineers to focus on the charge coupled semiconductor device (CCD). The CCD images were covered with spots. Makoto Kikuchi had learned at the Electro-Technical Laboratory that spots come from metal impurities on silicon crystals and the engineers solved this problem. In 1985 Sony marketed an 8 mm camcorder incorporating CCD technology. The camcorder became one of Sony's most profitable products.
- Sony engineers had freedom to do research at that time.
- Japanese engineers until 1975 also read much literature and philosophy in high school and college, while Japanese engineers now specialize in narrow fields and do not study much literature, language, or history (Sawa, 2013).

The Plaza Accord

- Other Japanese electronics companies (e.g., Matsushita) also succeeded and Japan became the leading electronics exporter in 1976.
- Japanese semiconductor production exploded in the 1980s.
- Rapid import penetration by Japan and U.S. trade deficits sparked consternation and protectionist pressure in the U.S.
- In September 1985 the G5 countries agreed to appreciate against the U.S. dollar to fight protectionism and the U.S. agreed to lower its budget deficit.
- The Japanese yen appreciated by more than 50 percent and Japanese exporters lost price competitiveness. To reduce costs, Japan continued producing technology-intensive parts and components domestically, and shipped these to the rest of Asia for assembly and re-export.

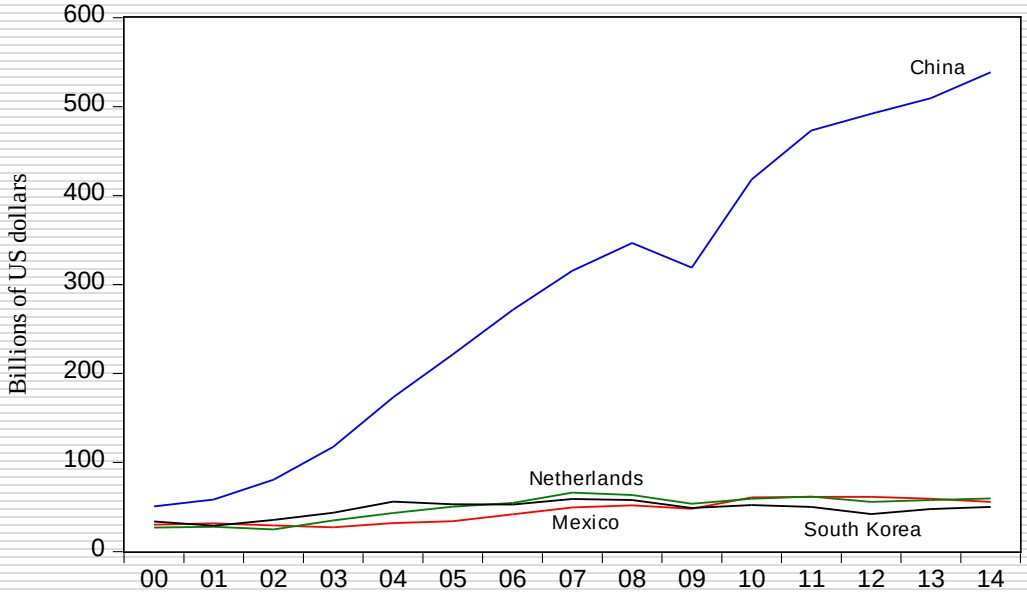
Japanese electronic parts and components exports to East Asia and ASEAN



