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by

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Lawrence J. Lau, Xikang Chen and Yanyan Xiong[1]

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Abstract: Significant differences exist between official Chinese and U.S. trade statistics on the magnitudes of the China-U.S. trade balance in goods as well as in goods and services. These differences arise from a number of factors. First, the convention that exports of goods are measured on an FOB (free on board) or FAS (free alongside ship) basis and imports on a CIF (cost, insurance and freight) basis means that the value of imported goods as measured by the importing nation is always higher than the same goods as measured by the exporting nation. Second, Chinese exports of goods to the U.S. according to Chinese official statistics include only direct exports to the U.S. but not re-exports to the U.S. through Hong Kong, whereas U.S. imports of goods from China according to U.S. official statistics include Chinese re-exports through Hong Kong because the U.S. applies its rules of origin with regard to imports. Third, similarly, U.S. exports of goods to China according to U.S. official statistics do not include re-exports of U.S. goods to China through Hong Kong. Fourth, the increasingly important trade in services between China and the U.S. are often not included. Finally, the real benefit that exports bring to an economy is the value-added (GDP) that it generates, and not its gross value (and employment). Thus a more appropriate measure of the relative benefit is the trade balance in terms of value-added. In this paper, we attempt to adjust both the Chinese and the U.S. official data for the effects of these factors. The Chinese trade surplus still exists after all these adjustments but is significantly reduced from the initial estimate of US$367.4 billion based on U.S. data on the trade in goods to an estimate of US$132.7 billion based on the value-added on the exports of goods and services of China and the U.S. to each other for 2015.

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1. Introduction

Significant differences exist between official Chinese and U.S. trade statistics on the magnitudes of the China-U.S. trade balance in goods as well as in goods and services. These differences arise from a number of factors. First, the convention that exports of goods are measured on an FOB (free on board) or FAS (free alongside ship) basis and imports on a CIF (cost, insurance and freight) basis means that the value of imported goods as measured by the importing nation is always higher than the same goods as measured by the exporting nation. Thus, Chinese exports of goods to the U.S. according to Chinese official statistics is always less than U.S. imports of goods from China according to U.S. official statistics, by approximately 10 percent, the CIF/FOB factor. Second, Chinese exports of goods to the U.S. according to Chinese official statistics include only direct exports to the U.S. but not re-exports to the U.S. through Hong Kong, whereas U.S. imports of goods from China according to U.S. official statistics include Chinese re-exports through Hong Kong because the U.S. applies its rules of origin with regard to imports. Third, similarly, U.S. exports of goods to China according to U.S. official statistics do not include re-exports of U.S. goods to China through Hong Kong. Fourth, the increasingly important trade in services between China and the U.S. are often not included. However, only the U.S. publishes data on trade in services between the two nations, which show that the U.S. has a persistent, significant and positive trade balance in services. In what follows, we attempt to adjust both the Chinese and the U.S. official data for the effects of these four factors and derive the corresponding estimate of the China-U.S. trade balance.

Finally, even the most accurately measured trade balance based on the gross value of exports of goods and services from each nation is not a reliable indicator of the relative benefit that each nation derives from the bilateral trade. The real benefit that exports bring to an economy is the value-added (GDP) that it generates, and not its gross value (and employment). Thus a more appropriate measure of the relative benefit is the trade balance in terms of value-added. In this paper, we also present estimate of the domestic value-added (equivalent to GDP) generated by each nation from their exports to each other. This estimate is based the value-added coefficients derived in a comprehensive study conducted by Prof. Xikang CHEN and his research collaborators at the Chinese Academy of Sciences. In terms of value added, the China-U.S. trade balance is further reduced as the domestic value-added

content of Chinese exports is significantly less than the domestic value-added content of U.S. exports to China. However, even with all these adjustments, the China-U.S. trade balance remains a significant large number in China's favor.

In Table 1 we present official Chinese and U.S. trade statistics on their bilateral trade in their original forms in Billion U.S. Dollars, including the respective implied bilateral trade balances, from 1989 to 2015. Table 1 shows that large discrepancies between the official Chinese and U.S. data still exist. In 2015, official Chinese data indicate Chinese exports to the U.S. (free on board (FOB)) to be US$409.2 billion compared to the official U.S. figure (cost, insurance and freight (CIF)) of US$484.1 billion. Similarly, official Chinese data indicate Chinese imports from the U.S. (CIF) to be US$147.8 billion compared to an official U.S. figure (FOB) of US$116.7 billion. The resulting trade balances are then US$261.4 billion according to Chinese data and US$367.4 billion according to U.S. data, a huge discrepancy. Fortunately, the discrepancies in the trade data seem to be narrowing over time. For example, the discrepancy in Chinese exports to the U.S. has declined from 63% in 1989 to 15% in 2015; the discrepancy in Chinese imports from the U.S. has declined from 36% to 27%; and the discrepancy in the China-U.S. trade balance has declined from a high of 75% in 1995 to 29% in 2015. It is our objective to try to reconcile the official Chinese and U.S. estimates of the China-U.S. trade and narrow the discrepancies in the estimates of the bilateral trade balance through adjustments of the differences in concepts and definitions.

