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Understanding the U.S.-China Trade War

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ABSTRACT

Three major concerns drove the U.S. into initiating the trade war, and they are (a) the concern that China's chronically large trade surplus was depressing job creation in the U.S. (b) the concern that China was using illegal and unfair methods to acquire U.S. technology at an effectively discounted price; and (c) the concern that China seeks to weaken U.S. national security and its international standing. On the dispute over China's exchange rate and trade imbalance, the first conclusion is that it was marked by analytical confusion over the meaning of the term 'equilibrium exchange rate'. The second conclusion is that China's trade imbalance reflects the economic conditions in both China and U.S., and that the efficient and fair solution of the problem requires policy changes in both countries. On the industrial policy dispute, the first conclusion is that the issue of forced technology transfer is largely a dispute about China using its market power to benefit itself at the expense of its trade partners. The second conclusion is that China's use of market power can last only until the other large countries could unite and retaliate as a group. The inevitability of retaliation means that China should replace the joint-venture (JV) mechanism for technological diffusion with other ways to strengthen its technological capability. On the U.S. concern about whether China trade weakens its national security, the first conclusion is that the notion of national security that is commonly adopted in the U.S. trade policy debate is ignorant about the primary determinants of U.S. capability in innovation. By focusing instead mainly on how to hold down China technologically, the long-run outcome will be a technologically weaker U.S. and hence, a more vulnerable U.S. The second conclusion is that the U.S. must identify a clear, short list of critical technologies and critical infrastructure for the recently reformed Committee for Foreign Investment in the United States (CFIUS) to cover, and update this list constantly. Otherwise, the broad and changing nature of notions about national security would allow the bureaucratically driven phenomenon of mission-creep to steadily expand the coverage of the CFIUS process, thereby steadily rendering CFIUS to be operationally capricious. Our principal policy suggestion to China is that, because China's economy in 2018 is very different from that in 1978 (e.g. many parts of China now look like Singapore and China is Africa's biggest donor), there should be more reciprocity in China's trade and investment relations with the advanced economies despite China's status as a developing economy under WTO rules. Our principal policy suggestion to President Trump is to stop equating strategic competition with economic competition. Strategic competition is normally a zero-sum game. While fair economic competition is usually a

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zero-sum game in the short run, it generally creates a win-win out-
come in the long run.

Introduction

As this article goes to press in early August 2018, China and the U.S. are engaged in a trade war that looks very likely to escalate. The U.S. implemented a 25 percent tariff on 6 July 2018 on Chinese imports that had amounted to $34 billion in 2017 and is planning to impose the 25 percent tariff on additional Chinese imports worth $16 billion on 23 August 2018. And China has responded in a tic-for-tac manner to this two-part U.S. tariff action.

In reaction to the Chinese retaliation, the U.S. has announced that it would impose 25 percent tariff on another $200 million worth of Chinese goods. In quick reply, China promised to respond with 25 percent tariff on $60 billion more of U.S. imports. Why did China not match the U.S. action in scale in this likely second round of the trade war? The answer is that China's export of goods to the U.S. was $505 billion in 2017, while U.S. exports to China was only $130 billion.

Needless to say, both the U.S. and China have been hurt by the trade war. $27 billion of U.S. agricultural exports have been adversely affected by Chinese tariffs implemented on 6 July 2018, and the U.S. now plans to dole out $12 billion in subsidies to U.S. farmers. China has eased up on credit growth in the last month to offset the negative consequences of U.S. tariffs, effectively suspending its efforts to reduce the debt-GDP ratio which stands at the dangerously high level of 300 percent compared to 170 percent in 2009.[1]

Three major concerns drove the U.S. into initiating the trade war, and they are (a) the concern that China's chronically large trade surplus was depressing job creation in the U.S.; (b) the concern that China was using illegal and unfair methods to acquire U. S. technology at an effectively discounted price; and (c) the concern that China seeks to weaken U.S. national security and its international standing.

China's journey in external economic engagement has been marked by many disputes, and it is safe to predict that its future course will generate new disputes. This paper hopes to help reduce the intensity and frequency of these future international economic disputes by evaluating (a) two protracted and cantankerous external economic disputes of the last 40 years – the disputes over China's chronic large trade surplus and over China's industrial policy – and (b) the hypothesis that trade with China undermines U.S. national security.

To anticipate the coming discussion in the paper, we will summarize some key conclusions here.

On the dispute over China's exchange rate and trade imbalance, the first conclusion is that it was marked by analytical confusion over the meaning of the term 'equilibrium exchange rate'. The second conclusion is that China's trade imbalance reflects the economic conditions in both China and U.S., and that the efficient and fair solution of the problem requires policy changes in both countries. The third conclusion is that the dispute on exchange rate misalignment has diverted attention away from better solutions that (a) address the underlying structural factors causing the trade imbalance,

and (b) improve the of U.S. job transition programs whose inadequacy has exacerbated U.S. unhappiness with trade imbalance.

On the industrial policy dispute, the first conclusion is that the issue of forced technology transfer is largely a dispute about China using its market power to benefit itself at the expense of its trade partners. The second conclusion is that China's use of market power can last only until the other large countries could unite and retaliate as a group. The inevitability of retaliation is why we do not see the imposition of optimum tariffs by large importers and which is why China should replace the JV mechanism for technological diffusion with other ways to strengthen its technological capability. The third conclusion is that the state subsidies component of China's industrial policy is too large because it has been used too often as macro-stabilization and socio-stabilization instruments, resulting in the phenomena of ghost cities and zombie firms.

On the U.S. concern about whether China trade weakens its national security, the first conclusion is that the notion of national security that is commonly adopted in the U.S. trade policy debate is ignorant about the primary determinants of U.S. capability in innovation. By focusing instead mainly on how to hold down China technologically, the long-run outcome will be a technologically weaker U.S. and hence a more vulnerable U. S. The second conclusion is that the U.S. must identify a clear, short list of critical technologies and critical infrastructure for the recently reformed Committee on Foreign Investment in the United States (CFIUS) to cover, and update this list constantly. Otherwise, the broad and changing nature of notions about national security would allow the bureaucratically driven phenomenon of mission-creep to steadily expand the coverage of the CFIUS process, thereby steadily rendering CFIUS to be operationally capricious.

The dispute over China's chronic trade surpluses, and its exchange rate policy

Figure 1 uses the GDP to normalize the trade imbalance to give a better measure of its impact on the economy. China's trade account surplus has been over 2 percent of GDP since 1996, averaged over 5 percent in the 2005–2008 period, and attained 8.6 percent in 2007. The relevant point is that China's trade surpluses in the last 20 years (1997–2016) has not only been persistent, but also large enough in size – the average amount being 3.8 percent of GDP – to create much discontent in many developed countries, particularly in the U.S., about displacement of labor by imports from China.

