The KORUS Effect:

Revisiting trade agreements and trade balances*

PRELIMINARY AND INCOMPLETE

Katheryn N. Russ †
University of California, Davis & NBER

Deborah L. Swenson‡
University of California, Davis and NBER

PRELIMINARY AND INCOMPLETE

Please do not quote without permission

12 July 2018

Abstract: We analyze disaggregate trade data to determine whether tariff preferences for South Korean goods imported by the U.S. after the Korea-U.S. Free Trade Agreement (KORUS) went into force drew U.S. import demand away from imports from other trading partners, a phenomenon called trade diversion. Adding up the effects across goods and third-country trading partners, total trade diversion is an estimated (preliminary) $16.8 billion in 2013 and $17.8 billion in 2014, more than half the size of the U.S. trade deficit during those years. Thus, trade diversion may have contributed to the increasing U.S. bilateral trade deficit with South Korea after 2012.

Keywords: Korea-U.S. Free Trade Agreement, preferential trade agreements, trade imbalances, trade diversion

JEL Codes: F10

*We thank Kelly Stangl for excellent research assistance.

†Address: Economics Department, University of California, Davis, One Shields Avenue, Davis, California 95616 USA. Email: knruss@ucdavis.edu.

‡Economics Department, University of California, Davis, One Shields Avenue, Davis, California 95616 USA. Email: deswenson@ucdavis.edu.

1. Introduction

The Korea-U.S. Free Trade Agreement (KORUS) received intense criticism from many quarters after going into force in March 2012, alleging that the agreement allows South Korea to exploit the United States. Most critics pointed to the ensuing increase in the U.S. bilateral trade deficit to motivate this argument. This paper asks the question of whether trade diversion may contribute to bilateral trade deficits after free trade agreements go into force, using KORUS as a case study.

Whether and how regional free trade agreements affect trade imbalances more generally remains an open question. The 2018 Economic Report of the President (Council of Economic Advisers, 2018, p.230) sums up the issue:

> Although trade agreements are associated with about twice as much overall trade, the causal impact on the trade balance is unclear, in part because agreements are more likely with countries that would otherwise have higher trade volumes. Nor does the presence of an agreement predict the balance of trade. The United States has free trade agreements (FTAs) with a number of countries—some of which represent net trade surpluses for the United States (Canada and Singapore), and some of which represent deficits (Mexico and South Korea).

Standard quantitative models assessing the impacts of trade policy either feed in past values of the trade balance as an exogenous variable (Dekle, Eaton, and Kortum, 2007), or extrapolate its baseline value based on past and forecasted macroeconomic growth (United States International Trade Commission, 2016).

Our mission is not to try to forecast the U.S. trade deficit with South Korea, but to assess whether (1) trade diversion may have played a role in the expansion of the U.S. bilateral trade deficit with South Korea in the years after KORUS went into force, and (2) South Korea's role within regional and global supply chains may influence the degree of trade diversion. The question is important because trade diversion may increase the U.S. bilateral trade imbalance with an FTA partner, but have no effect on the overall U.S. trade balance.

To address the issue, we provide estimates for the effect of trade diversion on U.S. imports from South Korea under KORUS. First, we use a method of detecting trade diversion pioneered by Romalis (2007) in his assessment of the North American Free Trade Agreement (NAFTA) and the Canadian-U.S. Free Trade Agreement. This involves measuring whether U.S. imports from

third countries appear to be sensitive to the degree of U.S. tariff preference toward South Korean goods, using imports by Australia and Canada to condition for external factors. We find that a 1 percent decline in the U.S. tariff on a South Korean (HS-6) goods categories is associated with about 0.05 percent lower U.S. imports from third countries as a share of Australian or Canadian imports of the same product lines from the same third countries each year between 2010 and 2014. The effect we identify is in proportion to Romalis's (2007) NAFTA effect, taking into account South Korea's smaller contribution to U.S. goods imports the year before KORUS went into force (2.5 percent for South Korea in 2011, compared to 26 percent for Mexico plus Canada in 1993) and the shorter horizon over which we are able to measure the effects taking place (3 years versus 5).

In aggregate, we find that trade diversion may have redirected between $16 billion and $18 billion worth of U.S. imports away from third countries in 2013 and 2014, more than half of the increase in the U.S. bilateral deficit with South Korea in those years.

2. Trade between South Korea and the United States

The United States imported $82.6 billion dollars in goods and services from and exported $72.3 billion dollars in goods and services to South Korea in 2017 according to the U.S. Bureau of Economic Analysis (BEA). To put this in context, although U.S. gross domestic product is more than 10 times larger, South Korea is the 7th largest U.S. trading partner in terms of total trade in goods and services and has accounted for roughly 3 percent of all U.S. imports and exports for the past several decades. Bilateral trade between the U.S. and South Korea constitutes 13 percent of South Korea's total trade according to United Nations Comtrade.

2.1 The trade balance

As with many countries, the U.S. runs a services trade surplus with South Korea and a large deficit in goods trade. The bilateral goods deficit increased between 2012, when KORUS went into force, and 2016. U.S. imports from South Korea expanded considerably after 2012, with 1,988 new HS10 categories imported in either 2016 or 2017 that did not appear in the 5 years prior to the agreement, according to data from the U.S. Census USATrade. The chart below shows the ten HS2 categories (other than HS 98, which includes re-imported goods), showing the largest increase in U.S. imports from South Korea between 2012 and 2016. Vehicles are at the top, having increased by $6.3 billion, followed by electrical machinery and equipment ($3.2) and