Table 1: Official Chinese and U.S. Trade Balance (Billion US$), Goods Only						
Year	Official Chinese Exports to the United States	Official U.S. Imports from China	Official Chinese Imports from the United States	Official U.S. Exports to China	Official China-U.S. Trade Balance	Official China-U.S. Trade Balance
	FOB	Customs Basis (CIF)	CIF	FAS	FOB-CIF	Customs Basis-FAS
	(Chinese Official Data)	(U.S. Official Data)	(Chinese Official Data)	(U.S. Official Data)	(Chinese Official Data)	(U.S. Official Data)
1989	4.4	12.0	7.9	5.8	-3.5	6.2
1990	5.2	15.2	6.6	4.8	-1.4	10.4
1991	6.2	19.0	8.0	6.3	-1.8	12.7
1992	8.6	25.7	8.9	7.5	-0.3	18.2
1993	17.0	31.5	10.7	8.8	6.3	22.7
1994	21.5	38.8	14.0	9.3	7.5	29.5
1995	24.7	45.6	16.1	11.7	8.6	33.9
1996	26.7	51.5	16.2	12.0	10.5	39.5
1997	32.7	62.6	16.3	12.8	16.4	49.8
1998	37.9	71.2	16.9	14.3	21.1	56.9
1999	41.9	81.9	19.5	13.2	22.5	68.7
2000	52.1	100.2	22.4	16.4	29.7	83.9
2001	54.3	102.6	26.2	19.4	28.1	83.2
2002	69.9	125.5	27.2	22.3	42.7	103.2
2003	92.5	153.0	33.9	28.6	58.6	124.3
2004	124.9	197.5	44.7	34.8	80.3	162.6
2005	162.9	244.7	48.6	41.9	114.3	202.8
2006	203.4	289.2	59.2	54.8	144.2	234.4
2007	232.7	323.0	69.4	64.3	163.3	258.7
2008	252.4	339.6	81.4	71.3	171.0	268.2
2009	220.8	297.9	77.5	70.6	143.3	227.2
2010	283.3	366.1	102.1	93.1	181.2	273.1
2011	324.5	400.6	122.1	105.4	202.3	295.2
2012	351.8	426.8	132.9	111.9	218.9	314.9
2013	368.4	441.6	152.3	122.9	216.1	318.8
2014	396.1	469.7	159.1	124.7	237.0	345.0
2015	409.2	484.1	147.8	116.7	261.4	367.4
Sources:						
Chinese Official Data						
1997 and before: from Fung, Lau and Xiong (2006).						
1998 and after: from the National Bureau of Statistics of China Online Database.						
http://data.stats.gov.cn/easyquery.htm?cn=C00						
U.S. Official Data						
1998 and before: from Fung, Lau and Xiong (2006).						
1999 and after: from the U.S. Bureau of Economic Analysis.						
Table 2.2. U.S. International Trade in Goods by Area and Country, Seasonally Adjusted Detail						

2. Estimation of China-U.S. Trade Balance Based on Export Data

First, we re-estimate the China-U.S. trade balance by relying only on the export data of each country. This avoids the distortions that may arise because of the different conventions used in the measurement of exports (FOB) and imports (CIF). It is necessary to make such an adjustment in order to be able to reconcile one trading country's export data with its trading partner country's import data. If such adjustments are not made, then total world exports of all nations will always be less than total world imports of all nations, which is not possible. Moreover, since the insurance and freight services are frequently not provided by the exporting country, it is misleading to include their costs as part of that country's exports. The results, based on the official data on the exports of goods of both China and the U.S., are presented in Table 2. Table 2 shows that by relying only on the export data of both countries, the estimated China-U.S. trade balance is higher than the official Chinese figure and lower than the office U.S. figure. For example, for 2015, the estimate of the China-U.S. trade balance based on export data is US$291.3 billion, intermediate between the Chinese figure of US$261.4 billion and the U.S. figure of UDS$367.4 billion.