Figure 2 shows the overall U.S. trade account balance and the bilateral U.S.-China trade account balance over the 1992–2017 period.[2] The overall U.S. trade account deficit enlarged rapidly from 1.52 percent of GDP in 1992 to peak at 6.04 percent of GDP in 2006. The overall U.S. trade account deficit has settled at about 4 percent of GDP for the past five years, 2013–2017. The fact that post-crisis U.S. continues to borrow a large amount annually from overseas suggests that the overspending and under-saving behavior of the U.S. economy is structural in nature not cyclical. The outstanding practitioner of these twin traits is the Government of the United States, whose military expenditure continues to soar, and whose taxes are cut further to pay off the plutocrats who had financed the elections.
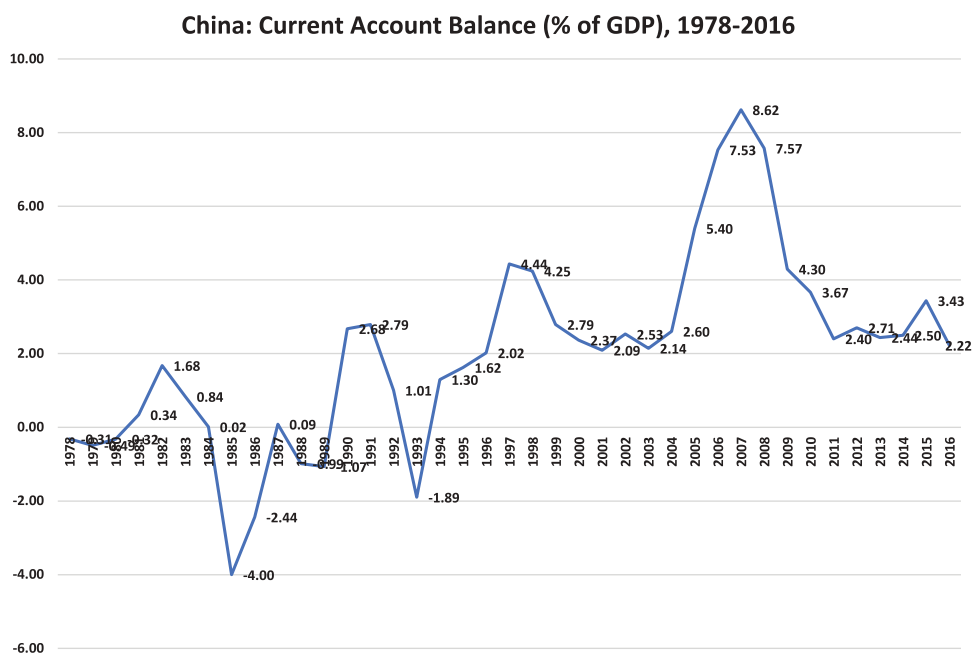
China: Current Account Balance (% of GDP), 1978-2016

Figure 1. China: Current Account Balance in Balance of Payments, 1978-2016.

Given the large shrinkage of the U.S. trade balance after 2006, and the expansion of the bilateral U.S.-China trade deficit after 2006, the latter now accounts for a much larger part of the former. The bilateral U.S.-China trade deficit has grown from about 17 percent of the overall trade deficit in 1993–1994 to 46 percent in 2016–2017. It is no wonder that the U.S. policy community and U.S. general public have now been persuaded to regard China as the major cause of its de-industrialization by imports. Many analysts have accused China of the mercantilist policy of keeping the Renminbi (RMB) undervalued vis-à-vis the U.S. Dollar (USD).

The impact of China's trade and industrialization policies on the U.S. economy has doubtlessly been real and substantial, but it is unfortunate that a lot of the discussion has been characterized by analytical confusion over basic economic concepts. Nothing reflects the pervasive misunderstanding of U.S.-China economic interaction better than the appearance of two essays on the page A17 of the U.S. edition of the *Wall Street Journal* on 7 May 2018.

At the top of that page in the *Wall Street Journal*, Niall Ferguson and Xiang Xu (2018) concluded that:

> What's required, in short, is a new balance. This can be achieved only if China gives ground and commits itself to reducing its bilateral trade deficit with the U.S.

Many readers of the *Wall Street Journal* of that day must have experienced cognitive dissonance when they reached the second essay at the bottom of the same page. This second essay is an obituary to the famous economist, Leland Yeager, by his student, David Henderson (2018), who noted that:
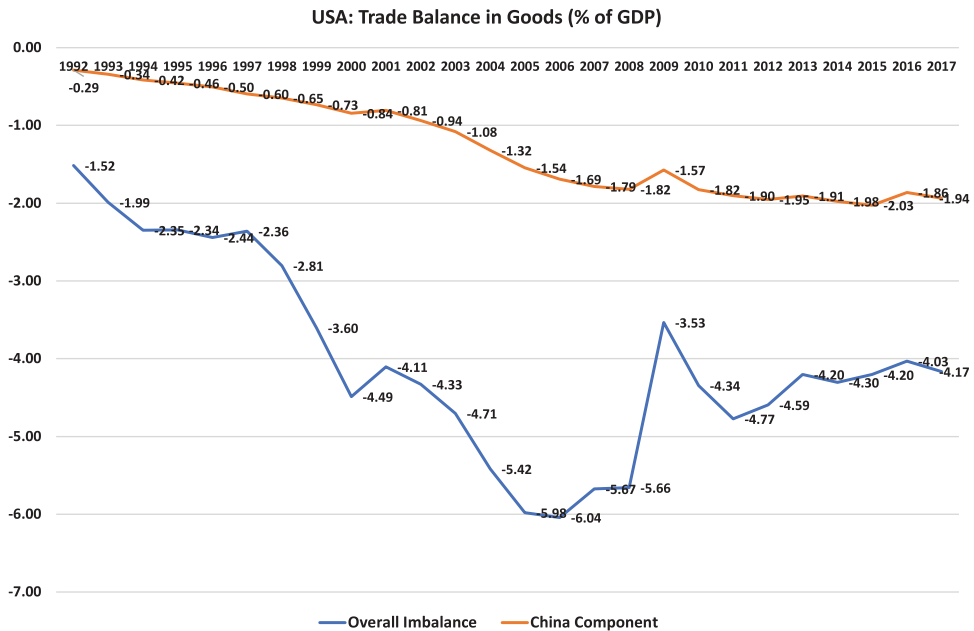
USA: Trade Balance in Goods (% of GDP)

Figure 2. USA: Merchandise Trade Balance in Balance of Payments, 1992-2017.

> Just this March, Yeager pointed out that in a world of many nations, President Trump is mistaken to single out a gap between U.S. exports to China and Mexico and the larger U.S. imports from those two countries.

The basic analytical confusion over the appropriate measure for 'trade imbalance' is also found in the appropriate measure for the 'equilibrium exchange rate'. We will argue later that, while it is true that the RMB has generally been undervalued, the extent of its undervaluation had been greatly exaggerated by critics because of incorrect definitions of the equilibrium exchange rate, and because they did not take into account the existence of China's capital controls and the inevitability of their removal.

What is the correct value for the exchange rate?

The economics profession defines the equilibrium market price of an item to be the price that equates the supply with the demand for that item (i.e. *the equilibrium exchange rate is the market-clearing exchange rate in the absence of central bank interventions*). Table 1 reports the recent balance of payments (BOP) for China and the RMB-USD exchange rate.[3] Column (i) shows that China's net current account (CA) has always been in surplus, rising from 1.69 percent of GDP in 2000 to 9.94 percent in 2007 and then declining to 1.34 percent in 2017. The non-reserve financial account (FA), column (iii), was mostly in surplus and that it registered significant deficits in 2015 and 2016 when capital controls were relaxed. We want to note for future discussion that the Errors and Omission component (EO), column (v), became substantially negative in the 2015–2017 period, with the largest negative values when net non-FA was in large deficits.