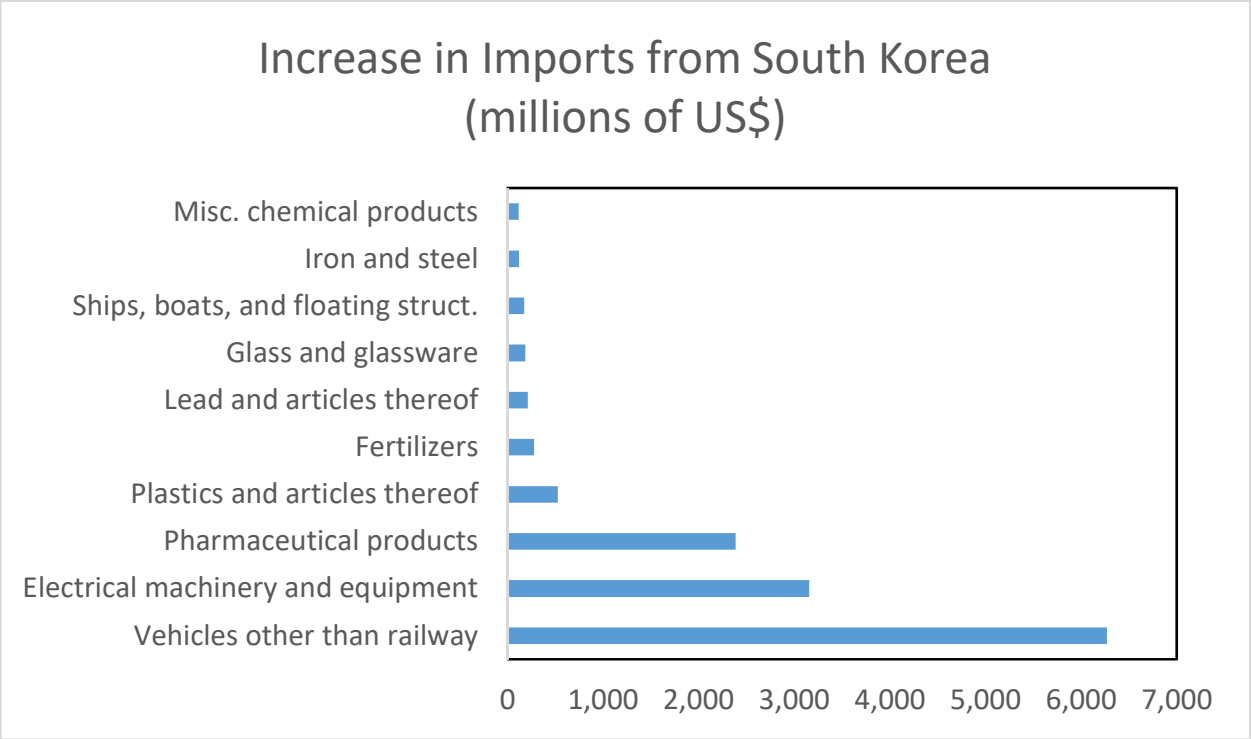


Figure 1: Commodities with greatest new preference under KORUS

pharmaceutical products ($2.4). Most of these categories—particularly chemicals, iron and steel; glass, lead, fertilizers, plastics, and electrical machinery and equipment—include intermediate inputs. Four of the top-ten categories rely heavily on metals—vehicles; electrical machinery and equipment; ships, boats, and floating structures; and iron and steel.

Yet, looking at import shares, a way to control for domestic factors influencing the overall demand for imports, imports from Korea as a fraction of US goods imports overall and US services imports overall changed little between 2012 and 2016 according to statistics from BEA. Imports from the US as a fraction of Korean goods imports overall ticked up from 8 to more than 10 percent. Using statistics from Comtrade, imports from the US as a fraction of Korean services imports increased as well, from 18 percent to nearly 20 percent. Thus, the increasing U.S. trade deficit with South Korea after KORUS took effect corresponds with an overall decline in the demand for imports in South Korea at the time, but a strengthening of Korean demand for U.S.