Emergence of Korean, Taiwanese, and Chinese electronics industries

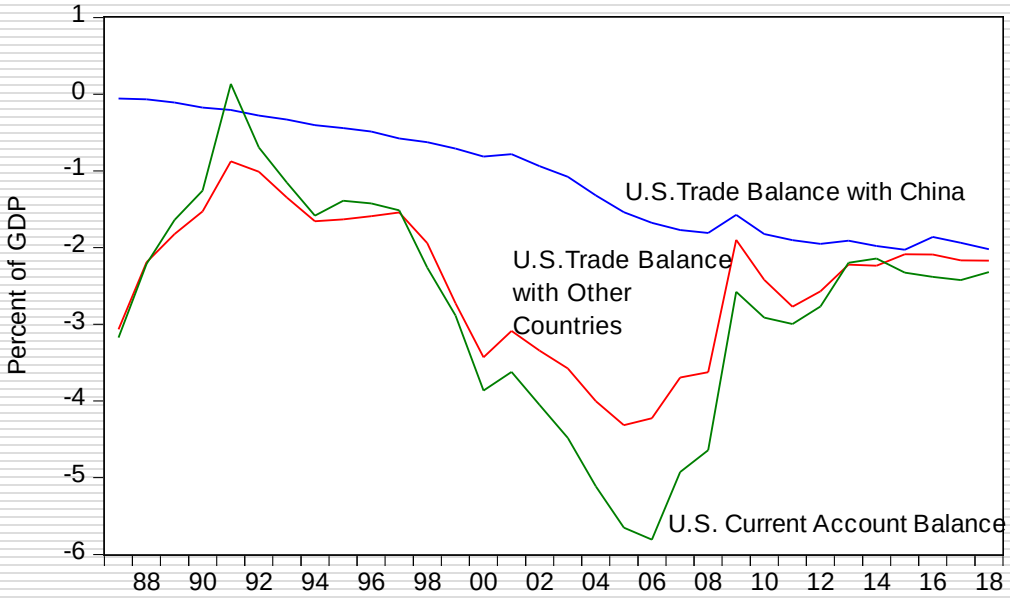
- Japan transferred production to Taiwan and Korea in the 1980s, to ASEAN in the 1990s, and to China after its WTO Accession in 2001.
- Taiwanese and Korean firms leveraged Japanese and other technologies with domestic R&D. TSMC and Samsung became leading semiconductor producers in the 1990s. Samsung became the leader in TVs and cellphones in the 2000s.
- China's WTO accession gave electronics firms confidence to shift production to China. Exports of computers, phones, and consumer electronics from China now exceed exports from the next 14 leading exporters combined.
- China's value-added in electronics is increasing, and competition between China, Korea, Japan, and Taiwan is fierce. Cooperation between these economies in electronics value chains is also intricate and well-developed.

Final electronics goods exports from the world's four leading exporters.



Note: Final electronics goods include computers, telephones, and consumer electronics.
Source: CEPII-CHELEM database.