Table 1. China: components of balance of payments and RMB-USD exchange rate, 2000–2017 net balance of each component as percentage of GDP.

| | Current acct (CA) | Capital acct (KA) | Non-reserve financial acct (FA) | Errors & omissions (EO) | Balance of payments surplus (BOP) | Memo items | |
						RMB-USD exchange rate (period average)	Capital-financial acct (KFA)
	(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)
2000	1.69	0.00	0.16	−0.97	0.87	8.278	−0.82
2001	1.30	0.00	2.60	−0.36	3.53	8.277	2.23
2002	2.41	0.00	2.20	0.53	5.13	8.277	2.73
2003	2.59	0.00	3.31	0.50	6.39	8.277	3.80
2004	3.53	0.00	5.53	0.66	9.72	8.277	6.19
2005	5.79	0.18	3.99	1.00	10.97	8.195	5.17
2006	8.42	0.15	1.65	0.13	10.35	7.973	1.92
2007	9.94	0.09	2.57	0.37	12.97	7.607	3.03
2008	9.15	0.07	0.81	0.41	10.43	6.948	1.28
2009	4.76	0.08	3.81	−0.81	7.83	6.831	3.07
2010	3.90	0.08	4.63	−0.87	7.73	6.770	3.83
2011	1.80	0.07	3.43	−0.18	5.12	6.461	3.32
2012	2.52	0.05	−0.42	−1.02	1.13	6.312	−1.39
2013	1.54	0.03	3.57	−0.65	4.49	6.196	2.95
2014	2.25	0.00	−0.49	−0.64	1.12	6.143	−1.13
2015	2.75	0.00	−3.93	−1.92	−3.10	6.227	−5.85
2016	1.81	0.00	−3.72	−2.05	−3.96	6.640	−5.77
2017	1.34	0.00	1.21	−1.81	0.75	6.746	−0.60

Note: We definite.
(1) KFA = KA + FA + EO.
(2) BOP = (i) + (ii) + (iii) + (iv).
(3) BOP = the negative of Reserve Financial Account (RFA) by accounting necessity.

The overall BOP, sum of columns (i) to (iv), was in deficit only in 2015–2016.[4] The BOP surpluses in the 2000–2017 period were generally large (over 5 percent of GDP) because of the twin surpluses of CA and FA. The movements of the RMB-USD exchange rate were in line with China's BOP position, strengthening from 8.3 in 2000 to 6.1 in 2014 and then weakening to 6.7 in 2017 with the relaxation of capital controls in 2015–2016 and the smaller CA surpluses. The fact that BOP was almost always in surplus is *prima facie* evidence that the People's Bank of China (PBC) had been preventing the RMB from strengthening to its equilibrium (market-clearing) value.

While it is intellectually fulfilling to show conclusively that the RMB is generally undervalued, the important information that is needed for policymaking is the degree of undervaluation. A RMB undervaluation of 20 percent will merit a policy response from the U.S. government, but an undervaluation of 10 percent or lower might not be worth reacting to. There are two commonly used methods to compute the equilibrium exchange rate (a) the purchasing power parity (PPP) approach, and (b) the price-elasticity approach

The PPP approach

The PPP approach posits 'that in the long run exchange rates should move towards the rate that would equalize the prices of an identical basket of goods and services ... in any two countries'.[5] This view inspired *The Economist* magazine to construct a PPP exchange rate based on the prices of Big Mac sandwiches sold in different countries. In January 2018, with the actual exchange rate being 6.43 RMB per USD it cost 20.4

RMB to buy a Big Mac in China, and \$5.28 in the U.S. So is it meaningful to say that the Chinese exchange rate was undervalued by almost 40 percent in January 2018?

The answer is no because the US and Chinese baskets of goods included non-tradable inputs, and the relative prices of non-tradables are lower in China than in the U.S. because labor costs are lower in the former. To see that the gap between the usual PPP exchange rate and the actual exchange rate reflects the development gap between the two countries, we first make the following definitions:

(a) Defining the consumer price index in China and U.S.

$$\text{CPI of China, CPI}^C = (1-a)\ P^C{}_T + aP^C{}_N$$

$$\text{CPI of United States, CPI}^U = (1-a)\ P^U{}_T + aP^U{}_N$$

where CPI = consumer price index
    C = China
    U = United States
    $P^i{}_T$ = price of tradable good in country i
    $P^i{}_N$ = price of non-tradable good in country i
    a = weight of non-tradable goods in price index

(b) Defining the PPP exchange rate

$$e^{PPP} = \text{CPI}^C/\text{CPI}^U$$

We next state three equilibrium conditions.
(1) Goods arbitrage

$$P^C{}_T = e^{actual} P^U{}_T$$

where e^{actual} = actual (nominal) exchange rate expressed as number of RMB per USD
(2) Relationship between prices of tradables and non-tradables within each country

$$\text{for developing China,} P^C{}_N = dP^C{}_T$$

$$\text{for developed United States,} P^U{}_N = fP^U{}_T$$

(3) The difference between developed and developing country is that relative price of non-tradables is higher in the former

$$f > d > 0$$

We can now derive the following relationship between the PPP exchange rate and the actual exchange rate:

$$e^{PPP} = \text{CPI}^C/\text{CPI}^U$$

$$e^{PPP} = [(1 - a + ad)/(1 - a + af)]\ e^{actual}$$

$$e^{PPP} < e^{actual}$$

The above exercise shows that the actual exchange rate of a developing country would always be 'undervalued' in relation to the PPP exchange rate, and it would be impossible for the developing country to set its exchange rate equal to the PPP exchange rate. *The optimistic conclusion from the above analysis is that as China continues catching up with the standard of living in the U.S., China's value of 'd' would converge to the U.S. value of 'f', finally making the 'equilibrium exchange rate with open KFA' identical to the 'PPP exchange rate'.*

The price elasticity approach

This approach starts by assuming some values for the price elasticities of exports and of imports, and then works backward from the actual value of the exchange rate to the exchange rate that is consistent with a CA balance that is equal in size but opposite in sign to a given capital-financial account (KFA) balance. Specifically, Goldstein (2006) imposed the following assumptions on the accounting identity CA + KFA + RFA = 0: (a) KFA is exogenous and equals 1.5 percent of GDP, and (b) CA is a function of only one variable, the RMB-USD exchange rate, e, with some assumed values for the price elasticities of import and export. Goldstein then calculated the value of e that would make CA + KFA = 0, and he called this computed value of e the equilibrium exchange rate. This is the basis of Goldstein's (2007) claim in his Congressional testimony that the RMB was undervalued by 40 percent in March 2007.

