Cultural Preferences in International Trade: Evidence from the Globalization of Korean Pop Culture*

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Abstract

The Korean pop culture (TV dramas and K-pop music) has grown immensely popular across the globe over the past two decades. This paper analyzes its impacts on international trade. We compile the cross-country panel data of South Korea's TV show exports covering over 150 countries for the period 1998-2014. This data, when combined with HS 4-digit data on Korea's exports, gives clear variations over time, countries, and products. The crucial point of this paper lies on the demand side. We focus on proving that more exposure to Korean culture changes foreign consumers' preferences, leading them to buy up Korean goods. First, we use the well-known fact that women have much stronger preferences for Korean dramas. We find that more TV show exports significantly increase exports of goods for women, while the effects are much smaller for the ones for men. This strongly supports the demand-side preference mechanism, because supply-side factors can hardly generate such gender bias within the same product category. Second, we find that the TV show effect is much stronger for consumer goods compared to capital or intermediate goods. Lastly, we show that there exist significantly positive effects even for the goods that are not actively advertised through televisions, which underscores the diffusion of preferences.

Key Words: Korean Wave; Trade; FDI; Gravity Equation; Cultural Preferences
JEL Classification: F14

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1 Introduction

> *"The booming South Korean presence on television and in the movies has spurred Asians to buy up South Korean goods and to travel to South Korea, traditionally not a popular tourist destination. The images that Asians traditionally have associated with the country — violent student marches, the demilitarized zone, division — have given way to trendy entertainers..."*
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> — *The New York Times,* ***2005*** *(by Norimitsu Onishi)*

Are cultural preferences important in international trade flows? It is difficult to systematically identify such effects because most cultural variables — language, ethnicity, and religion, for example — are strongly correlated with geographical factors, as well as communication and information costs. This paper overcomes this difficulty by using the phenomenon that the Korean pop culture has rapidly spread to many other countries, and demonstrates that this leads to increased exports of South Korea by changing foreign consumers' preferences for Korean products. Because the cultural flows substantially vary over time and across countries, and because its effects on consumers preferences are also likely to vary across products significantly, we can identify the cultural effects on trade. To our knowledge, this is the first paper in the trade literature which provides systematic econometric analysis demonstrating the causality in which cualtural shocks of a clear source affect international trade through the demand channel.

Over the last fifteen years, the Korean popular culture, especially soap operas (television dramas) and K-pop music, has become immensely popular across the globe. This phenomenon is called "Korean Wave" (or "Han-Ryu" in Chinese), a term that was coined by the Chinese media around 1998 and is now commonly used worldwide. For example, in 2011, the French press *Le Monde* and *Le Figaro* reported with the headlines "Korean Wave Reaches Europe" and "Korean Wave Hits Zénith."

Although K-pop is better known in the western world, it is the Korean soap operas that initially lead the wave in Asia and in many countries in the Middle East and South America. The Korean wave first began in China in 1997 with the drama series *What is Love All About?*. The soap opera recorded a 15% audience share, meaning that over 150 million Chinese watched it.[1] Meanwhile, the wave arrived in Japan in 2003, with another Korean drama series *Winter Sonata*, which recorded a

[1]The audience ratings of Korean dramas are reported by numerous news articles and various reports by Ministry of Foreign Affairs and Korea Foundation for International Culture Exchange.

sensational audience rating, 22.5%. Koreans were pleasantly surprised by this, because previously in Japan, Korean cultural contents had hardly received any attention despite the geographical proximity. The popularity has since grown dramatically in both countries, and nowadays the Korean culture has naturally pervaded their everyday life.[2]

Interestingly, the Korean culture has become even more popular in farther Asian/Central Asian countries (Vietnam, Thailand, Singapore, Taiwan, Malaysia, Indonesia, Kazakhstan, Mongolia, Philippines, Uzbekistan, Brunei, Myanmar, Cambodia, Kyrgyzstan, and Tajikistan). For example, in Kazakhstan, Tajikistan, and Mongolia, the audience ratings even exceeded 70% for *Jumong* (2007), *Jewel in the Palace* (2007), and *Temptation of Wife* (2009), respectively.

The Korean wave has also reached the Americas as well as the Middle East and Europe, since 2007-2012 with different starting years across countries (Peru, Iran, Hungary, Panama, Ecuador, Cuba, Paraguay, Romania, El Salvador, Bolivia, Chile, Costa Rica, Puerto Rico, UAE, Egypt, Turkey, etc.).[3] In Ecuador, for example, the wave started in 2009 with a phenomenal 55% audience rating. More surprisingly, in Cuba, yet another two drama series recorded more than 80% audience ratings in 2012-2013.[4] As another example, in the Middle East, IRIB (Islamic Republic of Iran Braodcasting) reports that *Jewel in the Palace* was ranked as the most popular drama from March to April in 2007, with 57% audience rating and 97% satisfaction.

Then, what can be the economic impact of the Korean wave? In many countries, it is a well-known admitted fact that the Korean wave has positively altered consumers' preferences for Korean goods and services. For example, the New York Times reports in 2005, "The booming South Korean presence on television and in the movies has spurred Asians to buy up South Korean goods and to travel to South Korea, traditionally not a popular tourist destination." Although there exist numerous news articles and extensive survey reports supporting the trade-creating effect of the Korean wave, there has not been any systematic analysis leading to robust and reliable estimates, prior to this paper.[5]

[2]For example, another Korean drama series, *Descendants of the Sun*, has become extremely popular in China, hitting more than 2.6 billion viewership within the two months starting February 2016. (The 2.6 billion viewership is the sum of 16 episodes' viewership, which is reported by the Chinese online video platfrom, Iqiyi.) In addition, it is no longer surprising to see a K-pop song ranked top of the most popular music charts in Japan.

[3]Among those countries, Peru has the largest and most devoted fans. It is reported that Channel 7, one of the most influential national channels of Peru, aired Korean dramas, instead of the news, in its prime time slot.

[4]The three dramas are *Stairway to Heaven* (2009), *Take Care of My Lady* (2012), and *My Wife is a Superwoman* (2013).

[5]For example, like any other papers in the literature, Park and Choe (2008 & 2009) and Choi (2012) explore the

To propose mechanisms on how the Korean wave affects Korea's exports, we partly rely on the recent empirical studies about the impacts of the media contents. The literature suggests that media portrayal of a role model leads to powerful imitative behavior, which significantly affects a wide range of economic outcomes such as consumption behavior, women's status, divorce, fertility, baby naming patterns, education, and violent crime.[6] Based on this literature and the extensive survey data conducted by the Korean government over 8,000 foreign respondents (KOTRA & KOFICE, 2015), we suggest the following two channels: (i) the diffusion of preferences, and (ii) advertisement using the Korean wave. First, the imitative behavior effect leads the viewers to develop preferences for Korean products, foods, and services which are actively shown in Korean TV shows. This eventually develops into positive national image of South Korea. Second, acknowleding the strong imitative behavior of the consumers of Korean pop culture, Korean exporting firms intentionally hire the associated celebrities (or use the media contents) to advertise their products. Indeed, these two channels combined are widely accepted in Korea as the main force behind the successful exports of goods and services in related industries.