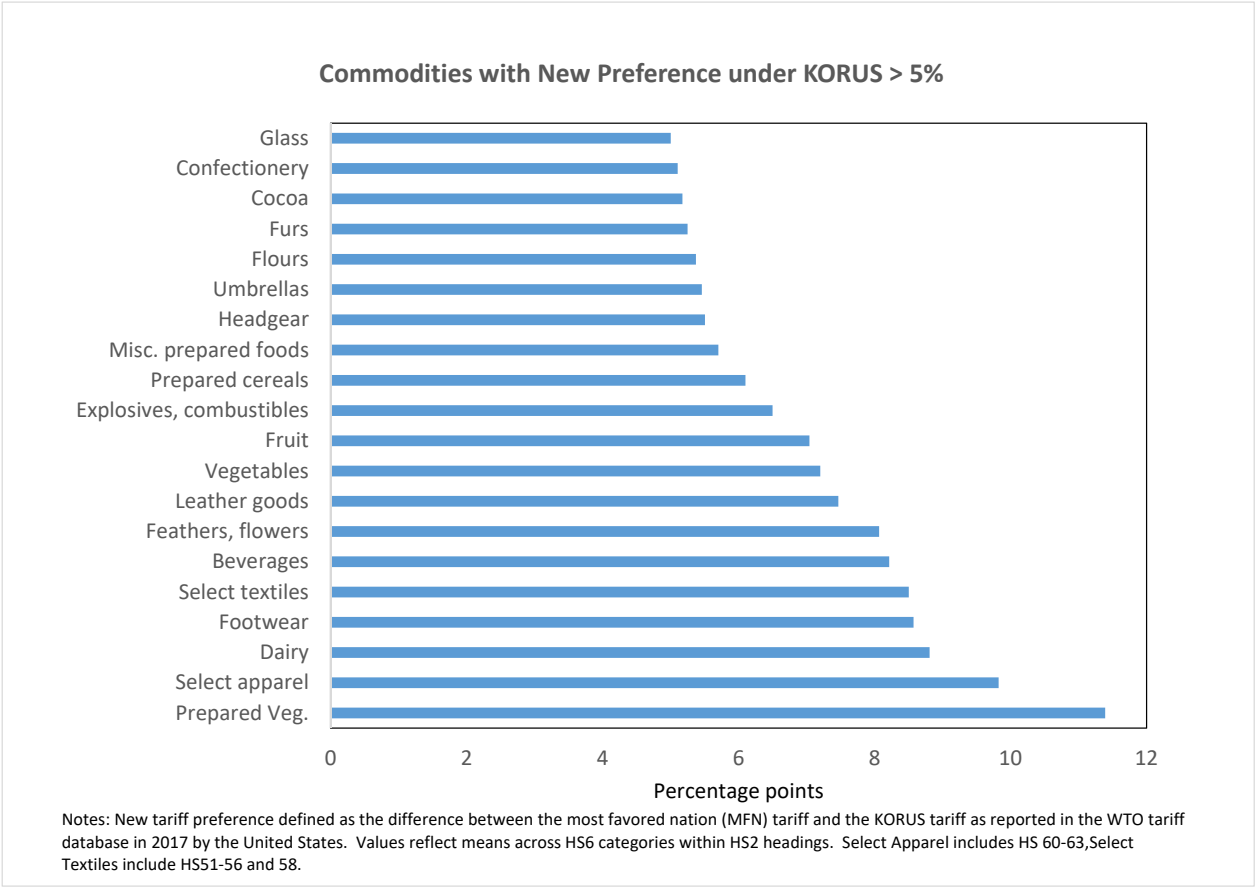


Figure 2: Commodities with greatest new preference under KORUS

goods and services compared to goods from elsewhere. These macroeconomic factors show up in large year fixed effects in the baseline specification of our estimation below.

2.2 *Tariff preferences under KORUS*

U.S. and South Korean producers of many manufactured goods industries received new tariff preferences under KORUS, relative to the most favored nation (MFN) tariff schedule. Figure 2 below shows the HS-2 categories with the greatest new preferences for South Korean producers exporting to the United States using a simple average across HS6 categories within each HS2 heading.

Many of the industries with the greatest new preference are finished or consumer goods, like apparel, footwear, and processed foods. In the chart below (Figure 3), we show U.S. import shares from South Korea broken down by new preferential access under KORUS. Categorizing goods by

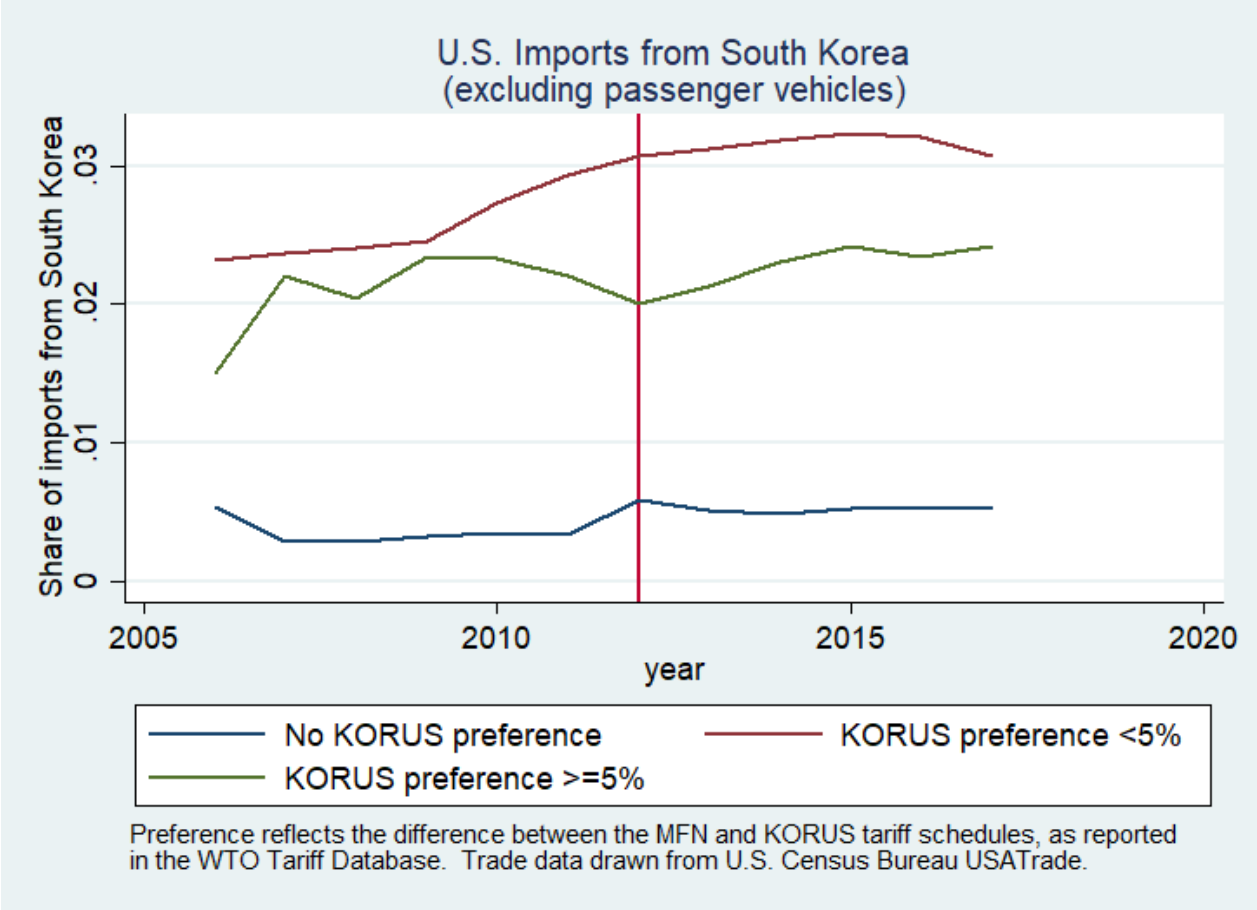


Figure 3: Imports by degree of new KORUS preference

the level of new preference, we see that, excluding passenger vehicles, import shares increased most for South Korean goods where new preference was greatest.