The capriciousness of the size and the sign of this exogenously set KFA balance is obvious. If KFA is 1.5, then equilibrium CA is −1.5 by accounting necessity. It is just impossible to justify that the equilibrium CA (hence the value of the equilibrium exchange rate) is an exogenous value that is independent of domestic and foreign macroeconomic policies.[6] The scenario that would make KFA an exogenous positive number is to have capital controls that prevents domestic residents from sending capital out and accepts less capital inflow than offered by foreigners. In short, the Goldstein-imputed exchange rate is the 'equilibrium exchange rate under stringent capital controls'.

Figure 3 shows the degree of RMB undervaluation in the 2000:1Q to 2017:4Q period, under three different assumptions of price elasticities,\when actual values of KFA are used in the Goldstein calculations. We assume

- the best estimates of the elasticities to be the import-price elasticity of 0.906 and export-price elasticity of 1.111 from Cheung, Chin and Qian (2012)
- the low elasticity case to be when both elasticities are 0.8; and
- the high elasticity case to be when both elasticities are 1.2

Figure 3 shows RMB undervaluation of over 10 percent in the 2001:3Q – 2011:2Q period, with an average overvaluation of 18 percent in 2004:4Q – 2008:1Q sub-period. The factor behind this sustained overvaluation after 2001:3Q was the successful conclusion of U.S.-China negotiations over China's WTO membership on 16 November
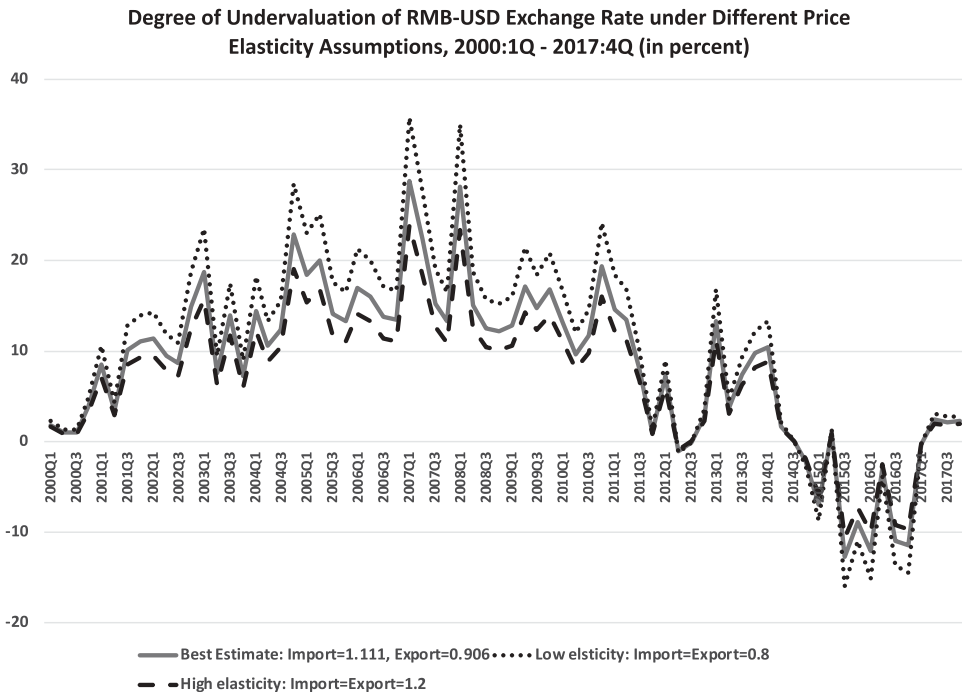
Degree of Undervaluation of RMB-USD Exchange Rate under Different Price
Elasticity Assumptions, 2000:1Q - 2017:4Q (in percent)

Best Estimate: Import=1.111, Export=0.906 ···· Low elsticity: Import=Export=0.8

– – High elasticity: Import=Export=1.2

Figure 3. Goldstein-Style Calculations of Undervaluation of the RMB-USD Exchange Rate, 2000-2017.

1999 that led to formal WTO accession on 11 December 2001. As pointed out by McKibbin and Woo (2003), the concluded U.S.-China negotiations in 1999 eliminated the annual uncertainty over whether China would be granted most favored nation (MFN) status by U.S. Congress for the following year, and this reduced the risk premium that inward FDI demanded in order to operate in China. The consequence was large inward FDI for a sustained period, causing CA and FA to be high. Combining this twin surplus in BOP with China's virtual dollar-peg exchange rate policy, RMB undervaluation became substantial. The undervaluation diminished with the steady appreciation of the RMB from 2006:4Q onward and the eventual slowdown in inward FDI.

An important change in China's external economic situation occurred in 2014:3Q when the direction of capital flow made a sustained reversal to make KFA deficit the new norm. The most important reasons for this change was the loosening of capital controls that allowed Chinese residents to diversify out of their RMB-denominated asset portfolios. The thirst for asset diversification in China is hard to exaggerate. If capital controls had been lifted in 2003, the great rush of funds outward would have started then.

The overvalued RMB since 2014:3Q from the relaxation of capital controls allows us to see two important flaws in the policy recommendation of drastic RMB appreciation by Nicholas Lardy and his colleagues at the Peterson Institute during the 2003–2008 period.[7]

The first major flaw in the Goldstein-Lardy policy recommendation is about the correct reference rate to calculate overvaluation. The actual RMB-USD exchange rate

in 2003 was 8.3, and the Goldstein reference rate is 6.4. However, because the value of 6.4 is based on the existence of China's capital controls that kept KFA to be positive the free market exchange rate in the absence of capital controls could have been 7.0.[8] Now compare the following two methods of exchange rate management.

The first method consists of two parts (1) free the exchange rate without freeing capital flow, and (2) after a couple of years, free the capital controls. The outcome would be the exchange rate first moving from 8.3 to 6.4 and staying there. When the capital controls are removed, the exchange rate would move to 7.0. In this first method, there would be exchange rate overshooting, and adjustments in the composition of production. This first method of exchange rate management is the method recommended in Goldstein and Lardy (2003)

The second method of exchange rate management is to appreciate the exchange rate gradually. Now suppose that value of the exchange rate was 6.8 when both exchange rate and capital flows were freed, the exchange rate would then move from 6.8 to 7.0. In this second method, the amount of exchange rate overshooting is smaller and the adjustments in the composition of production would hence also be smaller. This second method of exchange rate management is more efficient than the first method because it's the cost of reorienting production would be lower.

Given China's objectives of internationalizing the RMB and making Shanghai a top-tier international financial market, it is inevitable that China will open its FKA. One could, therefore, reasonably argue that the correct equilibrium exchange rate to use for analysis is the 'equilibrium exchange rate without capital controls' and not Goldstein's 'equilibrium exchange rate with stringent capital controls'.

The second major flaw in the Goldstein-Lardy policy recommendation comes from the 'big picture' question about Figure 3 which reports the deviations of the actual exchange rate from the equilibrium exchange rate. Is it harmful to have exchange rate deviations? Morris Goldstein and Nicholas Lardy certainly thought that they were harmful.

We have two reasons for our disagreement with the Goldstein-Lardy conclusion about the harmful effects. First, there is no economic rationale to justify why zero exchange rate deviations should be a desirable objective in itself unlike full employment, price stability, and dynamic growth. A floating exchange rate regime would have automatically produced zero deviations, but the choice of the exchange rate regime should be made within the context of the economic management framework of the country and not by the desire to generate a zero BOP at every moment in time.