Table 2: Chinese and U.S. Trade Balance (Billion US$), Goods Only, FOB Basis				
Year	Official Chinese Exports to the United States	Official U.S. Exports to China	Official U.S. Exports to China Concerted to an FOB Basis	China-U.S. Trade Balance Based on Export Data (FOB) of Both Countries
	FOB	FAS	FOB	FOB
	(Chinese Official Data)	(U.S. Official Data)		
1989	4.4	5.8	5.9	-1.5
1990	5.2	4.8	4.8	0.4
1991	6.2	6.3	6.4	-0.2
1992	8.6	7.5	7.5	1.1
1993	17.0	8.8	8.9	8.1
1994	21.5	9.3	9.4	12.1
1995	24.7	11.7	11.8	12.9
1996	26.7	12.0	12.1	14.6
1997	32.7	12.8	12.9	19.8
1998	37.9	14.3	14.4	23.5
1999	41.9	13.2	13.3	28.6
2000	52.1	16.4	16.5	35.6
2001	54.3	19.4	19.6	34.7
2002	69.9	22.3	22.5	47.4
2003	92.5	28.6	28.9	63.5
2004	124.9	34.8	35.2	89.8
2005	162.9	41.9	42.3	120.6
2006	203.4	54.8	55.4	148.1
2007	232.7	64.3	65.0	167.7
2008	252.4	71.3	72.1	180.3
2009	220.8	70.6	71.3	149.5
2010	283.3	93.1	94.0	189.3
2011	324.5	105.4	106.5	218.0
2012	351.8	111.9	113.0	238.8
2013	368.4	122.9	124.1	244.3
2014	396.1	124.7	125.9	270.1
2015	409.2	116.7	117.9	291.3
Note: Conversion from an FAS to an FOB basis through the multiplication by the factor 1.01.				

3. Adjustment for the Re-Exports through Hong Kong

Next, we adjust the China-U.S. bilateral trade data for the re-exports through Hong Kong. The official re-exports data through Hong Kong are presented in Table 3. Chinese re-exports to the U.S. are further adjusted by the division by the customarily assumed CIF/FOB factor of 1.1 to arrive at the FOB China values. U.S. re-exports to China through Hong Kong are also similarly adjusted.[2] It is believed that mark-up adjustments for re-exports through Hong Kong are not necessary, as most of the mark-ups of Chinese re-exports to the U.S. through Hong Kong have probably been actually earned on the Mainland but booked in Hong Kong for tax purposes. The values declared by the re-exporters of Chinese goods to the U.S. through Hong Kong actually reflect more closely the true values of the Chinese exports. Similarly, the mark-ups (or mark-downs) of U.S. re-exports to China through Hong Kong may be for exchange control or tariff avoidance purposes. A comparison of Table 1 and Table 3 reveals that re-exports through Hong Kong have declined significantly in recent years. Chinese re-exports to the U.S. through Hong Kong have declined from its peak of 196% of direct exports to the U.S. in 1991 to only 8% in 2015. Similarly, U.S. re-exports to China through Hong Kong has declined from its peak of 44% in 1996 to only 7% in 2015. Thus, an adjustment for the mark-ups would not have made much difference in any case.

In Table 4, the re-exports are added back to the official Chinese and U.S. export data to arrive at the total Chinese and U.S. exports of goods to each other on an FOB basis. With the adjustment for re-exports through Hong Kong, the estimate of the China-U.S. trade balance is increased from US$291.3 billion to US$317.4 billion.

[2] A possible alternative estimate of the CIF/FOB factor is the ratio of the total value of Chinese imports of goods into Hong Kong according to Hong Kong data to the total value of Chinese exports to Hong Kong according to Chinese data. Similarly, a possible alternative estimate of the CIF/FOB factor for the adjustment of the re-exports of U.S. goods from Hong Kong to the Mainland is the ratio of the total value of U.S. imports of goods into Hong Kong according to Hong Kong data to the total value of U.S. exports to Hong Kong according to the U.S. data. Unfortunately, these ratios show implausibly large values for certain years and cannot really be used for this purpose.

Table 3: Official Re-exports through Hong Kong (billion US$), Goods Only				
Year	Hong Kong Re-exports of Mainland Origin to the United States	Hong Kong Re-exports of Mainland Origin to the United States	Hong Kong Re-exports of U.S. Origin to Mainland	Hong Kong Re-exports of U.S. Origin to Mainland
	FOB, Hong Kong	FOB, Mainland China	FOB, Hong Kong	FOB, U.S.
	(Hong Kong Official Data)		(Hong Kong Official Data)	
1989	8.5	7.7	1.3	1.2
1990	10.5	9.5	1.3	1.2
1991	13.4	12.2	1.7	1.6
1992	18.1	16.4	2.3	2.1
1993	21.8	19.8	3.2	2.9
1994	25.3	23.0	3.7	3.4
1995	27.6	25.1	5.0	4.5
1996	29.2	26.6	5.9	5.3
1997	31.3	28.4	6.0	5.4
1998	30.9	28.1	5.3	4.8
1999	32.0	29.1	5.4	4.9
2000	36.4	33.1	6.1	5.6
2001	33.3	30.2	6.5	5.9
2002	34.3	31.2	6.2	5.6
2003	33.4	30.4	6.2	5.7
2004	35.5	32.3	5.8	5.3
2005	38.3	34.8	6.0	5.5
2006	40.1	36.5	6.5	5.9
2007	40.3	36.6	6.9	6.3
2008	39.7	36.1	8.1	7.4
2009	32.7	29.7	7.1	6.5
2010	37.7	34.2	8.6	7.8
2011	37.0	33.7	9.3	8.5
2012	38.3	34.8	9.5	8.6
2013	36.9	33.6	10.9	9.9
2014	37.7	34.3	11.4	10.3
2015	38.0	34.6	9.3	8.5
Source:				
Census and Statistics Department, Hong Kong Special Administrative Region.				
Notes:				
FOB Hong Kong values are converted into FOB China and FOB US values by the factor 1.1.				