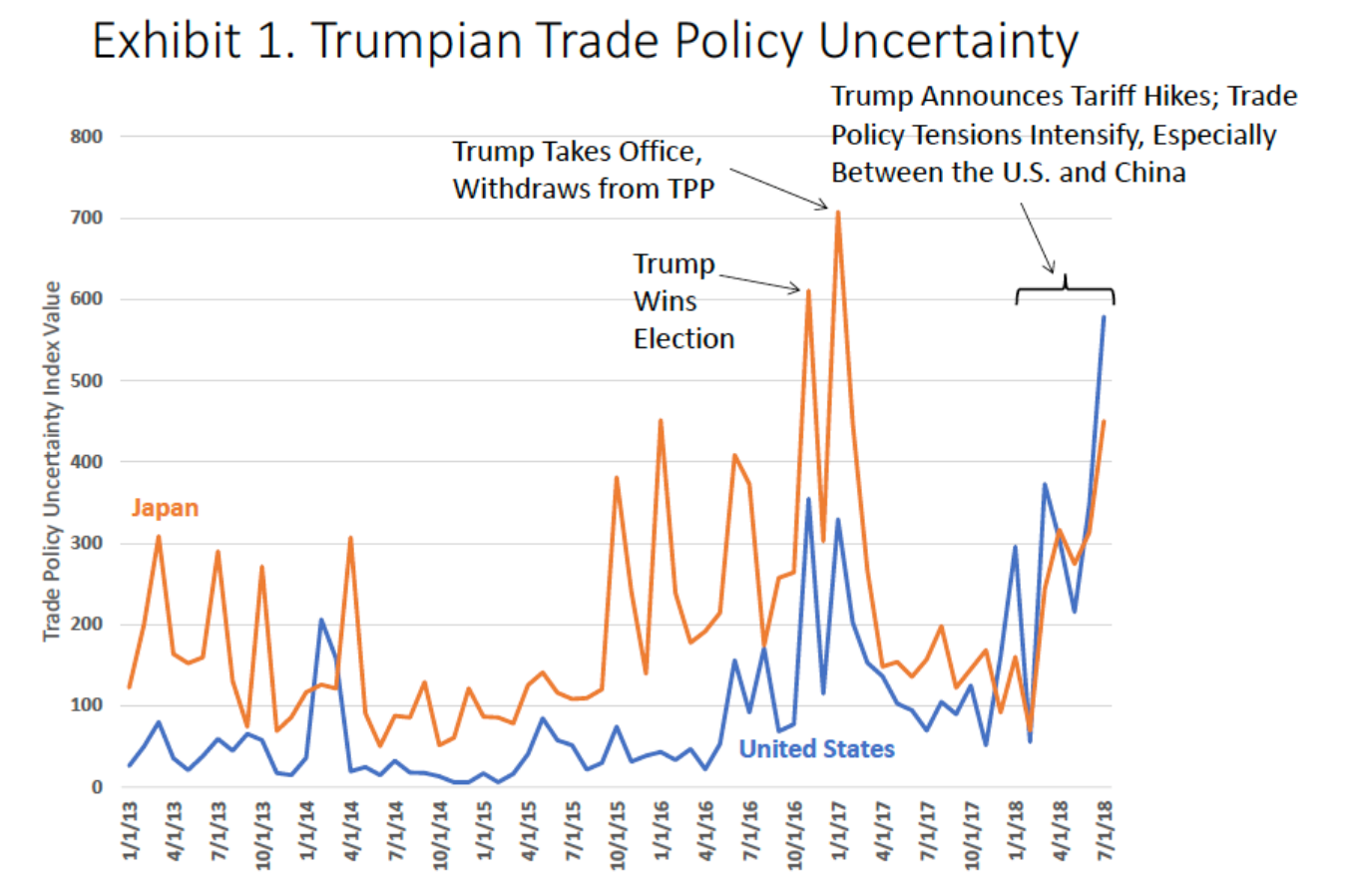
Huge imbalances continue between China and the U.S.



These imbalances produce destructive protectionism in the U.S. and uncertainty

- President Trump placed tariffs on imports of solar panels, washing machines, steel, aluminum, and Chinese goods.
- Trump is considering tariffs of 25% on auto and auto parts imports.
- Trading partners have retaliated.
- Uncertainty has soared

Trade Policy Uncertainty in Japan and the U.S.



- Source: Davis (2018).

Regression of returns on Japanese stock market on uncertainty and other variables

Independent Variable	Coefficients (HAC Standard Errors)		
Japanese Economic Policy Uncertainty	-0.029** (0.012)		
Japanese Trade Policy Uncertainty		-0.0067* (0.0037)	
Global Economic Policy Uncertainty			-0.024** (0.012)
VIX Index	-0.038** (0.018)	-0.046*** (0.018)	-0.031 (0.019)
Return on World Stock Market	0.63*** (0.059)	0.62*** (0.061)	0.64*** (0.063)
Yen/Dollar Exchange Rate	0.49*** (0.088)	0.49*** (0.089)	0.52*** (0.098)
Crude Oil Price	0.013 (0.029)	0.018 (0.029)	0.0035 (0.030)
Adjusted R-Squared	0.533	0.527	0.541
Sample Period	September 1993-July 2018	September 1993-July 2018	February 1997-July 2018

Exchange rate appreciations and rebalancing

- Rebalancing away from the U.S. can help to reduce protectionism and uncertainty about protectionism.
- Since 2010, more than 80 percent of China's merchandise trade surplus has been due to electronics trade, and in all but one year since 2010 China has had the largest overall merchandise trade surplus in the world.
- Since much of the value-added of electronics goods come from upstream Asian countries, this is really an Asian surplus.
- If Asian supply chain countries appreciated together, would this reduce the surplus?
- If so, appreciations would be less disruptive to trade than tariffs.
- Appreciations would also obviate uncertainty about protectionism.