The second reason for our disagreement is that Figure 3 is an accounting construct based on Goldstein's assumptions of KFA being exogenous and CA being a function only of the exchange rate. Both assumptions are indefensible, and so Figure 3 cannot be used to guide exchange rate management. Capital flows are generally not independent of the value of the exchange rate. When China joined WTO, it attracted a much larger amount of inward FDI that helped to boost export (and CA). If China had reacted by appreciating the RMB by 20 percent, much of the subsequent capital inflows and export boom would not have occurred, and Chinese growth would have been lower.

Why should it be preferable for China to reduce a BOP surplus through RMB appreciation than through a larger fiscal deficit from higher infrastructure investment? The former would have lowered growth and the latter would have increased it. The

Goldstein-Lardy policy framework that produced Figure 3 should not be used to guide exchange rate policy because the exchange rate is a policy instrument and not a policy objective in itself.

The 'Plaza Accord 2.0' proposal represents the triumph of hope over experience

On 22 September 1985, Japan, the United Kingdom, France and West Germany signed the Plaza Accord with the U.S. to appreciate their currencies collectively against the USD in order to shrink the protracted swinging U.S. trade deficits. The average Yen-USD exchange rate appreciated the most, going from 238 Yen per USD in 1985 to 145 in 1987, and then staying at around 128 in 1988.[9] Given this success in generating a large Yen appreciation quickly, it has become common since 2005 for analysts to call for a Plaza Accord 2.0 to engineer a significant RMB appreciation to reduce global trade imbalances.[10]

This call for a Plaza Accord 2.0 is wrong because it is based on ignorance of the global trade adjustment that occurred after September 1985. The trade data in Table 2 clearly shares that the 1985 Plaza Accord did not reduce the U.S. global trade deficit. When the average Yen-USD exchange rate appreciated by 40 percent in 1985–1988 period, Japan's global CA surplus declined from 3.76 percent of GDP to 2.74 percent, a drop of 1.02 percentage points. The U.S. global CA deficit, on the other hand, showed little change, going from 2.1 percentage of GDP to 1.7 percent, a drop of 0.4 percentage points. In short, the sizable appreciation of the Yen against the USD had substantial impact on the Japanese global trade imbalance but almost no impact on the U.S. global trade imbalance.

The huge appreciation of the Yen-USD exchange rate did cause a sizable decrease in the bilateral U.S.-Japan trade imbalance. The bilateral Japan-U.S. trade surplus declined from 3.64 percent of Japan's GDP in 1985 to 1.86 percent in 1988, a reduction of 1.78 percentage points. The drop in the bilateral Japan-U.S. trade surplus was even greater than Japan's global trade surplus, revealing that the Plaza Accord caused Japan to start running a larger bilateral trade surplus against some other countries.

The mechanism that caused Japan's bilateral trade surplus with non-U.S. countries to increase under the Plaza Accord was the same mechanism responsible for the small

Table 2. The Plaza Accord, 22 September 1985: impact of Yen-USD appreciation in 1985–1988 on current account balances of Japan and the United States.

	Exchange rate (Yen/US$)		Global current account balance (% of own GDP)		Bilateral Japan-U.S. trade balance (% of Japanese GDP)
	end of period	period	Japan	United States	
1984	251.10	237.52			
1985	200.50	238.54	3.76	−2.10	3.64
1986	159.10	168.52	4.24	−2.58	2.90
1987	123.50	144.64	3.52	−2.69	2.43
1988	125.85	128.15	2.74	−1.70	1.86
1989	143.45	137.96			

Source: Data is from IMF 'International Financial Statistics' and 'Direction of Trade'.
Global Current Account Balance i = 100*(series 90c.c – series 98c.c + series 98.nc)/(series 99b.c).
Bilateral trade balance = export – import, using U.S. data.

improvement in the U.S. global CA deficit. With the gigantic appreciation of the Yen against the USD, Japanese companies started investing in production facilities in Southeast Asia and other developing countries, and began exporting to the U.S. from there. Japan's bilateral trade surplus with non-U.S. countries increased because of increased Japanese export of capital equipment to Japanese-affiliated companies in these countries. U.S. global CA surplus hardly changed because while the U.S. imported less from Japan, it imported more other countries.

The unambiguous implication of an equally dramatic appreciation of the RMB against the dollar is that it could greatly reduce the bilateral U.S.-China trade deficit but this move would only hurt China and not reduce significantly the size of the overall trade deficit of U.S. The economic reasoning involved is straightforward. *Ceteris paribus*, in the aftermath of a 40 percent RMB appreciation, foreign companies producing in China for the U.S. market would move their operations to other Asian economies (e.g. Vietnam and India) and export from there, and U.S. would start importing the same goods from other Asian countries instead. *In the absence of a collective appreciation of all Asian currencies, the RMB appreciation would only reconfigure the Asian distribution of trade imbalances and not eliminate the trade imbalance of the U.S.* The many calls for a Plaza Accord 2.0 to reduce the U.S. trade account deficit are simply wrong-headed.

Understanding the evolution of China's CA balance

There are quite a number of China-centric explanations[11] for China's chronic trade surplus, and we will discuss the two that seems the most credible:

(1) the *dysfunctional financial market theory* that attributes the imbalance to the inability of China's largely unreformed financial system to intermediate all savings into investment, and
(2) the *aggressive industrial policy theory* that attributes the trade imbalance to China's promotion of exports and suppression of imports.

The *dysfunctional financial market theory* focuses on the aggregate-level accounting identity that the overall CA balance is determined by the fiscal position of the government, and the savings-investment decisions of the state-controlled enterprises (SCEs)[12] and the private sector. For the last decade, the Chinese fiscal position has been a small deficit, and so it is not the cause for the swelling CA surpluses in the 2000s. The CA surplus exists because the sum of savings by SCEs and the private sector exceeds the sum of their investment expenditures; and it has expanded steadily because the nongovernment savings rate has been rising faster than the growth of nongovernment investment.

Why has China's financial system failed to translate the savings into investments? Such an outcome was not always the case. Before 1994, the voracious absorption of bank loans by SCEs to invest recklessly kept the CA usually negative and the creation of nonperforming loans (NPLs) high. When the government implemented stricter controls on the state-owned banks (SOBs) from 1994 onward (e.g. removing top bank officials whenever their bank lent more than its credit quota or allowed the NPL ratio to

increase too rapidly), the SOBs slowed down the growth of loans to SCEs. This cutback created an excess of savings because the SOB-dominated financial sector did not then rechannel the released savings (which were also increasing) to finance the investment of the private sector.

This failure in financial intermediation by the SOBs is quite understandable. First, the legal status of private enterprises was, until recently, lower than that of the state enterprises; and, second, there was no reliable way to assess the balance sheets of the private enterprises, which were naturally eager to escape taxation. The upshot was that the residual excess savings leaked abroad in the form of the CA surplus. Inadequate financial intermediation has made developing China a capital exporting country!