To econometrically identify the effects, we construct two sets of data as proxy for the extent of influence of the Korean wave. First, we compile the cross-country panel data of South Korea's TV show exports covering over 150 countries for the period 1998-2014. This measure has significant variations across countries and over time. Second, beyond the TV show export values, we would like to give a sense about the extent to which people actually enjoy the Korean pop culture. Thus, we construct the popularity index criteria and classify countries into five levels of popularity for Korean culture, based on detailed Korean government reports of the Korean wave situation in each country. For example, one of the criteria for a country to be classified at Level 5 (very popular) of the K-wave index is, 'The Korean dramas and K-pop have been excessively popular to the extent that the government publicly expresses concerns over the dominant cultural effects on their citizens and tries to restrict the inflow of the Korean cultural contents.' We find that the total population

relationship between Korea's aggregate exports over all goods (cross-country panel data) and Korean wave intensity measures. Especially, Choi (2012) admits in his paper that although the signs are positive, many of the key estimates are not statistically significant. Indeed, we demonstrate with our data that one cannot generate robust estimates by exploiting only country and time variation. In sections 4 and 5 we show that the product variation (in addition to the country-time variation) is the key to the identification.

[6]See Bursztyn and Leonardo, 2016; Chong and Ferrara, 2009; Kearney and Levine, 2015; Olken, 2009; Chong, Duryea, and Ferrara, 2012; Disdier, Head, and Mayer, 2010. For example, Jensen and Oster (2009) demonstrates that exposure to cable television positively influenced women's status in rural India through decreases in violence toward women and preferences for son, and increases in women's autonomy and school enrollment.

of the countries assigned with the Level 5 exceeds 30% of the world population.

The crucial point of this paper lies on the demand side. We focus on proving that more exposure to Korean pop culture (proxied by Korea's TV show exports) changes consumer preferences, leading them to buy up Korean products, thus increasing South Korea's exports in relevant industries. One of challenges in our estimation is that exports of Korean goods exhibit different time trends across sectors. For example, because South Korea's industry specialization has moved upstream with downstream business being moved overseas over the past two decades, exports of durable and semi-durable consumer goods have decreased, while exports of intermediate and capital goods have increased dramatically. To effectively control for such industry-specific time trends, we pool over HS-4digit industries and use the time differenced framework equipped with the industry fixed effects.

In addition, one may raise a concern that the Korean TV show export variable can be endogenous. We will claim against this in detail that the Korean wave is purely driven by foreign viewers' demand for fun value and entertainment, thus largely exogenous to Korea's exports of goods/services, as similarly argued by DellaVigna and Ferrara (2015). But, admittedely, there can still be some coincidental factors that can lead to a mild correlation between the two variables. In order to address such endogeneity and to ensure the channel of consumer preferences, we additionally exploit variation across products by employing the three estimation strategies. First, we use the well-known fact that women have stronger affinity for the Korean soap operas and K-pop music.[7] Accordingly, we test whether the increased TV show exports from Korea have stronger positive effects on the exports of merchandize for women than for men. We also examine the gender-biased effect using data on female and male visitors to South Korea, as tourism is strongly driven by consumers' tastes and preferences.

Second, we test a natural hypothesis that such cultural influences have stronger effects on final consumer goods compared to intermediate or capital goods. Alternatively, we also examine whether the effects are stronger for a specific set of consumer products which reputedly enjoy boosted sales due to the Korean wave. These products are often called as *Korean wave goods*. To illustrate, one of the survey questions (conducted overseas by Korean government institutions) directly asks what

[7]This gender biased phenomenon can be verified from the viewership data of online video platforms. For example, the largest online video website *Iqiyi* in China reports the gender composition of the viewers for each video, and one can see that more than 70% of the viewers are female for most Korean dramas.

Korean products the person wanted to purchase after watching Korean dramas. We collect such information, construct a dummy that indicates such *Korean wave goods*, and interact it with the TV show export variable.

Third, we also estimate the TV show effects on exports of Korean goods/services that are rarely advertised through the mass media, to isolate the first channel (the diffusion of preferences). Among the *Korean wave goods*, Korean clothes and food/beverages are hardly advertised on televisions in foreign countries, and we give separate analysis for these products.[8] In addition, we use cross-country panel data on Korea's outward FDI and test whether the TV show effects are stronger for the service sectors which are reputedly benefited from the Korean wave.

Our results show strong evidence that the global spread of Korean pop culture positively affects foreign consumers' preferences for Korean goods and services. We find that more TV show exports significantly increase female foreign visitors and women's clothing exports, while the effects are much smaller for men. These results strongly support the demand-side preference mechanism, because supply-side factors can hardly generate such gender bias within the fine product/service category. The most striking result appears in cosmetics. We find that doubling the TV show exports increases exports of cosmetic products by 40% (the total TV show exports have grown about tenfold during 2002-2015).

Next, we find that doubling the TV show exports increases exports of consumer goods by 16%, while the effect disappears on capital or intermediate goods. Admittedly, not every product classified as a consumer good could have been significantly affected by the Korean wave. Accordingly, we find that the effect on the *Korean wave goods* significantly increases to 26%. That the result with the more specific indicator is stronger is consistent with the proposed preference mechanism and increases our confidence in the estimation results. Lastly, we find that there exist significantly positive Korean-wave effects even for foods and clothes which are not advertised through the mass media in foreign countries. In addition, we show that the TV show effects on outward FDI are significantly higher in sectors which are reputedly benefited by the Korean wave (such as restaurants, entertainment, grocery stores, hair salons and aesthetic clinics) compared to the other sectors. These strongly support the diffusion of preferences caused by the Korean wave.

[8]This is because, unlike Samsung or other popular Korean cosmetic brands, there is not a major Korean brand for clothes that are made in Korea (some well-known Korean brands all produce in China, Vietnam, etc.)

Closely related is the empirical literature studying the cultural aspects of international trade. For example, Guiso et al. (2009) document that cultural factors can influence trust between countries, and show that lower trust reduces bilateral trade. Felbermayr and Toubal (2010), Disdier and Mayer (2007), and Disdier et. al. (2010) construct proxies for cultural proximity and show their positive effects on trade volumes.[9] Similarly, the literature focuses on cultural variables which are inclusive of (or, correlated with) broad notion of culture and tries to capture the broad cultural effects in the gravity model estimations. As a result, in this literature there has not been any study providing robust econometric analysis highlighting the demand-side reasons. In contrast, this paper has a clear source of the shocks, which is the foreign viewer's demand for fun value and entertainment. This makes our Korean wave measures conceptually exogenous to any by-product economic outcomes including trade, and we can identify the effects of the demand channel using the country-time-product variations.

This paper relates to the literature studying the role of information in trade. Rauch and Trindade (2002) and Wagner et al. (2002) find that ethnic networks facilitate information flow and help match foreign buyers and sellers, which promotes international trade by lowering search costs. Rauch (2001) and Combes et al. (2005) argue that business and social network not only help locate foreign partners but also maintain complicated business relationships and overcome cultural/linguistic barriers. Similarly, Cristea (2011) shows that high quality information flow realized by in-person business meetings increases international trade.

The remainder of this paper is organized as follows. We explain in Section 2 how we construct the measures of the Korean wave. In sections 3 and 4, we outline the main mechanisms through which the exports of Korean pop culture affect merchandise exports and FDI and establish the estimation framework. Section 5 provides the empirical estimates of such impacts, differentiated by genders and types of goods, and highlights the effects on goods not advertised and on FDI, to document the mechanism of preference diffusion. Section 6 concludes.