Table 4: China-U.S. Trade Balance (billion US$), Goods Only, Based on Export Data, FOB, Adjusted for Hong Kong Re-Exports							
Year	Official Chinese Exports to the United States	Hong Kong Re-exports of Chinese Imports to the United States	Our Estimates of Chinese Exports to the United States	U.S. Exports to China	Hong Kong Re-exports of U.S. Imports to Mainland China	Our Estimates of U.S. Exports to Mainland China	Our Estimates of China-U.S. Trade Balance
	FOB	FOB, Mainland China	FOB, Adjusted for Hong Kong Re-exports	FOB	FOB, U.S.	FOB, Adjusted for Hong Kong Re-exports	FOB, Adjusted for Hong Kong Re-exports
	(Chinese Official Data)		(Chinese Data)	(U.S. Data)		(U.S. Data)	Based on Export Data
1989	4.4	7.7	12.1	5.9	1.2	7.1	5.0
1990	5.2	9.5	14.7	4.8	1.2	6.0	8.7
1991	6.2	12.2	18.4	6.4	1.6	7.9	10.4
1992	8.6	16.4	25.0	7.5	2.1	9.7	15.4
1993	17.0	19.8	36.8	8.9	2.9	11.8	25.0
1994	21.5	23.0	44.5	9.4	3.4	12.8	31.8
1995	24.7	25.1	49.8	11.8	4.5	16.3	33.4
1996	26.7	26.6	53.3	12.1	5.3	17.5	35.8
1997	32.7	28.4	61.1	12.9	5.4	18.4	42.8
1998	37.9	28.1	66.0	14.4	4.8	19.3	46.8
1999	41.9	29.1	71.0	13.3	4.9	18.2	52.8
2000	52.1	33.1	85.2	16.5	5.6	22.1	63.1
2001	54.3	30.2	84.5	19.6	5.9	25.5	59.0
2002	69.9	31.2	101.1	22.5	5.6	28.2	73.0
2003	92.5	30.4	122.8	28.9	5.7	34.6	88.2
2004	124.9	32.3	157.2	35.2	5.3	40.4	116.8
2005	162.9	34.8	197.7	42.3	5.5	47.8	149.9
2006	203.4	36.5	239.9	55.4	5.9	61.3	178.6
2007	232.7	36.6	269.3	65.0	6.3	71.2	198.1
2008	252.4	36.1	288.5	72.1	7.4	79.4	209.1
2009	220.8	29.7	250.5	71.3	6.5	77.8	172.7
2010	283.3	34.2	317.5	94.0	7.8	101.8	215.7
2011	324.5	33.7	358.1	106.5	8.5	115.0	243.1
2012	351.8	34.8	386.6	113.0	8.6	121.6	265.0
2013	368.4	33.6	402.0	124.1	9.9	134.0	268.0
2014	396.1	34.3	430.4	125.9	10.3	136.3	294.1
2015	409.2	34.6	443.8	117.9	8.5	126.3	317.4
Source:	Tables 2 and 3.						
Note:	Totals may not add because of rounding.						

In Table 5, we attempt to reconcile our estimate of the total Chinese exports to the U.S., including re-exports through Hong Kong, converted into a CIF basis, with the official U.S. data on U.S. imports from China (CIF). They show that the re-exports adjustment greatly reduce the discrepancy between the Chinese and the U.S. official data (compare columns 8 and 9). In particular, the discrepancy was less than 2 percent for the five-year period from 2011 to 2015. We attribute any remaining discrepancy between our adjusted estimates, CIF, and the U.S. official data to possible re-exports of Chinese goods to the U.S. through other third countries and regions than Hong Kong and the possible under-invoicing of imports by U.S. importers for the avoidance of tariffs.