This perverse CA outcome phenomenon in China is not new. Up to the mid-1980s, Taiwan experienced this same problem when all Taiwanese banks were state-owned and were operated under a civil service regulation that required each loan officer to repay any bad loan that she approved. The result was a massive failure in financial inter-mediation that caused Taiwan's CA surplus to be 21 percent of GDP in 1986. The reason why China has not been producing the gargantuan CA surpluses seen in Taiwan in the mid-1980s is the still large amount of SCE investments.

The important point is that savings behavior is not independent of the sophistication of the financial system; Liu and Woo (1994). An advanced financial system will have a variety of financial institutions that would enable pooling of risks by providing medical insurance, pension insurance, and unemployment insurance; and transform savings into education loans, housing loans, and other types of investment loans to the private sector. *Ceteris paribus*, the more sophisticated a financial system, the lower the savings rate.

The second credible theory for China's chronic trade surplus is the *aggressive industrial policy explanation*. This second theory views China's anomalous trade imbalance situation to be the unintentional outcome of, one, the overriding economic and political priority in China to create jobs for its underemployed (surplus) labor force; and, two, the widespread belief in the efficacy of infant industry protection. The resulting mix of export-promotion measures and import-suppression measures accelerated the simultaneous growth of export firms (which increased exports) and import-competing firms (which decreased imports), and hence kept the trade balance in surplus.[13]

There is now adequate evidence, however, that a large component of China's industrial policy has actually reduced China's welfare in addition to enlarging its trade surplus, especially in the 2008–2017 period. Woo (forthcoming) pointed out that the Chinese government's practice of bailing out loss-making SCEs had caused the SCEs to overinvest, resulting in huge excessive capacity in the heavy industries and crowding out of the private sector. The former outcome had led many SCEs to dump their products in foreign markets and worsened China's trade imbalance. The return on equity (ROE) for SCEs has dropped from 15.6 percent in 2007 to 7.0 percent in 2017.[14]

Clearly, the lowering of tension in trade disputes with the U.S. would require that (a) China accelerates the development of its financial sector if the dysfunctional financial market theory is correct; and/or (b) China reduces export incentives and import barriers – especially from the rent-seeking industries with low rates of ROE if the

aggressive industrial policy theory is correct. The important point is that, regardless of which theory is right, both actions should be undertaken because they both enhance China's economic welfare, with one of them also lowering the probability of a trade war with the U.S.

As to how the U.S. should react to China's subsidy-cum-tariff type of industrial policy, we begin by making two points. The first is that WTO rules allow developing countries to engage in some protectionist measures to nurture their industrialization. The second point is that China's industrial policies have only accelerated an economic development process that has been unfolding since 1978. The final outcome of low value-added industries in the U.S. being displaced by Chinese imports is inevitable because the U.S. is a capital-rich country and China is a labor-rich country.

The U.S. policy package to deal with the closing of these low value-added firms due to Chinese exports should contain three common elements with the U.S. policy package to deal the closing of low-tech firms due to technological changes. The three common elements are

(1) a U.S. unemployment insurance scheme that incentivizes acceptance of low-wage jobs (e.g. a negative income tax system)
(2) widely accessible U.S. job retraining programs that are effective, and
(3) STEM[15] programs in U.S. high schools and universities that are high quality and attractive to the average student.

We have identified an array of structural factors and macroeconomic policies behind the U.S. and Chinese trade imbalances (e.g. dysfunctional financial markets in China and large government budget deficits in the U.S.). Instead of insisting on RMB appreciation as the primary method for reducing U.S. unhappiness with the trade deficits, it is more efficient (a) to directly address the specific reasons behind the trade imbalance in each country, and (b) to strengthen the above three job transition programs to deal with the loss of low-skill jobs in the U.S.

The dispute over China's industrial policy

Because the proven way to increase economic prosperity is to increase productivity, It has been standard practice for a government to strengthen the country's indigenous capacity to innovate, and to accelerate the acquisition of innovations from abroad. China's government is no exception.[16] China's latest plan in industrial upgrading is the Made in China 2025 (MC-25) initiative unveiled in 2015. MC-25 aims to establish China as a 'manufacturing powerhouse' with global dominance in new high-tech areas like artificial intelligence, robotics, advanced micro-chips, new energy vehicles, aviation and space travel, autonomous driving systems, solar cells, machine tools, biopharmaceuticals, medical devices, telecom devices, and electronic sensors. The first step in China's planned journey to global leadership in high-technology is the achievement by 2025 of 'self-sufficiency' in the materials and parts used in the high-tech products. 'Self-sufficiency' is defined as local content comprising 70 percent of the product.

The ambitious range of high-tech products in MC-25 and its intended clustering of most parts of the production chain within China have sent tremors through the high-

tech business community and government ministries in the rest of the world. Since there was a perception that China had in the past frequently used industrial policy instruments that were not WTO-sanctioned in order to reach its present technological level, many U.S. observers saw MC-25 as a 'China's government-led drive .. [that would break] international rules to build cutting-edge industries of the future'.[17]

Peter Navarro (2018), a policy advisor to President Trump, has recently summed up his view of what China had been doing as follows:

> In textbook economics, trade is a win-win .. [but] America's trade with China is as far from that model as the Earth is from Mars …..Why is the textbook model failing? The answer is .. [China's] state-directed investments, nonmarket economy, and disregard for the rule of law.

> The problem's taproot is Chinese intellectual-property theft and the forced transfer of foreign technology as a condition of accessing China's market …. [which allowed] Chinese companies to move rapidly up the innovation curve at much lower cost than their foreign competitors, which must recoup the cost of research and development through higher prices.

The emerging view that is gaining influence rapidly is that the real dispute in U.S.-China economic interaction is not the size of China's trade imbalance but China's intellectual piracy. As David Joy, Chief Market Strategist for Ameriprise Financial, said:

> To me, that's [forced technology transfer is] actually the biggest issue, more even than currency valuation. Being forced to give up technology for access to market is essentially blackmail.[18]

And Chuck Schumer, the Minority Leader in the U.S. House of Representatives, has criticized the perennial focus of U.S. administrations on the bilateral U.S.-China trade deficit as asinine:

> China's trade negotiators must be laughing themselves all the way back to Beijing …. They're playing us for fools – temporary purchase of some goods, while China continues to steal our family jewels, the things that have made America great: the intellectual property, the know-how in the highest end industries. It makes no sense.[19]

U.S. dissatisfaction with China trade has now expanded from unhappiness over loss of U.S. jobs due to exchange rate manipulation by China to include discontent over the loss of future high-paying jobs in high-tech industries because of forced technology transfer to China.

We organize our evaluation of the recent round of charges of unfair trade practices by China by discussing the three main instruments of China's industrial policy identified by their critics[20]:

(1) import restrictions (e.g. tariffs, quotas),
(2) production subsidies (e.g. export subsidies, low interest loans, cheap land, preferential tax rates), and
(3) forced transfer of technology (e.g. conducting industrial espionage, demanding the surrender of production technology in exchange for market access, imposing local content requirements)

Import restrictions and production subsidies

Because learning-by-doing is an irrefutable phenomenon, it is often used to justify the use of import restrictions to induce the establishment of the target new industry. Such examples abound in China: China' ban on Google created Baidu, China's ban on Twitter created Weibo, China's ban on WhatsApp created WeChat, China's ban on PayPal created Taobao, and China's ban on eBay created Alibaba. While these bans are bad for the U.S. companies concerned, they could have increased consumer surplus worldwide because it is now commonly acknowledged that the services provided by WeChat and Alibaba are at least as good as those of WhatsApp and Amazon.