[9] In addition, Melitz and Toubal (2014) and Melitz (2008) construct new series for common language and find that the ease of communication facilitates bilateral trade.

2 Korean Wave and Data

In this section, we explain how we construct the measures of Korean wave. Details for the other variables used in the analysis can be found in the Appendix.

2.1 South Korea's TV program exports

We compile the cross-country panel data on South Korea's TV program exports for the period 1998–2014. The data are sourced from the "Annual Report on the Actual Condition of Korean Broadcasting Industry" by Korea Communications Commissions, a government agency. The report is published annually since the year 2000, but with data dating back to the year 1998. This publication reports South Korea's TV program exports (excluding exports for overseas Koreans) to over 150 countries for each genre (drama, reality shows, music, documentary, sports, movies, etc.).[10] The publication also separately reports the aggregate TV program exports for the overseas Koreans across the world. We allocate the sum across countries by the proportion of overseas Koreans residing in a country, and incorporate it in the total TV show export to each country. Note that the lump-sum export value for the overseas Koreans is trivial, at less than 0.5% compared to the total TV show exports (as of 2014).

Figure 1 illustrates the trend of the aggregate Korean TV program exports. It has grown substantially from US$8 to US$336 millions during the period 1997-2014. On the other hand, its imports only slightly increased from US$57 to US$64 millions. Figure 3 shows the TV program exports to a subset of destinations for each year in 2001, 2004, and 2014. We see exponential increases of Korean TV show exports to Japan, China, Singapore, Taiwan, Vietnam, Thailand, etc. In contrast, the TV show export values stay close to zero in countries such as India, Russia, France, and the UK. Note that the official export values likely have under-represented the actual extent of culture exposure, because many people watch the Korean TV shows using the internet.[11] Nonetheless, the TV show export data provide an excellent measure of the Korean wave, as it gives clear variations over time and a large set of countries.

[10] We note that the genre composition of the Korean TV show exports is highly biased toward Dramas, which account for 90% of the total TV show exports on average during 2010-2013, followed by reality shows at 5%.

[11] For example, the Korean drama series *My Love from Another Star (2014)* recorded over 6 billion viewership on the Chinese online video platform *Iqiyi* over the past three years. However, South Korea sold the TV program at only about US$3.5 million, while Iqiyi enjoyed over US$100 million profit within only several months of the release (reported in numerous online news articles in South Korea).

The global spread of Korean pop music is another key feature of the Korean wave. The export value of K-pop has grown dramatically from US$22 millions to US$381 millions during 2005-2015, while music imports by South Korea increased only from US$8 millions to US$14 millions (as shown in Figure 2). Many countries' enthusiasm for the Korean culture started with its soap operas, before spilling over to the K-pop music. Accordingly, Figure 2 shows that the exports of the K-pop music started increasing dramatically only around 2008, several years after the success of Korean TV dramas overseas. Unfortunately, data on bilateral exports of K-pop music does not exist, so we cannot incorporate it systematically in our analysis. However, Korean TV shows likely have caused greater impacts on Korea's merchandise exports than K-pop music, because viewers of Korean TV shows spend an extended period of time indirectly experiencing a large array of the Korean culture (through the fashion, foods, and electronic products used by the characters in TV shows). The exposure to the Korean culture is thus likely richer through the contents of soap operas than music clips, leading to potentially stronger affinity for Korean goods and services.

2.2 Popularity Index

In addition to the sales of Korean TV programs overseas, we construct an alternative measure which gives a sense on how intensely and extensively people in a country follow the Korean pop culture. To do this, we identify the criteria and classify countries into five-levels of popularity with which the Korean pop culture is perceived in the country. We use Korean government agency reports that provide detailed documentation of the situation of the Korean wave in more than 100 countries, as well as surveys conducted for over 8,000 foreign respondents across 29 countries. The documents used include: (1) "2015 Global Trend in Korean Wave," published by Ministry of Foreign Affairs and Korea Foundation, (2) "2015 Korean Wave White Paper," published by Korea Foundation for International Culture Exchange, and (3) various reports and articles provided by KOTRA (Korea Trade-Investment Promotion Agency), KOCCA (Korea Creative Content Agency), and IIT (Institute for International Trade). For example, these documents provide the audience ratings of popular Korean soap operas in each country, the viewership on major internet video platforms and the demographic composition of the viewers. The reports also provide general observations on the Korean wave in each country—for example, how easily one can hear K-pop music on the streets, how popular and widespread Korean restaurants are, and what the country's media say about the

Korean pop culture and its associated celebrities.

We summarize below the classification of the popularity index and the criteria used to classify countries into these categories. This gives rise to a cross-section of ratings for over 100 countries as of 2015, as the documents referred to are published in 2015.

Level 1 (Not Interested): Most people in the country are not interested in the Korean TV shows or K-pop music, and not aware of the Korean wave phenomenon. (47 countries belong to this category: India, Pakistan, Switzerland, Austria, Sweden, Spain, etc.)

Level 2 (Recognized): The K-pop music (or Korean soap operas) are very popular among a small fraction of the population, to the degree that national media give major coverages of the phenomenon. (25 countries belong to this category: Russia, Zimbabwe, Canada, US, Israel, France, UK, Chile, Mexico, Argentina, UAE, Morocco, etc.)

Level 3 (Somewhat Popular): The majority of the population have experienced the Korean soap operas, and they are popular at a moderate degree. The K-pop music is highly popular among the majority of teens and early twenties. (14 countries belong to this category: Iran, Hungary, Romania, Paraguay, Kyrgyzstan, Tajikistan, Bulgaria, Bolivia, Ukraine, etc.)

Level 4 (Popular): Almost everyone in the country is likely to admit that the Korean soap operas and K-pop music have been very popular. Due to its popularity, major channels of the country have been airing a number of Korean TV shows during prime time slots for many years. (7 countries belong to this category: Uzbekistan, Peru, Panama, Ecuador, Laos, Cuba, and El Salvador)

Level 5 (Very Popular): The Korean wave started from these countries between 1997 and 2003 without any promotion efforts by Korea. Numerous series of Korean dramas have been extremely popular, to the extent that the country's government publicly expresses concerns over the effects of the Korean wave on its citizens. Because the local government restricts the broadcasts of Korean soap operas, people in these countries actively use online video platforms to watch new and current Korean TV shows. (16 countries belong to this category: China, Vietnam, Thailand, Singapore, Taiwan, Japan, Malaysia, Philippines, Indonesia, Kazakhstan, Mongolia, Myanmar, Cambodia, Hong Kong, Brunei and South Korea)

Figure 5 illustrates the geographical reach of the Korean wave measured by the popularity index. The countries classified as Level 5 (very popular) are typically East Asian, South East Asian, and

Central and West Asian countries. The total population of these countries exceeds 30% of the world population. Remarkably, the Korean wave extends beyond Korea's immediate neighbors and reaches countries as far as Ecuador, and as unexpected as Cuba, Iran, Morocco or Zimbabwe.

3 Mechanism

There exist a number of daily news articles about Korean soap operas boosting sales of certain Korean brand products overseas, as well as government survey data which document why and how the Korean wave lead foreign consumers to buy up Korean products. Accordingly, we propose two channels in a broad sense: (i) the diffusion of preferences and (ii) marketing. The preference diffusion mechanism is potentially far reaching if consumers' affinity for Korean products/services improves in general as a result of exposure to Korean pop culture. On the other hand, the marketing channel is limited to certain products to which marketing strategies using the Korean wave are applied.