Table 5: Reconciliation of Our Estimates of Chinese Exports to the U.S., CIF, and U.S. Official Data on Imports from China, CIF								
Year	Chinese Exports to the U.S.	Chinese Exports to the U.S.	Hong Kong Re-exports of Chinese Imports to the U.S.	Hong Kong Re-exports of Chinese Imports to the U.S.	Our Estimate of Total Chinese Exports to the U.S., CIF	U.S. Official Data on Imports from China	Percentage Difference between Chinese Official Data, CIF, and U.S. Official Data	Percentage Difference between Our Estimate and U.S. Official Data
	FOB	CIF, U.S.	CIF, Hong Kong	CIF, U.S.	CIF, U.S.	CIF, U.S.		
	(Chinese Data)	(Chinese Data)						
1989	4.4	4.8	8.5	9.3	14.1	12.0	59.7	-17.9
1990	5.2	5.7	10.5	11.5	17.3	15.2	62.4	-13.5
1991	6.2	6.8	13.4	14.7	21.5	19.0	64.1	-13.3
1992	8.6	9.5	18.1	19.9	29.4	25.7	63.2	-14.2
1993	17.0	18.7	21.8	23.9	42.6	31.5	40.6	-35.4
1994	21.5	23.7	25.3	27.9	51.5	38.8	39.0	-32.8
1995	24.7	27.2	27.6	30.4	57.5	45.6	40.4	-26.2
1996	26.7	29.4	29.2	32.1	61.5	51.5	43.0	-19.5
1997	32.7	36.0	31.3	34.4	70.4	62.6	42.5	-12.5
1998	37.9	41.7	30.9	34.0	75.7	71.2	41.4	-6.4
1999	41.9	46.1	32.0	35.2	81.3	81.9	43.7	0.7
2000	52.1	57.3	36.4	40.1	97.4	100.2	42.8	2.8
2001	54.3	59.7	33.3	36.6	96.3	102.6	41.8	6.1
2002	69.9	76.9	34.3	37.7	114.7	125.5	38.7	8.6
2003	92.5	101.7	33.4	36.7	138.5	153.0	33.5	9.5
2004	124.9	137.4	35.5	39.1	176.5	197.5	30.4	10.6
2005	162.9	179.2	38.3	42.1	221.3	244.7	26.8	9.6
2006	203.4	223.8	40.1	44.1	267.9	289.2	22.6	7.4
2007	232.7	255.9	40.3	44.3	300.3	323.0	20.8	7.0
2008	252.4	277.6	39.7	43.7	321.3	339.6	18.2	5.4
2009	220.8	242.9	32.7	36.0	278.8	297.9	18.5	6.4
2010	283.3	311.6	37.7	41.4	353.0	366.1	14.9	3.6
2011	324.5	356.9	37.0	40.8	397.7	400.6	10.9	0.7
2012	351.8	387.0	38.3	42.1	429.1	426.8	9.3	-0.5
2013	368.4	405.2	36.9	40.6	445.9	441.6	8.2	-1.0
2014	396.1	435.7	37.7	41.5	477.2	469.7	7.2	-1.6
2015	409.2	450.1	38.0	41.8	492.0	484.1	7.0	-1.6
Source:	Tables 1, 3 and 4.							
Note:	FOB values are converted into CIF values by the factor 1.1.							

In Table 6, we attempt to reconcile our estimate of the total U.S. exports to China (FOB) after the adjustment for re-exports through Hong Kong with the official Chinese data on Chinese imports from the U.S. (CIF). Table 6 reveals something very interesting. The U.S. exports to China, according to U.S. official data, converted to a CIF basis (column 3) is almost always less than the Chinese imports from the U.S., according to Chinese official data (column 8), from 1989 to 2015, except for the years 2006, 2007, 2009 and 2010. This shows that the Chinese official data on U.S. imports probably include re-exports through Hong Kong. Once re-exports through Hong Kong are added back to the U.S. exports on a CIF basis, to arrive at our estimates of the total Chinese imports from the U.S., CIF (column 7), they become greater than the official Chinese data (column 8) for every year from 1990 to 2012. However, from 2013 to 2015, the imports from the U.S. according to the official Chinese data are still higher even though they are actually quite close, on the order of 5 percent. We attribute the remaining discrepancy between our estimates and the Chinese official data to possible re-exports of U.S. goods through other third countries and regions

other than Hong Kong and the possible over-invoicing of imports by Chinese importers for avoidance of capital control and tax purposes.[3]

Table 6: Reconciliation of Our Estimate of U.S. Exports to China, CIF, and Chinese Official Data on Imports from the U.S.,CIF