As noted earlier, WTO rules allow developing economies to use tariffs and subsidies to nurture some types of new industries, especially technologically advanced industries. It is usually only in the case where subsidies are used to expand production beyond domestic demand, resulting in significant exports, that the impacted country has a convincing complaint about the exporting country's violation of WTO protocol.

However, after 40 years of fast economic development, China's continued use of WTO-sanctioned incentives to promote infant industries is no longer viewed sympathetically in the advanced countries. Pascal Lamy (former Director-General of WTO) has pointed out that China is now not only the second largest economy in the world, but also the biggest producer of a wide range of products (e.g. cement and desktop computers) and he concluded that:

> [it is dishonest for China to pretend that it is] like India, or like Senegal, or like Botswana …. [China still had to do more to] ensure a level playing field between Chinese producers and foreign producers, whether they produce inside China or outside of China.[21]

Our discussion of China's use of import restrictions and production subsidies must not leave the impression that they have been very beneficial for China's economic growth. This is because the present condition of pervasive excess industrial capacity and the incongruous twin phenomena of inland ghost cities and coastal real estate bubbles are also products of China's production subsidies system. China's inability to enforce hard budget constraints on SCEs is now threatening the financial sector with an explosion of nonperforming loans, and undermining overall total factor productivity growth through crowding-out of the private sector. It is, therefore, wrong to give a glowing assessment of China's system of import restrictions and production subsidies as being good for China despite its successful nurturing of manufacturing powerhouses like Hai Er and of cutting-edge technology firms like Huawei.

Forced transfer of technology

A foreign firm that wishes to sell its products in China is sometimes told that its market access is conditional upon setting up production facilities in China in the form of a JV with a major government-linked company (who could later become a future competitor in markets outside of China). If it were Singapore instead of China which presented this choice to the foreign firm, the foreign firm could well decide to forgo the small Singapore market. But because the Chinese market is not only very large and because *there are other competing foreign firms also seeking access to*

China's market and possessing similar technology, a foreign firm will be more willing to trade its production technology for monopoly access to China's market.

The outcome from the above practice by China is effectively the equivalence of getting a lower price for the foreign-originated product in the long term. This outcome is very similar to the bulk discount that big buyers are able to extract from their suppliers, and very similar to the 'optimum tariff' that a large importer is wont to impose on its trade partner. In essence, the buyer in both cases is using her market power to extract a lower price for the product.

Is the exercise of market power wrong? Frankly, we are not sure because there has been no wide public outcry against Walmart's well-known practice of demanding and receiving big discounts from its suppliers. But Martin Feldstein (2018) is sure that it is wrong. Otherwise, he would not have called the 'willing-buyer willing-seller' defense of this Chinese method of acquiring technology 'disingenuous'.

U.S. firms have long complained quietly but bitterly to U.S. government officials about China's use of its market power to pay an effectively lower price for the good. As mandated technology transfer contravenes WTO rules on market access, it is therefore a puzzle that it is only now that the U.S. government is willing to take action against China's economically aggressive act of 'forced technology transfer'. The past reluctance to act could have been influenced by factors like (a) the absence of a coordination mechanism among the competing foreign firms to collectively reject China's demand and to collectively request their governments to file WTO complaints; (b) the perception by the U.S. government that the technology involved is not frontier technology that is critical for overall U.S. competitiveness and for U.S. national security; and (c) the importance of China as an ally in international affairs.

The recent turn-around in U.S. policy on mandated technology transfer is likely to have been due to a combination of developments like (a) the technology that China is now demanding is truly frontier technology that is necessary for the development of the next generation of high value-added products; (b) the recognition that China is turning out to be more of a strategic competitor than a potential strategic partner; and (c) the sense that China should not be treated like a developing economy because it has, after all, become the biggest aid donor in Africa and many parts of Asia.

Given the strong likelihood that the U.S. would be able to mobilize its biggest G7 allies to join in retaliatory actions against China's JV requirement for market access, China should start using other ways to accelerate technology transfer. This new behavior by China is the same as the non-imposition of optimum tariffs by large countries. A new phase in China's use of industrial policy tools has arrived.

The conflation of national security concern with economic competition

CFIUS is an interagency body that reviews transactions that would give control of a U.S. firm or technology to a foreign entity, and rejects those that would hurt the national security of the U.S. The truth is that CFIUS faces extreme difficulties in doing its job well, and this point is brought home most glaringly when one considers the following two cases.

Case 1: CFIUS would approve transactions where the product/technology has no military applications and reject transactions where the product/technology has military applications. However, most products and technologies can be weaponized. A KGB agent could put advertisements for vodka on a website or he could put up fake news to help get Donald Trump elected a second term.

Case 2: The level of national security of a country depends on the quality of its weapons. The richer the country, the higher the quality of weapons it could afford. Since economic power is the basis of national security, should CFIUS ever approve the sale of any productivity-enhancing technology to Russian firms?

In short, if CFIUS is to take its job literally, 'CFIUS really should be managing all global trade'.[22]

The Made in China 2025 (MC-25) program states explicitly that it will also seek to buy the next generation of high-technology (e.g. buy promising start-ups). There is hence great fear in U.S. and other advanced countries that the next generation of high-technology could be appropriated by Chinese firms, possibly, sometimes even through unfair means. Laskai (2018) reported that:

Circumstantial evidence confirms this suspicion … Take the example of Fujian Grand Chips, a purportedly private Chinese company that attempted to acquire German machine maker Aixtron in 2016. Shortly before it staged a public takeover of Aixtron, another Fujian-based company San'an Optoelectronics canceled a critical order from Aixtron on dubious grounds, sending its stock tumbling and presenting Fujian Grand Chips with an opportunity to swoop in. Both Fujian Grand Chip and San'an Optoelectronics shared a common investor: an important national semiconductor fund controlled by Beijing. The acquisition was stymied by an 11th-hour intervention by government officials but demonstrated how Beijing can drive investing abroad, often in a highly coordinated manner.

Given the possible conspiratorial nature of the actions by the two Chinese firms in the preceding quote, one could be misled to conclude that there is paranoia in Washington DC today when one reads:

Senate Majority Whip, John Comity (R-Texas) regularly warns his colleagues that China is using private-sector investments to pilfer American technology. China has 'weaponized' its investments in America 'in order to vacuum up U.S. industrial capabilities from American companies … [The goal is] to turn our own technology and know-how against us in an effort to erase our national security advantage'.[23]

Since the word 'pilfer' in the Comity quote means to 'steal', it is befuddling when one reads that Peter Navarro (2018) sees the opposite outcome in China's purchases:

[China has been] targeting American companies based on strategic and military goals rather than pure economic considerations … [and hence have been] often willing to pay distortive prices, far above what the free market would dictate.