First, the spread of Korean pop culture can change foreign consumers' perception about the national image of Korea and their preferences for its products. For example, in 1990, 51% of the Japanese respondents had negative feelings toward Korea (and only 9.5% had a positive image of Korea) according to a survey conducted by the Japan-Korea 21st Century Association. However, the Japanese perception of Korea had dramatically turned around, after the Korean drama *Winter Sonata* was aired in Japan with multiple encore runs in 2003-2004. In 2004, 66.6% of the respondents had a positive image of Korea (and the rate increased to 77.8% in 2005) according to the "2005 Report on Korea's National Image" by KOTRA. Such positive images of Korea could thus affect consumption behaviors through the country-of-origin effect (Obermiller and Spangenberg, 1989; Ozsomer and Cavusgil, 1991; Elliott and Cameron, 1994).[12]

To show some direct evidence on the mechanism, Figure ??? diagrams survery results over 6,500 foreign participants across the world who have experienced Korean pop culture (KOFICE 2015). Interestingly, over 50% responded that watching Korean TV shows lead them to have desires of eating Korean foods and visiting Korea. Because one's demands for foreign foods and tourism

[12]In general, country-of-origin effects could be driven by demand-side preference changes or supply-side quality changes. In the case of the Korean wave, the former plays a dominant role, because the drastic changes in the sales of several Korean products can hardly be explained by quality changes.

are highly dependent on tastes and cultural preferences, rather than the objective quality of the product, the results can serve as strong evidence on the preference diffusion channel. Indeed, 45% replied that they became interested in purchasing 'Korean products in general' after experiencing Korean pop culture.

Second, Korean multinationals or exporting firms use the Korean wave phenomenon to effectively deliver information about their products/brands to consumers abroad. To illustrate, Korean firms often sponsor the production of soap operas on the condition that their products naturally appear in the soap opera scenes. These include, for example, cosmetics, home appliances, or electronics. For example, when *Descendants of the Sun* was released in China on online video website Iqiyi in 2016, the sales of the compact powder used by the main actress increased by ten-times compared to the same period in the previous year.[13] Celebrity branding is also heavily used by many Korean multinationals (e.g., Samsung, LG, Hyundai and cosmetic companines). They strategically use Korean-wave celebrities to promote the sales abroad. To illustrate, when the Korean drama *Descendants of the Sun* had a sensational hit in China and the region, J.Estina and Laneige (two Korean brands that sell jewelry and skin-care products) saw a sudden increase in their sales (and their stock prices) during the period. In fact, the two brands were using the lead actress of the drama in their advertisements.

4 Framework and Identification Strategies

4.1 Framework

We apply the conceptual framework of Anderson and van Wincoop (2003) [AvW] and allow the two channels discussed above to work through the preference parameter. Let there be C countries and I industries, with an upper-tier Cobb-Douglas preference (and expenditure share α_i) over the industries and a lower-tier CES preference over goods imported from different sources of origin within each industry. Specifically, in each industry i, goods are differentiated by the country of origin, and buyers in each country c choose imports q_{oci} from origin o to maximize the lower-tier

[13] Similarly, the lipstick that she used in the drama was immediately sold out within three days, based on one of the largest online shopping websites (SK Planet) selling Korean products.

utility,

$$\left(\sum_{o}\left(b_{oci}\right)^{1/\sigma}\left(q_{oci}\right)^{(\sigma-1)/\sigma}\right)^{\sigma/(\sigma-1)} \quad \text{subject to} \quad \sum_{o} p_{oci}q_{oci} = \alpha_i Y_c \tag{1}$$

where b_{oci} is the taste parameter for goods produced in o perceived by buyers in country c, which can vary across industries i. The parameter $\sigma > 1$ indicates the elasticity of substitution across sources of imports; Y_c is the country c's nominal income; and $p_{oci} \equiv p_{oi}\tau_{oci}$ is the destination price equal to the exporter's supply price p_{oi} scaled up by the iceberg trade cost factor $\tau_{oci} \equiv Dist_{oc}^{\rho}\delta_{oc}e^{\epsilon_{oci}}$, where $Dist_{oc}$ represents the distance between o and c, δ_{oc} contains other observable trade costs, and $\epsilon_{oci} \sim N(0, \sigma_{\epsilon}^2)$. Solving the utility maximization (1) yields country c consumers' demand for good i from country o, which we assume to be equal to the country o's exports of the good i:

$$Exp_{oci} = b_{oci}\left(\frac{p_{oi}\tau_{oci}}{P_{ci}}\right)^{(1-\sigma)}\alpha_i Y_c \tag{2}$$

where P_{ci} is the consumer price index of destination c given by $P_{ci} = \left[\sum_o b_{oci}\left(p_{oi}\tau_{oci}\right)^{1-\sigma}\right]^{1/(1-\sigma)}$.

Importantly, we hypothesize that the two channels (preference diffusion and marketing) discussed in section 3.1 work through the time-varying taste parameter $b_{oci,t}$. We assume that it is a loglinear function of TV show exports in the previous year $t-1$ and a country-product specific variable,

$$b_{ci,t} = \bar{b}_{ci} \cdot TVshowExp_{c,t-1}^{\theta_i} \ , \tag{3}$$

where we omit the origin subscript as it is fixed at Korea in our analysis. $b_{ci,t}$ can be also considered as perceived quality of the Korean product which can change over time with the consumer's experience on the Korean TV shows. We assume that the TV show elasticity of goods exports θ_i depends on the product i.

A challenge in our estimation is that exports of Korean goods exhibit different time trends across industries due to the changing economic situation in South Korea. For example, as shown in Figure (8), nondurable good exports (BEC 63, excluding foods) — which mostly consist of beauty products (cosmetics & skin-care) — have increased substantially during 2003-2015, largely due to the Korean wave. In contrast, the exports of semi-durable goods — which mostly consist of clothing — have decreased significantly, because many plants in the industry have moved to nearby

low-wage countries during the period.[14] Meanwhile, exports of intermediate and capital goods have grown dramatically, as South Korea's specialization has moved to upstream industries (see Figure (8)). This can create a difficulty in estimation because Korea's TV show exports happen to grow dramatically over the same time period. For these reasons, we use two different empirical frameworks depending on the characteristics of industries.

Framework 1: A widely accepted fact is that Korea's exports of beauty products (cosmetics, skin-care, and hair products) and tourists to South Korea have grown dramatically due to the Korean wave, as can be seen in Figures (7) and (9). Both variables for the index-5 (very popular) countries have significantly increased during 2003-2015, while those for countries indexed 1 or 2 (not popular) have increased only minimally. In other words, the substantial growth patterns are observed only in the countries where the TV show exports have grown dramatically during the same period (compare with Figure 3). In this case, we can directly identify the effect by restricting the sample to the industry. Below we propose two estimating equations which exploit two important dimensions of variations, respectively: countries and time.