Year	U.S. Exports to China	U.S. Exports to China	Hong Kong Re-exports of U.S. Imports to Mainland China	Hong Kong Re-exports of U.S. Imports to Mainland China	Hong Kong Re-exports of U.S. Imports to Mainland China	Our Estimate of Chinese Imports from the U.S., CIF	Chinese Official Data on Imports from the U.S.	Percentage Difference between U.S. Official Data, CIF, and Chinese Official Data	Percentage Difference between Our Estimate and Chinese Official Data
	FOB	CIF, Mainland China	FOB, U.S.	CIF, Hong Kong	CIF, Mainland China	CIF, Mainland China	CIF, Mainland China		
	(U.S. Data)	(U.S. Data)							
1989	5.9	6.4	1.2	1.3	1.4	7.9	7.9	18.43	0.11
1990	4.8	5.3	1.2	1.3	1.5	6.8	6.6	19.20	-2.80
1991	6.4	7.0	1.6	1.7	1.9	8.9	8.0	12.51	-11.03
1992	7.5	8.3	2.1	2.3	2.6	10.9	8.9	6.75	-22.28
1993	8.9	9.8	2.9	3.2	3.5	13.3	10.7	8.63	-24.06
1994	9.4	10.3	3.4	3.7	4.1	14.4	14.0	26.20	-2.94
1995	11.8	13.0	4.5	5.0	5.5	18.5	16.1	19.26	-14.78
1996	12.1	13.3	5.3	5.9	6.5	19.8	16.2	17.70	-22.12
1997	12.9	14.2	5.4	6.0	6.6	20.8	16.3	12.76	-27.50
1998	14.4	15.9	4.8	5.3	5.8	21.7	16.9	5.90	-28.59
1999	13.3	14.6	4.9	5.4	5.9	20.5	19.5	24.86	-5.48
2000	16.5	18.2	5.6	6.1	6.7	24.9	22.4	18.70	-11.35
2001	19.6	21.5	5.9	6.5	7.1	28.7	26.2	17.76	-9.39
2002	22.5	24.8	5.6	6.2	6.8	31.6	27.2	8.97	-16.06
2003	28.9	31.8	5.7	6.2	6.9	38.7	33.9	6.02	-14.24
2004	35.2	38.7	5.3	5.8	6.4	45.1	44.7	13.34	-0.91
2005	42.3	46.5	5.5	6.0	6.6	53.2	48.6	4.32	-9.32
2006	55.4	60.9	5.9	6.5	7.2	68.1	59.2	-2.85	-14.97
2007	65.0	71.5	6.3	6.9	7.6	79.0	69.4	-2.97	-13.91
2008	72.1	79.3	7.4	8.1	8.9	88.2	81.4	2.57	-8.36
2009	71.3	78.5	6.5	7.1	7.9	86.3	77.5	-1.31	-11.46
2010	94.0	103.4	7.8	8.6	9.5	112.9	102.1	-1.26	-10.56
2011	106.5	117.1	8.5	9.3	10.3	127.4	122.1	4.08	-4.34
2012	113.0	124.3	8.6	9.5	10.4	134.7	132.9	6.49	-1.37
2013	124.1	136.5	9.9	10.9	12.0	148.5	152.3	10.41	2.55
2014	125.9	138.5	10.3	11.4	12.5	151.0	159.1	12.91	5.05
2015	117.9	129.7	8.5	9.3	10.2	139.9	147.8	12.28	5.35
Source:	Tables 1, 3 and 4.								
Note:	FOB values are converted into CIF values by the factor 1.1.								

4. Official Data on Trade in Services

The U.S. publishes bilateral data on trade in services. Unfortunately, China does not currently publish such data. The values of the bilateral trade in services between China and the U.S., based on U.S. official data, are presented in Table 7 below. Bilateral trade in services was in approximate balance in 2006, at an annual rate of US$10 billion each way. Since then, U.S. exports of services to China has grown rapidly, to US$48.4 billion in 2015, compared to Chinese exports of services to the U.S. of US$15.1 billion, resulting in a surplus of US$33.3 billion for the U.S. However, fragmentary Chinese data suggest that the U.S.

[3] But not for the avoidance of import tariff purposes.

surplus in trade in services was higher, approximately US$45 billion in 2015. The U.S. surplus in trade in services is likely to continue increasing for a long time because of the rapidly rising total expenditures of Chinese students and tourists in the U.S. and the possibility of the expansion of U.S. financial services in China.

Table 7: Official U.S. Data on Trade in Services (billion US$)

	U.S. Exports of Services to China	U.S. Imports of Services from China	China-U.S. Trade Balance in Services
1989	N.A.	N.A.	N.A.
1990	N.A.	N.A.	N.A.
1991	N.A.	N.A.	N.A.
1992	1.6	1.0	-0.6
1993	1.9	1.3	-0.6
1994	2.0	1.5	-0.5
1995	2.5	1.7	-0.8
1996	3.2	1.9	-1.3
1997	3.6	2.2	-1.4
1998	3.9	2.3	-1.6
1999	4.0	2.7	-1.3
2000	5.1	3.2	-1.9
2001	5.4	3.6	-1.8
2002	5.8	4.5	-1.3
2003	5.9	4.3	-1.6
2004	7.3	6.2	-1.1
2005	8.7	6.9	-1.8
2006	10.6	10.1	-0.4
2007	13.1	11.8	-1.3
2008	15.8	10.9	-4.9
2009	17.1	9.6	-7.5
2010	22.5	10.6	-11.9
2011	28.4	11.8	-16.7
2012	33.0	13.0	-20.0
2013	37.5	13.9	-23.6
2014	44.5	14.0	-30.5
2015	48.4	15.1	-33.3
Source:			
1998 and before: from Fung, Lau and Xiong (2006).			
1999 and after: from the Bureau of Economic Analysis, Table 3.2.			
U.S. International Trade in Services by Area and Country, Seasonally Adjusted Detail			

5. Estimates of China-U.S. Trade Balance in Goods and Services Combined

In Table 8 we present estimates of the trade in goods and services combined between China and the U.S. as well as the implied China-U.S. trade balance. In terms of gross value, the China-U.S. trade balance is reduced from US$317.5 billion to US$284.1 billion in 2015, based on U.S. official data. If the alternative estimate of U.S. surplus in trade in services of US$45 billion is used, the China-U.S. trade balance is further reduced to US$272.1 billion, still a very substantial number.