Next, we break down end-use categories within goods that received new tariff preference under KORUS of 5 percentage points or more in Figure 4. Intermediate goods appear to have been the most responsive, suggesting that new tariff preferences under a regional free trade agreement may have an effect on supply chains. In the case here, the effect is somewhat lagged, most noticeable 2-4 years after the agreement goes into force in 2012. The lag suggests that adjustment costs or other impediments may be at work.

Finally, we examine whether all import shares for South Korean intermediate goods increased after KORUS, or whether there is reason to believe the new tariff preference may be driving the shift. Figure 5 demonstrates that import shares for intermediate goods with no new tariff preference under KORUS or new tariff preference of less than 5 percentage points (but above

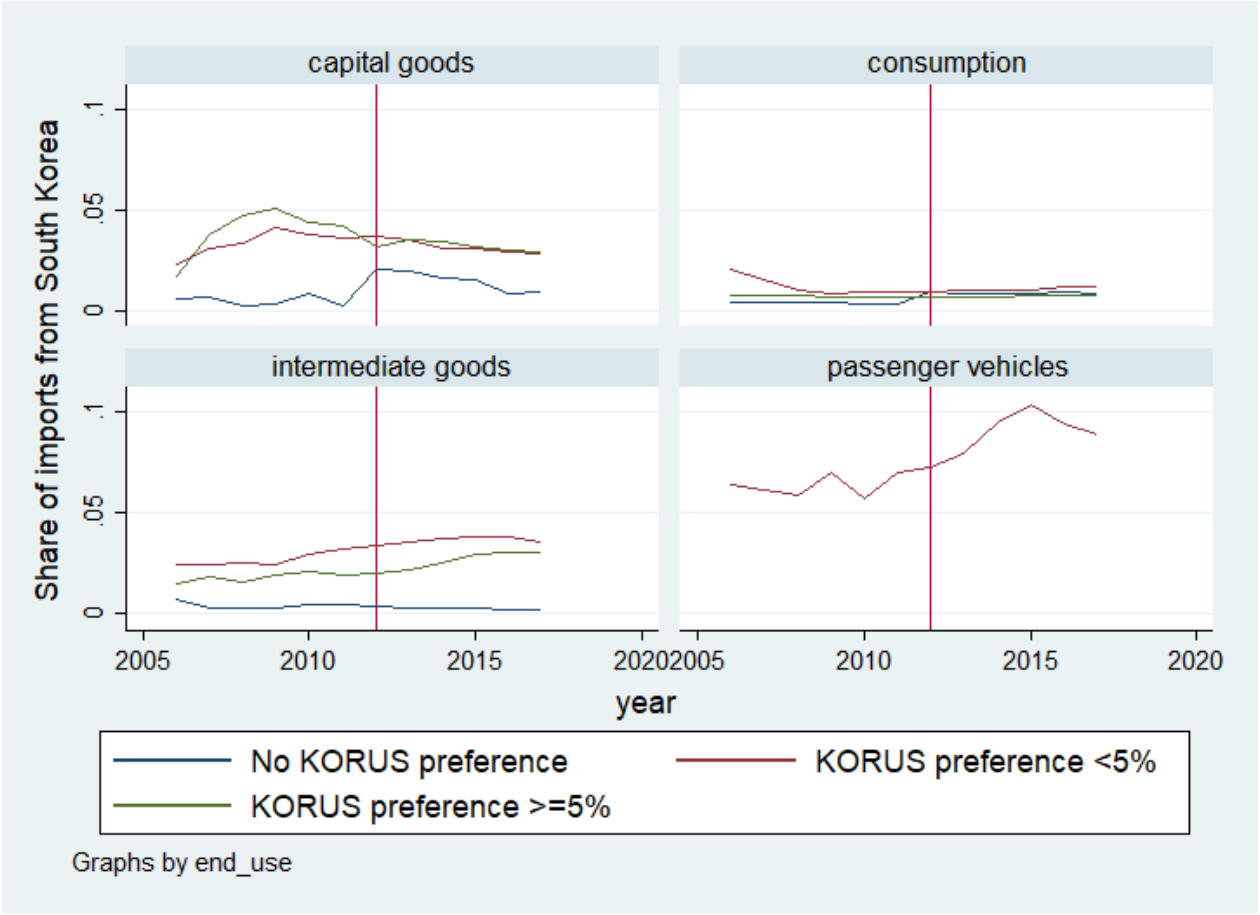


Figure 4: Imports of intermediate goods and passenger vehicles increase most under KORUS