Regression of Chinese final electronics exports on exchange rates in supply chain countries and renminbi exchange rate

Table 1 Panel Dynamic OLS estimates for China's Final Electronics Goods Exports to 20 Countries

	(1)	(2)	(3)	(4)	(5)	(6)
Weighted Exchange Rates in Supply Chain Countries	-1.45***	-2.10***		-3.38***	-1.89***	
	(0.41)	(0.11)		(0.11)	(0.10)	
Renminbi Exchange Rate	-0.76*		-2.27***	1.82***		0.28*
	(0.45)		(0.11)	(0.09)		(0.15)
GDP in Importing Countries	0.40	1.00**	1.14***	0.76**	2.85***	4.33***
	(0.51)	(0.50)	(0.41)	(0.20)	(0.16)	(0.18)
Fixed Effects Included	Yes	Yes	Yes	Yes	Yes	Yes
Time Trend Included	Yes	Yes	Yes	No	No	No
Adjusted R-squared	0.988	0.987	0.986	0.974	0.942	0.899

Regression of Chinese phone and computer exports on supply chain exchange rates and renminbi exchange rate

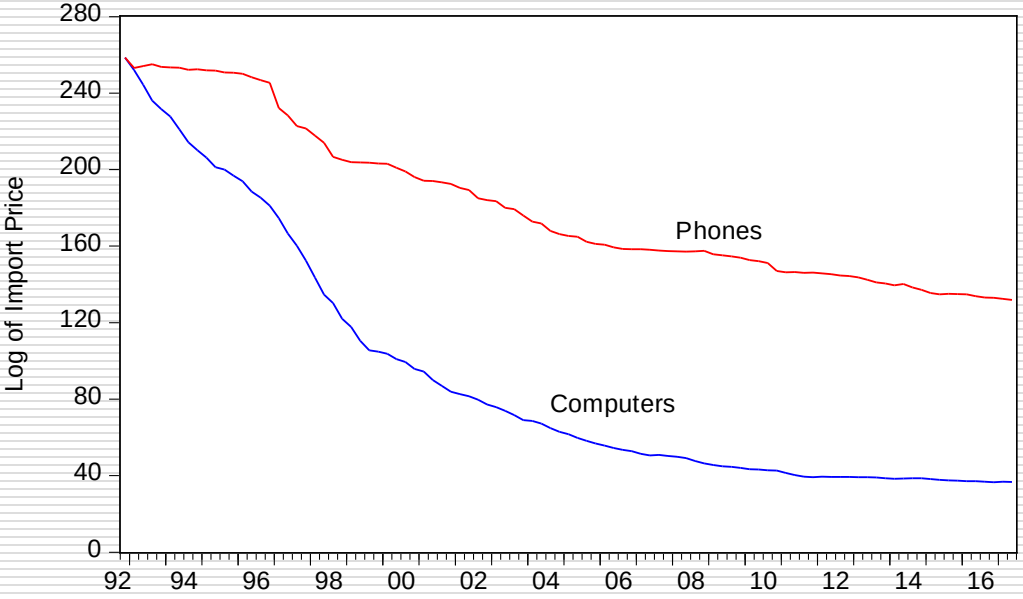
Table 2 Panel Dynamic OLS estimates for China's Telephone Exports [columns (1)-(3)] and Computer Exports [columns (4)-(6)] to 20 Countries

	(1)	(2)	(3)	(4)	(5)	(6)
Weighted Exchange Rates in Supply Chain Countries	-1.95***	-2.02***		-0.83*	-2.14***	
	(0.47)	(0.12)		(0.48)	(0.14)	
Renminbi Exchange Rate	-0.18		-2.12***	-1.53***		-2.34***
	(0.50)		(0.13)	(0.52)		(0.13)
GDP in Importing Countries	0.76	1.90***	1.83***	0.51	1.21**	1.08***
	(0.58)	(0.54)	(0.52)	(0.59)	(0.59)	(0.54)
Fixed Effects Included	Yes	Yes	Yes	Yes	Yes	Yes
Time Trend Included	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.981	0.978	0.976	0.983	0.981	0.981

Results

- The results indicate that exchange rates in upstream supply chain countries are more important for phone exports and that the renminbi exchange rate is more important for computer exports.
- How can we understand these findings? Computers may have become more commoditized than smartphones over the sample period, and thus compared to phones less of the value added of computers may have come from cutting edge parts imported from advanced Asian economies.
- Some support for this hypothesis comes from examining price indices for computers and for phones. The figure on the next slide indicates that computer prices have fallen much more than telephone prices.