Combining (2) and (3) and including additional controls leads to the follwing log-linear forms with year and country fixed effects, respectively (the sample is restricted to a specific product i):

$$\ln Exp_{ci,t} = \lambda_t + \theta_i \cdot \ln TVshowExp_{c,t-1} + \ln GDP_{c,t} + (1-\sigma)\rho \cdot \ln Dist_c + X_{c,t} + \epsilon_{ci,t} \quad (4)$$

$$\ln Exp_{ci,t} = \lambda_c + \theta_i \cdot \ln TVshowExp_{c,t-1} + \ln GDP_{c,t} + X_{c,t} + u_{ci,t} \ , \quad (5)$$

where $X_{c,t}$ contains other trade cost proxies: linguistic distance ($\ln LangDist_c$) which we construct using the language tree (see the Data Appendix), regional trade agreement dummy ($RTA_{c,t}$), Korean embassy dummy ($Embassy_{c,t}$), the number of Koreans residing in the destination country ($\ln Koreans_{c,t}$), and the cross exchange rate ($\ln ExRate_{c,t}$, Korean Won / destination currency).[15] As typical in the literature, we assume the trade cost to depend on these proxies log-linearly with parameters allowed to vary systematically across industries. In (4), we include the year fixed effects and allow variations across countries with errors $\epsilon_{ci,t}$ clustered by country, while (5) allows time

[14] As for durable goods, the exports had substantially increased until 2004 due to productivity growth, but have decreased since then with the increased FDI.

[15] Note that $\ln ExRate_{c,t}$ will be dropped in (4) as including the cross exchange rates in a given year are not meaningful, and $\ln LangDist_c$ will be dropped in (5) as it will be absorbed by the country fixed effect.

variation with errors $u_{ci,t}$ clustered by year.

Framework 2: Unlike the above cases, the time trends of most industries in Korea are strongly dominated by outside factors such as FDIs, industry-specific government policies, or the China effects, as shown in Figure (8). In this case it is difficult to identify the TV show effect with the restriction of the sample to a specific industry. Although the equation (4) including the time fixed effects can control for such time trends to some degree, such test alone cannot exploit the most interesting feature of our data — the time variation of the cultural variable.

Our solution to this problem is to pool over all HS-4digit industries and use first-differences over time with industry-fixed effects. This way, we can exploit both of the time and country variations, while effectively controlling for industry-specific time trends. With the pooled sample, we test more general hypoteses. One of the important hypotheses is that the effect can be stronger on consumer goods compared to capital or intermediate goods. To test this, we construct a consumer good dummy ($ConsumerGoods_i$) and assume that the TV show elasticity is the sum of a parmeter specific to the set of consumer goods and a constant, i.e., $\theta_i = \beta_1 \cdot ConsumerGoods_i + \beta_2$. Now, expressing equation (5) in first differences leads to the following form:

$$\Delta \ln Exp_{ci} = \lambda_i + \beta_1 \cdot ConsumerGoods_i \cdot \Delta \ln TVshowExp_c + \beta_2 \cdot \Delta \ln TVshowExp_c + \Delta X_c + u_{ci} \,, \quad (6)$$

where $\Delta \ln Exp_{ci}$ stands for $(\ln Exp_{ci,2015} - \ln Exp_{ci,2002})$, for example, if the period of interest is 2002-2015; λ_i is an industry fixed effect.

Recall that the growth rates of Korean TV show exports vary substantially across countries depending on the Korean wave influence. Basically, equation (6) tests how changes in Korean TV show exports affect Korea's merchandise exports differently in consumer and non-consumer goods. This framework is excellently suited for this case, because it allows us to exploit the three key variations (country, time, industry) of the data while controlling for the troublesome industry-specific time trends in a single equation.

4.2 Endogeneity and Identification Strategies

One may raise a concern that the Korean TV show export variable can be endogenous. Especially, people — who are not familiar with the Korean wave phenomenon — can argue to the contrary

that it is the Korea's exports of goods/services which have caused the overseas popularity of Korean pop culture. But this is not so. To illustrate, Japan exports more of higher quality goods/services than South Korea to most destinations, but the overseas popularity of Korean TV shows and pop music nowadays is incomparably higher than that of Japan's (certainly, the quality of Japanese pop culture is no less than that of Korea's, as Korean music and TV show producers have often learned or copied the contents/formats of Japan's until recently): for example, 15% of the total imports of Thailand comes from Japan while South Korea makes up only about 3%; nonetheless, Korean pop culture is eminently more popular in Thailand; this holds true for many other countries (Phillippines, Taiwan, Indonesia, Malaysia, etc.). Furthermore, one can easily find a number of cases in which a country's export flows of goods/services do not necessarily induce the spread of the exporter's pop culture (e.g., China, India, Japan, Germany, Sweden, etc.). Similarly, Korea's merchandise export flows can hardly explain the global spread of the Korean pop culture.

Rather, the Korean wave phenomenon results from exogenous shocks to the foreign viewers' demand for exotic cultural experience. In fact, how the K-pop song *Gangnam Style (2012)* — which was composed targeting only Koreans without expectation for overseas popularity — quickly rose to top in famous music charts of many countries, highly resembles how the Korean pop culture in general have grown popular across many countries. Due to the lack of systematic supply chains for Korean TV shows and music, the Korean wave has been so far driven by foreign consumers' preferences and tastes.

Though we claim that the Korean wave is strongly attributed to foreign viewers' tastes, thus largely exogenous to Korea's exports of goods/services, there can be some coincident factors that can raise exports of both TV shows and goods/services. For example, it is undeniable that without the development of the internet the Korean wave would have not been as strong and widespread as it is nowadays; at the same time, the internet has also lowered communication and information costs and increased trade relationships. It is also possible that the increased popularity of Korean culture in a country has coincidentally happened with Korea's enhanced trade relationship with the destination country in general.

In order to address such endogeneity issues, we exploit variations across products using the time differenced framework equipped with the industry fixed effects. For example, as explained earlier with equation (6), we test the natural hypothesis that the cultural effects are stronger on

consumer goods than capital or intermediate goods. We also exploit the fact that women have stronger affinity for Korean pop culture and test whether exports of goods/services for women are more responsive to the Korean wave. In addition, we explicitly control for such destination-time specific coincidental factors explained above by including the mean grwoth rates of exports across all 4-digit HS industries. We will show that our key estimates are highly robust to the inclusion of the new variable; we will also show that, on the other hand, the robustness does not hold for estimates associated with other country-time specific variables (growth rates in GDP, exchange rates, and overseas Koreans), which by contrast further ensures the explanatory power of the TV show export variable. Furthermore, we conduct falsification tests by exploring the relationship between *future* changes in TV show exports and *past* changes in goods exports, in order to ensure that our results are not the consequence of some long-run common factor behind the two variables. Detailed analysis exploiting the product variation and various robustness checks are presented in the following section.

5 Three Pieces of Evidence for the Demand-side Mechanism

This section aims to provide econometric evidence that more exports of Korean TV shows induce more exports of Korean goods and services through the channel of changing consumers' preferences. We employ three test strategies. One, given the observation that women enjoy Korean pop culture more than men, we test whether the TV show effect is stronger on goods/services designed for women. Two, we examine the natural hypothesis that the effect is stronger for final consumer goods compared to intermediate or capital goods. Three, to isolate the effect of preference diffusion, we estimate the effect on goods/services that are rarely advertised through the mass media. In the following three subsections, we explain estimation approaches, results, and implications.