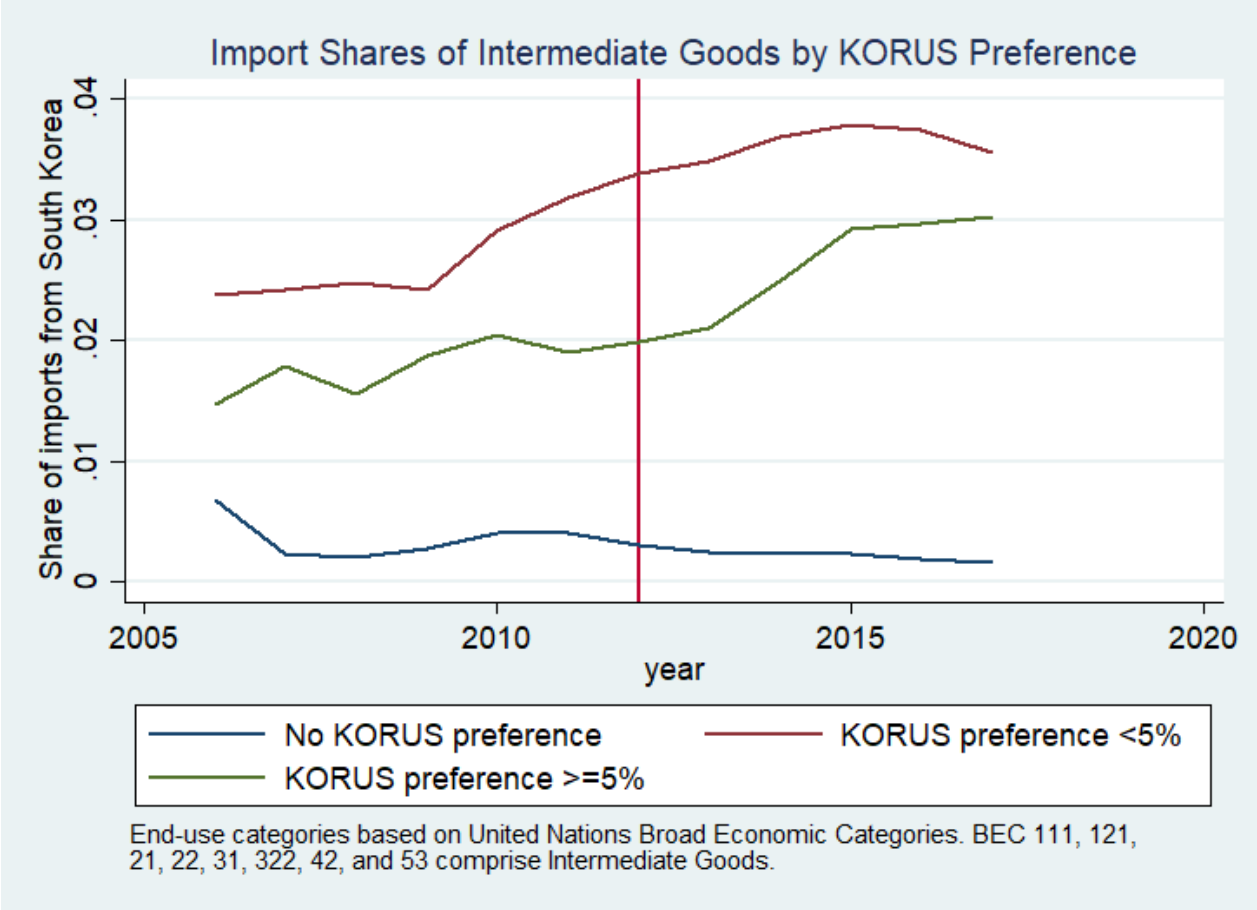


Figure 5: Imports of intermediate goods by degree of new KORUS preference

zero) do not increase at the same rate as for this higher preference class. The greater degree and persistence of the increase in import shares for intermediate goods subject to the highest levels of new preference under KORUS suggests the presence of adjustment costs and other hangups or persistent cost differentials between source countries that outweigh tariff cuts between 0 and 5 percent.

3. Trade Diversion

The literature on trade diversion is vast,[1] with some questioning whether in the age of proliferating preferential trade agreements, it is still quantitatively important (Magee, 2017). We use the measure of trade diversion constructed by Romalis (2007) to show that even for a bilateral free trade agreement with a country that accounts for only 3 percent of U.S. trade, trade diversion exists and is nontrivial.

[1] Full literature review forthcoming.

3.1 Detecting trade diversion

Based on an economy with constant elasticity of demand (CES) preferences, Romalis (2007) derives a relative import demand equation for the FTA partner, in our case the United States, and a reference country, R, for good i purchased from a control or third country j. Simplifying the notation here, it is given by

$$\ln \frac{M_{ijt}^{US}}{M_{ijt}^{R}} = \sigma \ln \frac{1+\tau_{ijt}^{US}}{1+\tau_{ijt}^{R}} - (\sigma-1) \ln \frac{g_{ijt}^{US}}{g_{ijt}^{R}} + (\sigma-1) \ln \frac{P_{it}^{US}}{P_{it}^{R}} + \ln \frac{b_{it}^{US} Y_t^{US}}{b_{it}^{R} Y_t^{R}}, \tag{1}$$

where σ is the elasticity of substitution between goods, τ the relevant tariff in percentage points, g an iceberg trade cost representing other trade costs, P the aggregate price index of all sellers of product i in the United States or reference country, b a demand shifter, and Y aggregate domestic production, with the product bY equal to aggregate domestic demand in the United States or reference country. Note that the relative price level in this equation captures real exchange rate effects and relative demand captures GDP ratios generally modeled in macro approaches to current account imbalances.

We obtain all import data at the HS-6 digit level from UN Comtrade for the countries listed in the appendix. We obtain tariff data for U.S. MFN and KORUS schedules from the WTO tariff database. We use Australia and Canada as control countries instead of the European Union because the EU enacted a free trade agreement with South Korea the year before KORUS went into effect, precluding its usefulness as a reference area. However, both Australia and Canada also put into force free trade agreements with South Korea in December 2014 and January 2015, respectively so we cut off the sample at 2014. We use them instead of Japan because Japan put into force agreements with many countries in the control-country sample, particularly in Asia. We begin the sample in 2010 to avoid confounding factors related to the trade collapse and rebound between 2007 and 2009.

Equation 1 yields an econometric specification:

$$\ln \frac{M_{ijt}^{US}}{M_{ijt}^{R}} = \beta_1 \ln(1+\tau_{it}^{US,Korea}) + \beta_2 \ln(1+\tau_{it}^{US,MFN}) + D_i + D_t + \varepsilon_{it}. \tag{2}$$

D_i and D_t are a full set of product and year fixed effects, with ε_{it} an error term orthogonal to the tariffs. These are meant to capture the relative non-tariff trade costs, $\frac{g_{ijt}^{US}}{g_{ijt}^{R}}$, factors affecting relative demand, $\frac{b_{it}^{US} Y_t^{US}}{b_{it}^{R} Y_t^{R}}$, as well as factors that may affect relative prices of Korean versus other goods, such as changes in the won-dollar rate and domestic factors affecting industry and aggregate price levels in the U.S. relative to the reference country.