Price indices for computer equipment and telephone equipment



Note: The price index for computer equipment is for the HS classification number 8471 and the price index for telephone equipment is for the HS classification 8517.
Source: U.S. Bureau of Labor Statistics.

Computers are more commoditized than phones

- The collapse in computer prices suggests that computer producers have no pricing power and that these goods have become commoditized. In contrast telephone prices have not collapsed, suggesting that goods such as smartphones still have advanced features that enable producers to maintain some pricing power.
- These technologically advanced features such as accelerometers or gyroscopes are likely to be produced partly in developed Asian economies such as Japan, South Korea, and Taiwan. This could explain why exchange rates in these upstream countries matter more for telephone exports than for computer exports.

Exchange rate policy

- The electronics sector is now the predominant sector within East Asian supply chains, and 80 percent of China's trade surplus arises from trade in final electronics goods. Taiwan, Korea, Japan, and other upstream countries ship parts and components to China where they are used to make final electronics goods for re-export. The work above indicates that exchange rates throughout the supply chain exert important effects on these exports.
- A concerted appreciation of East Asian currencies against the U.S. dollar is often hindered because countries compete extensively with each other in the U.S. and other third markets. Individual countries resist appreciation because they do not want to lose price competitiveness relative to their neighbors. If regional monetary authorities could dialogue extensively with each other about monetary policy and respond together to market forces, they might be able to achieve a joint appreciation and thus not lose price competitiveness relative to each other.
- An Asian Plaza Accord may be possible, whereby East Asian countries agree to appreciate together and the U.S. agrees to eschew protectionism and reduce its budget deficit.

How could Asian currencies appreciate together?

- Does the Bank of Japan need to focus on a 2 percent inflation target?
- Do Korean and Taiwanese government pension funds need to invest so much abroad?
- Does China need to give loans at high rates to Belt and Road countries?
- These actions all weaken exchange rates.

Benefits of appreciating together

- A joint appreciation would increase final goods imports into East Asian countries. Thorbecke (2011) found that currency appreciations in East Asia would raise the purchasing power of consumers in the region and increase their consumption imports. Thus concerted appreciations in the region could help to rebalance trade in East Asia and help workers enjoy more of the fruits of their labors.
- A concerted appreciation would also help to maintain intra-regional exchange rate stability. Kiyota and Urata (2004) reported that exchange rate stability promotes the flow of FDI in the region. Hayakawa and Kimura (2009) found that exchange rate volatility promotes intra-East Asian trade and especially intermediate goods trade within regional production networks. Schnabl and Spantig (2016) reported that exchange rate volatility reduces growth for ten East Asian countries.

Japan and Asia should pursue free trade agreements (FTAs)

- Japan and Asia should pursue free trade with as many countries and regions as possible.
- If American markets are closed or uncertain, access to European, Asian, and other markets becomes more important.
- If President Trump feels excluded from FTAs, he may want to join.

How can Japan handle intense competition and rapid technological changes such as the rise of AI?

- View volatility and disruption as opportunities.
- Invest in human capital so workers can confront challenging environment.
- Invest in nutrition and health during first 1,000 days of life.
- Provide engineers with a well-rounded education including in the humanities.
- Allow engineers to be creative.
- Focus on craftsmanship (e.g., image sensors at Sony).

Technology & the humanities

- “Technology alone is not enough. It’s technology married with liberal arts, married with humanities, that yields the results that make our hearts sing.“

  Steve Jobs

- Thank You