5.1 Gender Biased Preferences

It is a well-known fact that women have stronger affinity for the Korean soap operas and K-pop music which have lead the Korean wave phenomenon worldwide. For example, the most popular online video platform *Iqiyi* in China reports that more than 70% of the viewers are female for most Korean soap operas. Given that women consume Korean pop culture more than men, our

proposed mechanisms in section 3 imply that products and services designed for women can be more responsive to the Korean wave. We examine this on three industries whose revenues tend to be highly sensitive to the Korean wave situation: tourism, beauty products (e.g., skin-care and cosmetics), and fashion industries. Especially, our gender-specific data on tourism and clothing allow us to estimate the differing effects on female versus male visitors, and on women's versus men's clothing, respectively. We emphasize that these tests are highly suited for ensuring the demand-side preference mechanism, because production-side factors can hardly generate gender biased effects within a narrow industry.

5.1.1 Female versus Male Tourists

It is well-known in Korea that the tourism industry is highly sensitive to the overseas popularity of Korean pop culture. As mentioned in the New York Times (2005), Korea had been one of the least popular tourist destination till around 2002, but the trend has then shifted due to the Korean wave: tourists to South Korea have more than quadrapled during 2003 -2016, as shown in Figure 9.[16] Indeed, more than 50% (out of 6500 foreign respondents) replied that experiencing Korean pop culture made them want to visit Korea (see Figure 6).[17] The two facts that women have stronger affinity for Korean pop culture and that tourism is highly influenced by the Korean wave naturally lead us to the question, has the Korean wave attracted more female visitors than the male visitors? We examine this using the cross-country panel data on the annual number of female and male visitors to South Korea for the period 2003-2015, provided by the Korea Tourism Organization. We believe that this is a good motivating excercise for the demand-side mechanism, because tourism is strongly driven by consumers' tastes and preferences.

Columns 1-9 of Table 1 provide estimates of equations (4) and (5), using the portion of female visitors (% out of total visitors) and the number of female and male visitors (in log) as the dependent variables.[18] The results show that the Korean TV show exports not only increased the number of

[16]The slight decrease in tourists in 2015 was due to the serious outbreak of epidemic desease MERS in South Korea.

[17]To illustrate, after watching the Korean soap operas *Winter Sonata*, 74 thousands of Japanese traveled to the region, Kwangwon-do in Korea, where the soap opera was filmed. The province enjoyed a 884% increase in the number of tourists compared to the previous year.

[18]Note that we split the log GDP variables in equations (4) and (5) into log population and log per capita gdp, because the two factors are likely to be important independently in tourism. In addition, we exclude countries with per capita GDP less than $4,000 as of 2015, because a number of temporary workers from these country come to South Korea to work in construction sites or factories.

female visitors more than that of male visitors, but also increased the portion of female visitors, which is consistent with our hypothesis. The column 1 result implies that when only the cross-country variation is allowed (year-fixed effects only), doubling the TV show exports increases the percentage of female visitors by 1.99 percentage points. The estimate is not only statistically significant at the 1% level but is also economically significant considering that Korea's total TV show exports have grown more than eightfold during 2002-2014.

The equations (4) and (5) predict that the estimate of the coefficient on the TV show export variable θ_i is consistent in the two specifications with country or time fixed effects. Hence, when only the time variation is allowed (country-fixed effects only) in column 2, we expect to see the estimate to be close to 1.99. However, the estimate appears to be insignificant.[19] A plausible reason is that one travels to South Korea only if he/she has consumed a massive amount of Korean TV shows; because traveling abroad — the only way to get to South Korea is by plane as it is surrounded by the ocean and North Korea — requires significant amount of time and efforts beyond the expenses. Taking this into consideration, we create a dummy '$Popular_c$', which takes 1 if the country is assigned with the popularity index 4 (popular) or 5 (very popular), and interact it with the TV show export variable. Now, column 3 shows that the estimate substantially increases to 1.93, very close to the column 1 estimate, for the countries indexed 4 or 5 (sum of the two coefficients of $\ln TVshowExp_c$ and the interaction term with $Popular_c$). That the two estimated effects exploiting time or country variation are almost the same strongly ensures the reliability of our results.

Next, we test the same specifications using the number of female and male visitors (in log) as dependent variables. Again, the positive effects are stronger for female visitors. When only the cross-country variation is allowed (year-fixed effects only), doubling the TV show exports leads to a 22% increase in the number of female visitors, while it increases the male visitors by 13% (columns 4 and 7). When the time variation is allowed (country-fixed effects only), column 6 results show that the TV show effect on the number of female visitors from highly influenced countries (indexed 4 or 5) is about 8%. This is about four times larger than the estimate for all countries in column 5, thus more comparable to the column 4 result 22%. The reason why these two estimates in columns 4 and

[19] Although the effects might be large in highly influenced countries by Korean pop culture, the country-fixed effects can make the estimates averaged out by not-influenced countries where the the changes in TV show exports over time — whose actual levels are very low — hardly affect the visitors.

6 are not as close to each other as in the earlier case of the female visitor percentage specifications is that the results are likely to be affected by the initial levels in the number of visitors.

Lastly, we utilize the data on the number of tourists. Note that a visitor is classified as a tourist if he/she declares tourism as the main purpose of visit (seperate data on female and male tourists are not available). Columns 10-12 show that similar results hold: the result of the specification allowing country variation implies that doubling the Korean TV show exports raises tourists to Korea by 19%; and the specification allowing time variation generates the effect at 8% for countries with popularity index 4 or 5.

5.1.2 Beauty Product Exports

Beauty product (e.g., skin-care, cosmetics, and hair preparations) is another iconic industry known to be immensely benefited from the Korean wave. According to the survey conducted by the Korean government agency KOFICE (2015), more than 60% and 50% of the 6500 foreign respondents chose 'attractive appearances of actors and actresses' and 'leading the fashion and beauty trend' as main popularity factors of Korean soap operas, respectively. Acknowledging this, many Korean cosmetic firms actively advertise their products in the soap opera scenes and hire internationally famous actresses to advertise their brands overseas. As a result, exports of the beauty products have dramatically increased by more than tenfold during 2003-2015. As shown in Figure 7, the dramatic growth patterns are observed in China, Japan, Thailand, Singapore, and Viet Nam for example, while the exports stay close to zero for England, France, or Germany where the Korean pop culture is not popular. These export patterns of Korean beauty products cannot be explained by typical gravity model variables.

Table 3 provides estimates of equations (4) and (5), using log of the beauty product exports (aggregate of HS 3304, 3305, 3307, 3402) as the dependent variable. When only the cross-country variation is allowed (year-fixed effects), doubling the Korean TV show exports leads to a 40% increase in beauty product exports (column 1). This estimate is remarkably close to the estimates of the country-fixed effect equations: column 3 shows that the effect is 37% for the countries indexed 4 or 5 (very popular). That these estimates — exploiting country or time variation — have highly consistent magnitudes and are statistcally significant at the 1% level is a strong indication that the Korean wave induced a massive positive impact on Korea's exports of beauty products.

5.1.3 Women's versus Men's Clothing Exports

As mentioned above, female viewers of Korean soap operas tend to be mesmerized by the fashion style of the actresses and try to emulate it. This made Korean fashion style highly popular in many countries. Indeed, 40% of the 6500 foreign respondents replied that experiencing the Korean pop culture made them want to purchase Korean clothing (KOTRA, 2015). Combined with the fact that women have stronger affinity for Korean soap operas, this leads us to test whether the TV show effect is stronger on women's clothing than men's clothing.