This clash in perception between Comity and Navarro about whether the Chinese are paying enough for American technology does not necessarily confirm that there is no consistency in paranoia. It could imply instead that Comity and Navarro have too broad a definition, and too short-sighted a definition, of national security.

The Comity and Navarro definition is too broad because it automatically equates an increase in Chinese economic competitiveness with a decrease in U.S. national security.

Since Comity and Navarro do not want the U.S. to anything to strengthen its economic competitors, they would restrain technology-rich U.S. from selling technology-intensive goods to foreigners when economic theory shows that this is a mutually beneficial outcome. The Comity and Navarro definition of national security is also too short-sighted because U.S. technological dynamism is reinforced when it faces foreign competition. The immediate short-term outcome in economic competition is a zero-sum game but the long-run outcome in economic competition is a win-win situation.

Comity and Navarro are correct about national security being dependent on economic strength, which is in turn strongly dependent on technological capability. But they are incorrect to believe that the best way to protect and promote U.S. technological capability is to hold China back technologically. The most effective ways to improve U.S. capability in innovation is to ensure easy access to high-quality education by all domestic residents, to attract talented foreigners to study and work in U.S., and to have the government work effectively with universities and businesses to promote R&D. It is, therefore, most harmful for U.S. national security for the Trump administration to be cutting funding for education and R&D and to be whipping up xenophobic sentiments.

Finally, the Comity and Navarro conception of national security is based on the false notion that Chinese investors (maybe, Chinese bureaucrats) are much smarter than the Japanese investors who flooded into the U.S. in the late 1980s and early 1990s, buying assets like the Rockefeller Center 1989 and ending up in tears frequently. Furthermore, their perception of threat from Chinese investment does not take into account that most start-ups fail and that Chinese investors cannot afford to buy up all the start-ups that bubble up in Silicon Valley, Silicon Forest, Silicon Alley, Silicon Prairie and Silicon Slopes – not to mention other technological centers outside of the U.S. (e.g. Silicon Wadi in Israel, Silicon Mountain in Cameroon, and Silicon Cape in South Africa).

On 13 August 2018, President Trump signed the Foreign Investment Risk Review Modernization Act to reform CFIUS to deal with the increasing conflation of economic competition and national security considerations.[24] The scope of CFIUS has been widened (e.g. it now includes review of activities of hedge funds with minority foreign participation), and its funding increased. The most important remaining task now is for U.S. Treasury to draw up a clear, short list of critical technologies and critical infrastructure for CFIUS to cover and update this list regularly. Otherwise, the broad and changing nature of notions about national security would allow the bureaucratically driven phenomenon of mission-creep to steadily expand the coverage of the CFIUS process, thereby steadily rendering CFIUS to be operationally capricious.

Final remarks

There is a broader context which the U.S.-China trade war fits into. A new international economic normal is asserting itself with the emergence of China and India as economic powerhouses alongside North America, Europe, Japan, and Russia. This new international economic normal will be consolidated further as other large developing countries start growing faster. The toppling of U.S. hegemony by the emergence of a multipolar world has greatly heighted U.S. concern for its national security.

President Trump's present trade wars on multiple fronts reflect both this heightened concern for national security and the hesitation of the U.S. in continuing to promote

economic globalization. Our prediction is that the settlement of the present U.S.-China trade dispute will inevitably be followed by new disputes breaking out over other trade issues until the leaders of the different spheres of influence can agree to deepen multilateral free trade. *Economic disputes are a systemic feature of the present uncoordinated multipolar political order.*

Our principal policy suggestion to China is that, because China's economy in 2018 is very different from that in 1978 (e.g. there are now many parts of China that look like Singapore and China is Africa's biggest donor), there should be more reciprocity in China's trade and investment relations with the advanced economies despite China's status as a developing economy under WTO rules. China should not only give national treatment in the near future to more types of foreign firms (e.g. financial institutions), it should also set up a mechanism to start easing up on foreign acquisition of Chinese firms in a manner that is consistent with China's national security concerns.

Our principal policy suggestion to President Trump is to stop equating strategic competition with economic competition. Strategic competition is normally a zero-sum game while economic competition is usually a zero-sum game in the short run, but generally creates a win-win outcome in the long run. National economic dynamism and economic resilience emerge from a vibrant domestic innovation system that is internationally competitive and not from trying to prevent other countries from becoming technological powers.

Notes

1. See Bown and Kolb (2018) and Borzykowski (2018).
2. This is the trade imbalance in the trade of goods. There is controversy over the size of the bilateral trade imbalance, e.g. the official U.S. estimate of the bilateral trade deficit in 1996 is $39.5 bn, and the official Chinese estimate is $10.5 bn. When Feenstra et al. (1999) corrected these estimates by taking account of the value-added in Hong Kong during transshipment, the two figures were revised to $26.1 bn and $20.6 bn, respectively.
3. For simplicity in notation, we will refer to the sum of columns (ii), (iii), and (iv) as the capital-financial account (KFA).
4. By accounting necessity, BOP = the negative of the reserve financial account (RFA).
5. The Economist (2018).
6. The equilibrium CA of a developing country is not always negative, see Liu and Woo (1994) for an imperfect financial market explanation why the economic development of Taiwan had been characterized by current account surpluses.
7. See Goldstein and Lardy (2003) and (Goldstein and Lardy 2008).
8. The validity of the point being developed does not rely on the free market exchange rate with open FKA being 7.0. We know that it has to lie above 6.4 and could even exceed 8.3. Our point is even stronger when the reference value is higher than 8.3.
9. This fast, large appreciation of the G-5 currencies against the USD from September 1985 to end of 1986 was quickly considered by all to be excessive and destabilizing to global financial markets. The upshot was that the G-5 and Canada signed the Louvre Accord on 22 February 1987 to halt the slide of USD but sharp Yen appreciation continued.
10. See Pesek (2016).
11. 'China-centric' because they ignore the obvious fact that the current account balance is also determined by foreign, notably U.S., economic conditions.
12. The SCE category covers companies that are classified as state-owned enterprises (SOEs); and joint-ventures and joint-stock companies, which are controlled by third parties (e.g. legal persons) who are answerable to the state. To understand the principal-agent

problems in SCEs has shaped China's macroeconomic performance, see Woo (2006) and Woo (Forthcoming).
13. The simultaneous expansion of these two sectors meant that the nontradeable sector was contracting. The undervalued RMB explanation for China's trade imbalance is actually an aggressive industry policy explanation. The subsidy-tariff combination is equivalent to the undervaluation of a currency, see Woo (2004).
14. ROE data are from Cho and Kawase (2018). Also see Tan, Huang, and Woo (2016) for a discussion on China's zombie firms.
15. STEM = Science, Technology, Engineering, and Mathematics.
16. See Fu, Woo, and Hou (2016).
17. Bradsher and Rappeport (2018).
18. Isidore (2012).
19. Bennett and Bender (2018).
20. The use of an undervalued exchange rate as an industrial policy tool has already been discussed adequately in the previous sections of the paper.
21. Bradsher and Rappeport (2018).
22. Observation by Paul Rosenzweig, former CFIUS staff member, quoted by Bennett and Bender (2018).
23. Bennett and Bender (2018).
24. See McQueen (2018), Rubenfeld (2018), and Klein (2018).

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