Table 8: China-U.S. Trade Balance in Goods and Services (Bill. US$), Adjusted for Re-Exports			
Year	Our Estimate of China-U.S. Trade Balance in Goods	China-U.S. Trade Balance in Services	Our Estimate of China-U.S. Trade Balance in Goods and Services
	FOB, Adjusted for Hong Kong Re-exports		Goods Based on Export Data, Adjusted for Hong Kong Re-exports;
	Based on Export Data	Official U.S. Data	Services Based on Official U.S. Data
1989	5.0	N.A.	0
1990	8.7	N.A.	0
1991	10.4	N.A.	0
1992	15.4	-0.6	14.8
1993	25.0	-0.6	24.4
1994	31.8	-0.5	31.3
1995	33.4	-0.8	32.6
1996	35.8	-1.31	34.5
1997	42.8	-1.4	41.4
1998	46.8	-1.6	45.2
1999	52.8	-1.301	51.5
2000	63.1	-1.897	61.2
2001	59.0	-1.794	57.2
2002	73.0	-1.312	71.7
2003	88.2	-1.623	86.6
2004	116.8	-1.118	115.7
2005	149.9	-1.841	148.1
2006	178.6	-0.438	178.2
2007	198.1	-1.336	196.8
2008	209.1	-4.921	204.1
2009	172.7	-7.501	165.2
2010	215.7	-11.891	203.8
2011	243.1	-16.654	226.5
2012	265.0	-19.999	245.0
2013	268.0	-23.615	244.4
2014	294.1	-30.516	263.6
2015	317.4	-33.336	284.1
Source:	Tables 4 and 7.		

6. Domestic Value-Added Generated by Exports of Goods and Services

The gross value of exports is not a reliable measure of the benefits to the exporting country. For example, while most of the Apple i-phones are assembled in China, the value-added in China is no more than US$20 for each i-phone assembled in China even though it is exported for approximately US$500 with a value-added to gross value ratio of 4%. What is more useful as an indicator of the benefit for the exporting country is the domestic value-added (or equivalently, the GDP) generated directly and indirectly by the exports. Prof. Xikang CHEN and his collaborators at the Chinese Academy of Sciences have estimated the value-added corresponding to the exports of goods and services of both China and the U.S. in 2015 by using input-occupancy-output tables of both countries, adapting a methodology similar to that used in Chen et al (2006, 2009, 2012) and Lau et al (2007). The results are summarized in Table 9 below.

Table 9: China-U.S. Trade Balance in Terms of Value Added in 2015 (US$ billions)

	Chinese Exports to the U.S.	U.S. Exports to China	Trade Balance
(1) Gross Value of Direct Exports of Goods, FOB	409.21	117.87	291.35
(2) Value-Added of Direct Exports of Goods	263.80	102.01	161.79
(3) Gross Value of Re-Exports of Goods through Hong Kong	34.57	8.47	26.10
(4) Value-Added of Re-Exports of Goods through Hong Kong	21.71	6.56	15.15
(5) Gross Value of Exports of Services Based on U.S. Data on Trade in Services	15.11	48.44	-33.34
(6) Gross Value of Exports of Services Based on Fragmentary Chinese Data on Trade in Services	N.A.	N.A.	-45.34
(7) Value-Added of Services Based on U.S. Data on Trade in Services	13.06	45.04	-31.98
(8) Value-Added of Services Based on Fragmentary Chinese Data on Trade in Services	N.A.	N.A.	-44.19
(9) Gross Value of Exports of Goods, including Re-Exports (1) + (3)	443.78	126.34	317.45
(10) Value-Added of Exports of Goods, including Re-Exports (2) + (4)	285.51	108.57	176.94
(11) Gross Value of Exports of Goods and Services Based on U.S. Data on Trade in Services (9) + (5)	458.89	174.78	284.11
(12) Gross Value of Exports of Goods and Services Based on Fragmentary Chinese Data on Trade in Services (9) + (6)	N.A.	N.A.	272.11
(13) Value-Added of Exports of Goods and Services Based on U.S. Data on Trade in Services (10) + (7)	298.57	153.61	144.96
(14) Value-Added of Exports of Goods and Services Based on Fragmentary Chinese Data on Trade in Services (10) + (8)	N.A.	N.A.	132.74
Sources:			
Tables 1, 2, 4 and 7.			
Value-added based on estimates made by Prof. Xikang CHEN and his collaborators at the Chinese Academy of Sciences.			
Gross value and value-added of China-U.S. trade balance in services estimated by Prof. Lawrence J. Lau on the basis of fragmentary Chinese data.			