This clothing case, however, faces a different challenge in estimation. Unlike the cases of tourism and beauty products, where the Korean wave was the central engine for the industries' growth, Korea's exports of clothing have decreased for the last two decades due to the production moving to low-wage countries (see Figure 8 semi-durables). To effectively control for such sector-specific time trends, we use Framework 2 and pool over a larger sample which includes not only clothing industries but also other industries such as textiles that are highly associated with clothing (see section 4.1 for detailed explanation on how we control the time trends using the industry-fixed effect).

The appropriate pool of the sample is the set of HS 4-digit industries classified as 'Section XI - Textiles and Textile Articles' by the UN (see Panel B of Table 2). In this set of industries, HS 61 and 62 are the final consumer goods, clothing, while the remaining ones are mostly intermediate goods such as textiles or goods that are irrelevent with the Kroean wave such as carpets or worn clothing. Thus, we first hypothesize that the TV show effect will be stronger on clothing (HS 61 & 62) compared to the rest of the sample.

The clothing industries (HS 61 & 62) can be again classified into women's and men's clothing using the HS nomenclature: the eight even-number HS 4-digit codes (6102-6108 & 6202-6208) represent women's, while odd-number codes are men's (listed in Panel C of Table 2). Accordingly, we construct the two dummies '$WomensClothing_i$' and '$MensClothing_i$' over the HS 4-digit industries i. Due to women's stronger affinity for Korean pop culture, our second hypothesis is that the effect will be larger on women's clothing than men's clothing.

We use the time-differenced framework, equation (6), over the HS 4-digit industries of the section XI (textiles and textile articles), replacing the $ConsumerGoods_i$ dummy with the sum of

$WomensClothing_i$ and $MensClothing_i$ dummies. Thus, the estimating equation will have two interaction terms of $\Delta \ln TVshowExp_c$ with $WomensClothing_i$ and $MensClothing_i$, respectively. The above two hypotheses predict the following: (1) the two coefficients on the interaction terms will be both positive and significant, because both $WomensClothing_i$ and $MensClothing_i$ indicate consumer goods, while the remaining industries in the sample are mostly textiles; (2) the coefficient on the $WomensClothing_i$ interaction term will be larger than the one for $MensClothing_i$ due to women's stronger preferences for Korean soap operas.

Using the framework, Table 4 explores how changes in TV show exports affect changes in exports of textiles and textile article industries. The observation is a country and a HS 4-digit industry (and a period for the two-period stacked regressions), and we include the industry-fixed effect to control for industry-specific time trends. Regressions for columns 1-3 are performed over one period, 2002-2015, and coloumns 4-6 over two stacked periods, 2002-2007 & 2007-2015, with the industry-period dummies.[20] Columns 1 & 4 show that the Korean wave has a significantly larger positive impact on women's clothing exports than on men's: especially, column 4 result implies that doubling the TV show exports leads to a 27% increase in women's clothing exports, while the effect is limited to 13% for men's clothing exports. This gender-biased effect strongly supports the demand-side mechanism. In addition, that both estimates for women's and men's clothing are positive and significant is consistent with our first hypothesis that the TV show effect will be stronger on consumer goods. In contrast, the coefficients on $\Delta \ln TVshowExp_c$ are close to zero and not significant (columns 1 & 4), which implies that the Korean wave effect may not exsit in other textile inudstries which are mostly intermediate goods.

To address the endogeneity concern discussed in section 4.2, we construct another country-specific variable $\Delta GoodsExpTrend_c$ defined as the average of the log export growth rates, $\Delta \ln Exp_{i,c}$, across the HS 4-digit industries i in the sample. In other words, $\Delta GoodsExpTrend_c$ represents Korea's overall export trend (of the sample industries) to a specific destination c. Columns 2 & 5 of Table 4 show that the key estimates are highly robust to the inclusion of $\Delta GoodsExpTrend_c$, except the magnitudes of the key estimates modestly decreased by about 10%. By contrast, one can notice that the inclusion of $\Delta GoodsExpTrend_c$ seriously distorts all the other estimates associated with country specific variables — growth rates in GDP, exchange rates, and overseas

[20] We choose the year 2007 instead of 2008 or 2009 to avoid the economic impact of the 2008 financial crisis.

Koreans.[21] These contrasted results further ensures the strong explanatory power of the TV show export variable, though we admit the existence of mild correlation between $\Delta TVshowExp_c$ and $\Delta GoodsExpTrend_c$.

To further ensure robustness of our results against destination-specific unobservables, we experiment with country-fixed effects which absorb all the country-specific variables but the $WomensClothing_i$ and $MensClothing_i$ interaction terms with $\Delta \ln TVshowExp_c$. Again, columns 3 & 6 show that the same patterns of results hold at the 1% level statistcal significance. Importantly, we face a trade-off with the inclusion of country-fixed effects — controlling for destination-specific idiosyncratic shocks versus absorbing the mean effect of TV show export growth rates. As a result, compared to the baseline results in columns 1 & 3, the statistical precision of the estimates have slightly increased, while the magnitudes of the estimates have decreased by about 40%. In sum, that the pattern of results — the significantly larger effects on women's clothing — is unchanged throughout the various specifications strongly supports the presence of the gender-biased preference mechanism.

Lastly, to verify that our results are not driven by some long-run common causal factor behind both the growth in TV show exports and the relative increase in women's clothing exports compared to men's clothing and textile exports, we conduct falsification tests by regressing *past* (1991-2001) changes in clothing and textile exports on *future* (2003-2013) changes in TV show exports (we use the period 1991-2001 for the other control variables as well).[22] The results in Panel B of Table 4 show no statistically significant correlation between changes in Korea's clothing exports in the 1990s and changes in Korea's future TV show exports in the 2000s, and no differing effects on women's versus men's clothing exports as well. This is true in either long-period growth regressions (1991-2001) or stacked-period regressions (1991-1996, 1996-2001). These falsification test results thus much alleviate the concern that our results could be a consequence of some long-run coincidental factors.

To summarize, the results in this section support the demand-side mechanism that the Korean wave has changed consumers' preferences and their consumption behaviors. That the effects are

[21] Regardless of the inclusion of $\Delta GoodsExpTrend_c$, the coefficieints on $\Delta TVshowExp_c$ stay close to zero (compared to the above two key estimates in the table). Although there exist some discrepancies in statistical significance of the estimates, the magnitudes stay much more stable compared to the other estimates irrelevant with the TV show export variable.

[22] The exception is the number of overseas Koreans, which uses the future period values (2003-2013) because its data are not available for the period of 1991-2001. The results are similar if we simply drop this variable from the regression. Note that the falsification test framework is partly motivated by Autor, Dorn, and Hanson (2013).

stronger for products/services used by women is especially revealing of this preference mechanism, because such gender-biased trade effects within fine product categories is difficult to reconcile with supply-side reasons.

5.2 Consumer Goods Effects

In this section, we pool over all HS 4-digit industries and examine the two natural hypotheses: (1) the effects of Korean pop culture on exports are stronger for final consumer goods compared to capital or intermediate goods; (2) the effects are even stronger on the subset of consumer goods which are reputedly known to enjoy boosted sales overseas due to the Korean wave (according to various reports and survey data provided by the Korean government agencies). Note that such set of consumer goods is often called 'Korean wave goods', and we follow the naming for effective communication. In both exercises, we use the first-differences framework — analogous to our earlier specifications for clothing — using the two different dummies $ConsumerGoods_i$ and $KoreanWaveGoods_i$, respectively for each exercise.