3.2 Identifying trade diversion

We view Canada as our baseline specification because it is geographically closest to the United States, with results for Australia showing very similar quantitative and qualitative patterns. Table 1 shows that a one percent reduction in the U.S. tariff on South Korean goods is associated with a reduction in imports from third countries of 0.06 percent relative to Canadian imports. The baseline estimate in Column (1) is within the range (0.06-0.40) that Romalis estimates for U.S. tariffs on Canadian in the years leading up to and following the adoption of NAFTA for a similar country sample, using the EU as the reference area. It is much smaller than his estimates for Mexico (1.27-1.38), so in the first three years after KORUS, we see roughly 3-5 percent as much trade diversion as in the five years after NAFTA. This is in proportion, given South Korea's smaller contribution to U.S. imports the year before KORUS took effect (2.5 percent) relative to the sum of Canada and Mexico's (25.5 percent) and the shorter time horizon over which we have to measure the effects— only 3 years rather than 5. We have to end our sample in 2014 due to free trade agreements going into force between South Korea and both Australia and Canada in, respectively, December 2014 and January 2015. The coefficient using Australia as the reference country is not significant, but is of the same sign and order of magnitude and becomes significant with the addition of simple controls below.

We also explicitly note the year fixed effects in Table 1 to highlight the magnitude of macroeconomic influences. The year fixed effects after 2012 are up to four times larger than the coefficient on the U.S.-South Korea tariff, showing the dominance of macro effects driving import flows during the period.

Table 2 shows the sensitivity of the log U.S.-Canada ratio of imports from third countries by end-use category. We define intermediate goods as United Nations Broad Economic Categories (BEC) 111, 121, 21, 22, 31, 322, 42, and 53; consumption goods as BEC 112, 122, 522, 61, 62, and 63; and capital goods as BEC 41 and 521. The coefficient on the interaction term between intermediate goods and the U.S.-South Korea tariff is negative, significant, and almost the same size as the coefficient on the tariff alone. Thus, intermediate goods as a broad category do not appear subject to trade diversion within the first 3 years of KORUS.

In contrast, consumption goods are sensitive compared to non-consumption categories. Consumption goods may drive much of the sensitivity observed for the sample as a whole since the

Table 1: Log of U.S.-reference country import ratio on U.S. tariff for South Korean goods

	(1)	(2)
Reference Country	Canada	Australia
$\tau_{it}^{US,Korea}$	0.062***	0.032
	(0.021)	(0.026)
Year Fixed Effects		
2011	-0.000	0.047*
	(0.020)	(0.025)
2012	0.057	0.096**
	(0.038)	(0.046)
2013	0.090**	0.167***
	(0.038)	(0.046)
2014	0.147***	0.222***
	(0.039)	(0.047)
MFN Tariffs	Yes	Yes
HS-6 Product FE	Yes	Yes
Control Countries	Table A.1	Table A.1
N	99,456	73,248
R^2	0.174	0.230
RMSE	2.276	2.400

Note: Standard errors in parentheses with ***, **, and * respectively denoting significance at the 1%, 5% and 10% levels.

inclusion of the consumption interaction term takes on nearly the full value and significance of the tariff, leaving the coefficient estimate on the tariff by itself close to zero and without significance. Capital goods show no special sensitivity either way, as the coefficient on the interaction term is close to zero and not significant. The relative persistence of trading relationships for intermediate goods is consistent with Figure 4, where we observe very gradual increase in U.S. imports of intermediate goods from South Korea after KORUS took effect and the increase in Korean import shares persisting mainly for goods with new tariff preference greater than 5 percent. We surmise that it often may take time for firms to respond to new tariff preferences by reorganizing supply chains in this case, or that there are costs involved which make it unprofitable to do so.

Table 2: Log of U.S.-Canada import ratio on U.S. tariff for South Korean goods by end-use

	(1)	(2)	(3)
$\tau^{US,Korea}$	0.067**	0.005	0.061***
	(0.021)	(0.030)	(0.021)
Intermediate Good$\times\tau_{ijt}^{US,Korea}$	-0.060**		
	(0.023)		
Consumption Good$\times\tau_{ijt}^{US,Korea}$		0.061***	
		(0.023)	
Capital Good$\times\tau_{ijt}^{US,Korea}$			-0.007
			(0.049)
Constant	5.378**	5.378**	5.378**
	(2.276)	(2.276)	(2.276)
MFN Tariffs	Yes	Yes	Yes
HS-6 Product FE	Yes	Yes	Yes
Control Countries	Table A.1	Table A.1	Table A.1
N	99,456	99,456	99,456
R^2	0.174	0.174	0.174
RMSE	2.276	2.276	2.276

Note: Standard errors in parentheses with ^{a}, ^{b}, and ^{c} respectively denoting significance at the 1%, 5% and 10% levels.

The peculiar resilience of intermediate goods does not hold for regional supply chains within Asia. Results in Column (1) of Table 3 show that U.S. trading relationships with countries in Asia other than South Korea generally are more resilient (less subject to KORUS-related trade diversion) than trading relationships elsewhere. Given a 1 percent reduction in the U.S.-South Korea tariff, U.S. imports from third countries outside of Asia are 0.13 percent lower relative to

Canada, double the baseline sensitivity in Column (1) of Table 1. Yet U.S. imports from countries in Asia are much less sensitive, with a coefficient on the Asia-tariff interaction term of -0.104 yielding an overall sensitivity for U.S. imports from Asia of only 0.026 percent.