By including re-exports through Hong Kong, the China-U.S. trade balance is increased from US$291.3 billion to US$317.5 billion. By including also trade in services, the China-U.S. trade balance is reduced from US$317.5 billion to between US$284.1 billion and US$272.1 billion. By considering value-added instead of gross value, the China-U.S. trade balance in goods alone, including re-exports, may be estimated to be US$176.9 billion (from the estimate of US$317.5 billion based on adjusted export FOB data). If the bilateral trade in both goods and services are included, the China-U.S. trade balance in terms of value-added in 2015 may be estimated to be between US$145.0 billion and US$132.7 billion.

7. Concluding Remarks

The differences between the official Chinese and U.S. trade data have been largely reconciled by using only export data on an FOB basis, even though small differences still exist (see Tables 5 and 6 above). What are some of the possible reasons for the existence of remaining discrepancies between the Chinese and U.S. trade data? First, there can be differences between departure and arrival dates, so that the exports from one country in one year may be recorded as imports in the following year by the other country. If exports have been increasing or decreasing rapidly, the discrepancies can be quite noticeable. However, these discrepancies can account for at most a month or two of the year's exports and should normalize afterwards. Second, the actual FOB-CIF adjustments may not be the same as what we have implicitly assumed because the insurance and freight costs may be asymmetric between shipping from China to U.S. and from U.S. to China. Third, there may be over-invoicing and under-invoicing by exporters, importers and re-exporters for various reasons such as avoidance of capital control, tax on profits and import tariffs.

Unfortunately, Chinese official data on bilateral trade in services are not available. Based on the U.S. data on bilateral trade in services, the China-U.S. trade balance in goods and services combined in terms of value-added in 2015 may be estimated to be US$145.0 billion. Based on fragmentary Chinese data on trade in services, the China-U.S. trade balance in terms of value-added in 2015 may be estimated to be US$132.7 billion. While these numbers are still large and significant, they represent very large reductions from the estimate based on official U.S. gross value of trade in goods data of US$367.4 billion for 2015 (see Table 1).

One stream of service payments received by the U.S. beneficially but which may not be reflected in the bilateral trade in services data are the "royalties and license fees" paid to subsidiaries of U.S. firms such as Apple and Qualcomm that are domiciled in third countries and regions such as Ireland or Netherlands Antilles and not repatriated to the U.S. They will show up in the trade data as an export of services from these third countries to China instead of from the U.S. to China. These amounts are substantial and their domestic value-added content is close to 100 percent. If they can be identified and properly included in the estimation, the China-U.S trade balance in terms of value-added will be even further reduced.

References

Xikang Chen, Leonard K. Cheng, Kwok-Chiu Fung, Lawrence J. Lau, Jiansuo Pei, Yun-Wing Sung, Zhipeng Tang, Yanyan Xiong, Cuihong Yang and Kunfu Zhu (2006), "Estimates of U.S.-China Trade Balances in Terms of Domestic Value-Added," Working Paper No. 295, Stanford Center for International Development, Stanford University, Stanford, revised October.

Xikang Chen, Leonard K. Cheng, K.C. Fung and Lawrence J. Lau (2009), "The Estimation of Domestic Value-Added and Employment Induced by Exports: An Application to Chinese Exports to the United States," in Yin-Wong Cheung and Kar-Yiu Wong, eds., China and Asia: Economic and Financial Interactions, Oxon: Routledge, pp. 64-82.

Xikang Chen, Leonard K. Cheng, Kwok-Chiu Fung, Lawrence J. Lau, Yun-Wing Sung, Kunfu Zhu, Cuihong Yang, Jiansuo Pei and Y. Duan (2012), "Domestic Value Added and Employment Generated by Chinese Exports: A Quantitative Estimation," China Economic Review, Vol. 23, No. 4, pp. 850-864.

Kwok-Chiu Fung, Lawrence J. Lau and Yanyan Xiong (2006), "Adjusted Estimates of United States-China Bilateral Trade Balances: An Update," Pacific Economic Review, Vol. 11, No. 3, October, pp. 299-314.

Lawrence J. Lau, Xikang Chen, Cuihong Yang, Leonard K. Cheng, K. C. Fung, Yun-Wing Sung, Kunfu Zhu, Jiansuo Pei, and Zhipeng Tang (2007), "Feijingzhengxing Touru Zhanyong Chanchu Moxing Jiqi Yingyong--Zhong-Mei Maoyi Shuncha Toushi" (Input-Occupancy-Output Models of the Non-Competitive Type and Their Application--An Examination of the China-U.S. Trade Surplus), in Zhongguo Shehui Kexue (Social Sciences in China), Vol. 5, pp. 91-103.