Table 3: Log of U.S.-Canada import ratio on U.S. tariff for South Korean goods by region

	(1)	(2)	(3)
$\tau^{US,Korea}$	0.130***	0.136***	0.136***
	(0.023)	(0.024)	(0.023)
Asia$\times\tau_{ijt}^{US,Korea}$	-0.104***	-0.113***	
	(0.017)	(0.020)	
Intermediate Good$\times\tau_{ijt}^{US,Korea}$		-0.154***	
		(0.023)	
Asia$\times\tau_{ijt}^{US,Korea}$		-0.007	
		(0.049)	
Japan$\times\tau_{ijt}^{US,Korea}$			-0.077***
			(0.028)
China$\times\tau_{ijt}^{US,Korea}$			-0.110***
			(0.026)
Other Asia$\times\tau_{ijt}^{US,Korea}$			-0.126***
			(0.026)
Constant	5.378**	5.378**	5.378**
	(2.276)	(2.276)	(2.276)
MFN Tariffs	Yes	Yes	Yes
HS-6 Product FE	Yes	Yes	Yes
Control Countries	Table A.1	Table A.1	Table A.1
N	99,456	99,456	99,456
R^2	0.174	0.174	0.189
RMSE	2.276	2.276	2.256

Note: Standard errors in parentheses with ^{a}, ^{b}, and ^{c} respectively denoting significance at the 1%, 5% and 10% levels.

The same pattern holds for intermediate goods taken as a group, in Column (2) of Table 3, with an interaction term of -0.154. In contrast, the coefficient on the triple-interaction term in Column (2) of Table 3 representing the sensitivity of U.S. imports of intermediate goods from Asia is nearly 0.14 and significant, even though the tariff interaction with Asia alone is still negative, relatively large (-0.113), and significant. Therefore, intermediate goods from countries in Asia appear particularly subject to trade diversion under KORUS, despite the more resilient nature of

both U.S. trade relationships with Asia overall and of intermediate goods supply chains outside of Asia.

We also break out the other large countries in the region to observe whether their trade with the U.S. appears differentially responsive to U.S. tariff preferences for South Korea under KORUS. Column (3) of Table 3 shows that the resilience of U.S. trade with Asia overall likewise applies to China. However, it does not apply to Japan. The interaction between the Japan indicator and the U.S-South Korea tariff is (in absolute magnitude) just over half the size of the coefficient on the tariff alone, yielding an overall sensitivity for U.S. imports from Japan close to the baseline of 0.062 in Table 1. Japan appears more subject to trade diversion from KORUS preferences than other countries in Asia, though standard errors make the comparison somewhat ambiguous, especially in comparison to China. Nevertheless, the negative and significant coefficient on the China and Japan indicators suggest that both China and Japan's trading relationships with the U.S. are more resilient to KORUS preferences than is the case for countries outside of Asia.

To check for robustness, Tables 4 and 5 show that these patterns generally hold using Australia as a reference country. U.S. trade in intermediate goods with control countries is more resilient to the new KORUS tariff preferences than the baseline estimates in Table 1, while U.S. imports of consumption goods are much more prone to trade diversion than the baseline. U.S. imports from control countries outside of Asia (Table 5) are about 3 times more sensitive to the KORUS preferences, while imports from control countries within Asia are hardly sensitive at all. And while both U.S. imports from Asia and of intermediate goods generally are impervious to trade diversion, the same does not hold for intermediate goods sourced from control countries within Asia.

Two differences emerge between the baseline with Canada as the reference country and the robustness check with Australia. First, capital goods are as resilient as intermediate goods in the Australia-reference case, but for the Canada-reference case capital goods show no special resilience or sensitivity to the U.S.-South Korea tariff. Second, when using Australia as the reference country, Japan appears less sensitive to trade diversion than other control countries within Asia. U.S. imports from control countries in Asia other than Japan and China here appear more sensitive to the Korean tariff than either Japan or China. For the Canada-reference baseline case, Japan is more subject to trade diversion and Asian control countries other than Japan and

Table 4: Log of U.S.-Australia import ratio on U.S. tariff for South Korean goods by end-use

	(1)	(2)	(3)
$\tau^{US,Korea}$	0.050*	-0.098***	0.028***
	(0.027)	(0.036)	(0.026)
Intermediate Goods$\times\tau_{ijt}^{US,Korea}$	-0.114***		
	(0.028)		
Consumption Goods$\times\tau_{ijt}^{US,Korea}$		0.150***	
		(0.028)	
Capital Goods$\times\tau_{ijt}^{US,Korea}$			-0.134**
			(0.057)
Constant	-2.344	-2.311	-2.550
	(1.565)	(1.565)	(1.565)
MFN Tariffs	Yes	Yes	Yes
HS-6 Product FE	Yes	Yes	Yes
Control Countries	Table A.1	Table A.1	Table A.1
N	73,243	73,243	73,243
R^2	0.230	0.230	0.230
RMSE	2.400	2.400	2.400

Note: Standard errors in parentheses with ^{a}, ^{b}, and ^{c} respectively denoting significance at the 1%, 5% and 10% levels.

China are quite resilient.

Table 5: Log of U.S.-Canada import ratio on U.S. tariff for South Korean goods by region

	(1)	(2)	(3)
$\tau^{US,Korea}$	0.179***	0.231***	0.119***
	(0.033)	(0.035)	(0.031)
Asia$\times\tau_{ijt}^{US,Korea}$	-0.170***	-0.220***	
	(0.026)	(0.030)	
Intermediate Goods$\times\tau_{ijt}^{US,Korea}$		-0.275***	
		(0.059)	
Asia$\times$Intermediate Goods$\times\tau_{ijt}^{US,Korea}$		0.196***	
		(0.060)	
Japan$\times\tau_{ijt}^{US,Korea}$			-0.237***
			(0.036)
China$\times\tau_{ijt}^{US,Korea}$			-0.175***
			(0.031)
Other Asia$\times\tau_{ijt}^{US,Korea}$			-0.077***
			(0.024)
Constant	-2.606	-1.668	-2.606
	(1.519)	(1.552)	(1.519)
MFN Tariffs	Yes	Yes	Yes
HS-6 Product FE	Yes	Yes	Yes
Control Countries	Table A.1	Table A.1	Table A.1
N	73,243	73,243	73,243
R^2	0.243	0.244	0.275
RMSE	2.380	2.380	2.330

Note: Standard errors in parentheses with $^{*}**$, $^{*}*$, and * respectively denoting significance at the 1%, 5% and 10% levels.

4. Aggregate estimates (Preliminary)

How much trade diversion is there overall? We first estimate a slightly modified version of Eq. (2),

$$\ln(M_{ijt}^{US}) = \beta_1 \ln(1+\tau_{it}^{US,Korea}) + \beta_2 \ln(1+\tau_{it}^{US,MFN}) + \ln(M_{ijt}^{R}) + D_i + D_t + \varepsilon_{it}. \quad (3)$$

We compute a KORUS effect for any year t in the interval 2013-2014, the years in our sample after the year that KORUS went into force holding everything but the U.S. tariffs on South Korean

goods constant,

$$\ln \frac{M_{ijt}^{US}}{M_{ij,2011}^{US}} = \beta_1 \left(\frac{\ln(1+\tau_{it}^{US,Korea})}{\ln(1+\tau_{i,2011}^{US,Korea})} \right),$$

where I is the total number of HS-6 goods categories and J is the total number of third-country partners. Let D be the amount of trade diversion in terms of dollar expenditures on U.S. imports. A bit of algebra yields a formula for the change in import expenditures as a function of this KORUS effect from (4),

$$D_t = \sum_{i=1,j=1}^{I,J} D_{ijt} = \sum_{i=1,j=1}^{I,J} \left[\exp \beta_1 \left(\frac{\ln \tau_{it}^{US,Korea}}{\ln \tau_{i,2011}^{US,Korea}} \right) - 1 \right] M_{ij,2011}^{US}. \quad (4)$$

The exercise, using Canada as the reference country, yields a (preliminary) figure for total trade diversion equal to $16.8 billion in 2013 and $17.8 billion in 2014. This amounts to more than half of the 2013 U.S. bilateral goods trade deficit with South Korea of $20.7 billion and the 2014 U.S. bilateral trade deficit of $25.5 billion.

5. Conclusion

We revisit the question of whether trade agreements can affect the bilateral trade balance using the lens of trade diversion. U.S. imports from countries in Asia and of intermediate goods appear to be quite resilient to Korea gaining preferential tariff access in 2012. Nonetheless, imports from outside of Asia, imports of consumption goods, and imports of intermediate goods from countries in Asia (other than China) all appear to decline in the face of the KORUS tariff preferences. We estimate that trade diversion, summed across all traded goods categories, amounted to $16.8 billion and $17.8 billion annually in 2013 and 2014, apart from any additional macroeconomic forces in those years. The results suggest that trade diversion may have contributed substantially to the increasing U.S. bilateral trade deficit with South Korea after 2012.

Appendix A. Control country list

The third-country trading partners to the U.S. and reference country are taken from Table A.1 of Romalis (2007), omitting countries establishing free trade agreements with Australia, Canada, or the U.S. after 2008:

Angola, Antigua Barbuda, Argentina, Aruba, Australia, Bahamas, Bahrain, Bangladesh, Barbados, Belize, Benin, Bermuda, Bhutan, Bolivia, Botswana, Brazil, Brunei, Burkina Faso, Burundi,

Cambodia, Cameroon, Cape Verde, Cayman Islands, Central African Republic, Chad, Chile, China, Christmas Island, Cocos Islands, Comoros, Congo (DROC), Congo (ROC), Cook Islands, Costa Rica, Cote d'Ivoire, Cuba, Dijbouti, Dominica Island, Dominican Republic, Ecuador, El Salvador, Equitorial Guinea, Ethiopia, Fiji, Gabon, Gambia, Ghana, Greenland, Grenada Island, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, Hong Kong, Indonesia, Jamaica, Japan, Kenya, Kiribati, Laos, Lesotho, Liberia, Libya, Macao, Madagascar, Malawi, Malaysia, Maldive Island, Mali, Marshall Islands, Mauritania, Mauritius, Mongolia, Monserrat Islands, Mozambique, Namibia, Nauru, Nepal, Netherlands Antilles, New Caledonia, New Zealand, Nicaragua, Niger, Nigeria, Niue, Norfolk Islands, North Korea, Norway, Oman, Pakistan, Palau, Papua New Guinea, Paraguay, Peru, Philippines, Pitcairn Islands, Qatar, Rwanda, Samoa, Saudi Arabia, Senegal, Seychelles, Sierra Leone, Singapore, Solomon Islands, Somalia, Sri Lanka, St. Kitts-Nevis, St. Lucia Islands, St. Vinc & Gren, Sudan, Suriname, Swaziland, Switzerland, Tanzania, Thailand, Togo, Trinidad & Tobago, Tuvalu, Uganda, United Arab Emirates, Uruguay, Venezuela, Yemen.

Australian, Canadian, and U.S. import data for these countries were downloaded using UN Comtrade API. Tariff data were downloaded from WTO online Tariff Database.

References

Council of Economic Advisers (2018): "Enhancing U.S. Trade in a Global Economy," in *Economic Report of the President of the United States*, chap. 5, 219–278.

Dekle, R., J. Eaton, and S. Kortum (2007): "Unbalanced Trade," *The American Economic Review*, 97, 351–355.

Magee, C. S. (2017): "The Increasing Irrelevance of Trade Diversion," *KYKLOS: The Journal of Social Sciences*, 70, 278–305.

Romalis, J. (2007): "NAFTA's and CUSFTA's Impact on International Trade," *Review of Economics & Statistics*, 89, 416–435270.

United States International Trade Commission (2016): "The Economic Impact of Trade Agreements Implemented under Trade Promotion Authorities Procedures," Investigation 332-555.