In these exercises, we pursue two objectives beyond testing the econometric validity of the above hypotheses. One, econometrically estimating the magnitudes of the effects on overall industries is important. The Korean government and cultural and economic research institutions have put tremendous efforts to investigate the economic impacts of Korean wave. While they have been successful at producing high quality reports and survey data, we, on the other hand, provide robust estimates based on systematic econometric analysis for the overall effect of Korean wave on Korea's exports. Two, comparing the magnitudes of the two estimates associated with the above hypotheses is highly important for the reliability of the results. Due to the nature of the hypotheses, we expect that the estimate associated with $KoreanWaveGoods_i$ will be larger and more significant than the estimate associated with $ConsumerGoods_i$. In the following two subsections, we detail our estimation approach, results, and implications for each of the two hypotheses.

5.2.1 Consumer Goods dummy Specifications

Panel A of Table 6 explores the relationship between changes in TV show exports and relative changes in exports of final consumer goods compared to capital or intermediate goods. We use the UN Broad Economic Categories (BEC) to identify the consumer goods: they are *Food and beverages*

- Primary/Processed - Mainly for household consumption; *Passenger motor cars*; *Consumer goods not elsewhere specified - Durable, Semi-durable, and Non-durable.* The dummy $ConsumerGoods_i$ takes 1 if the HS 4-digit industry i falls under the consumer goods category and 0 otherwise.[23]

Column 1 of Table 6 reports estimates of equation (6) over one period 2002-2015. Consistent with our hypothesis, the result implies that doubling the TV show exports induces a 16% increase in consumer goods exports, while there is no significant effect on non-consumer goods. Given that Korea's TV show exports have grown more than eightfold over the period, the estimated effect on consumer goods appears to be economically significant. Next, following the similar step as section 5.1.3, we include Korea's destination-specific overall export trend, $\Delta GoodsExpTrend_c$, defined as the average of log export growth rates across HS 4-digit industries. The key results remain economically large and statistically significant, although the magnitudes have modestly decreased.[24] To further ensure robustness of our results against any country-specific unobservables, column 3 adds country-fixed effects which eliminate all the country-specific variables but the consumer goods dummy interaction. The estimate remains statistically significant, but with modestly reduced magnitude due to the country-fixed effects absorbing the mean effects of $\Delta \ln TVshowExp_c$ across countries. In addition, columns 4-6 of Table 6 confirm that the same patterns of the results hold true for the estimates of the stacked period (2002-2007 & 2007-2015) specifications.

Lastly, Panel B of Table 6 — similarly to Panel B of Table 4 — displays results of falsification tests, regressing *past* (1991-2001) changes in exports of HS4 industries on *future* (2003-2013) changes in TV show exports. Again, we find that the key estimates are not only very close to zero compared to the Panel A results but also statistically not significant. These results verify that our key estimates in Panel A are not the consequence of some long-run common causal factor driving both the growth in TV show exports and growth in consumer goods exports. Overall, all our findings in Table 6 suggest that the Korean pop culture has economically and statistically significant effects

[23]We use the concordance tables between HS6 and BEC provided by the UN. About 10% of the HS4 industries are mapped into both consumer and non-consumer goods, and we drop such industries. However, all the results in Table 6 are robust to forcefully classifying the problematic industries as either consumer goods or non-consumer goods.

[24]Especially, the effect on non-consumer goods appears to be statistically significant in column 2. However, the magnitude is still close to zero compared to the effect on consumer goods. Furthermore, the distortion is even severer for all other country-specific variables (growth rates in GDP, exchange rates, and overseas Koreans), because the export trend variable is significantly absorbing the country-specific factors. Combined with the fact that the corresponding estimate of our preferred specification in column 1 is not siginificnat, we interpret it as a spurious correlation caused by the inclusion of $\Delta GoodsExpTrend_c$.

on the exports of consumer goods, but no significant effects on capital or intermediate goods.

5.2.2 Korean Wave Goods dummy Specifications

Admittedly, it is not likely that all the consumer goods industries are significantly benefited from the Korean wave. Indeed, there exists a specific set of consumer goods that are renowned for their boosted sales overseas largely due to the Korean wave. These are often called as *Korean wave goods*. Information on what constitutes the *Korean wave goods* are easily available from numerous news articles as well as reports and survey data from various sources including Korean government agencies and institutions such as KOTRA and KOFICE. For example, Figure 6 summarizes the survey results on a question asking what Korean product the foreign respondent intended to purchase after experiencing Korean pop culture. These *Korean wave goods* are typically food/beverages, cosmetics, clothing/accessories, certain home appliances, electronic products, and cars. We collect such information and construct the dummy $KoreanWaveGoods_i$ — which takes 1 if the industry i belongs to the *Korean wave goods* and 0 otherwise — across all the HS-4digit industries. The industries classified as *Korean wave goods* are listed in Panel A of Table 2.

Table 7 reports the results of the same specifications based on equation (6) as Table 6 but with the $KoreanWaveGoods_i$ dummy in place of $ConsumerGoods_i$. The baseline specification result over a period 2002-2015 implies that doubling the Korean TV show exports raises the exports of *Korean wave goods* by 26% (column 1). Notably, the magnitude of this effect is significantly larger than the previously estimated effect on general consumer goods which was 16% (compare with column 1 of Table 6). This pattern of results — significantly larger estimates for the *Korean wave goods* — consistently holds true throughout all the comparable specifications in columns 1-6 of Table 7 (compare with columns 1-6 of Table 6). These results are consistent with our natural expectation that the *Korean wave goods* are more responsive than the whole set of consumer goods, which further bolsters the robustness of all the results in Tables 6 and 7.

Columns 3-6 show estimates of the two-stacked periods specifications, and we additionally provide results for each sub-period of 2002-2007 and 2007-2015 in the next six columns because we believe that the *Korean wave goods* specification generates central results of this paper. These additional results are qualitatively very similar as the benchmark results, though the magnitudes of the key estimates are modestly reduced over the shorter timeframes. The corresponding falsification

test results are provided in Table 8. It is assuring to see that there are no spurious effects of the *future* TV show export growth on the *past* changes in Korea's exports, across all the twelve specifications in Table 8.

The above specifications in Tables 6 – 8 impose homogenous slope coefficients across broad industries in consumer goods or the *Korean wave goods*. These specifications — pooling over all industries with industry-fixed effects — have the advantages of maximizing available observations and effectively controling for Korea's industry-specific export trend, but at the cost of losing information about how the Korean wave effects differ across industries. Thus, to examine heterogeneity in the coefficients, we estimate the year-fixed effect equation (4) for each of the key industries classified as the *Korean wave goods* in Table 9. Note that these specifications exploit only the cross-country variation (without the time variation) of the data, so it is likely that some of the results are misleading; but, we also have seen from the earlier results on beauty products and tourism that some estimates exploiting cross-country variation can be very similar to the ones exploiting time variation.

To summarize the results in Table 9, we find that exports of most *Korean wave goods* are highly responsive to the TV show exports, especially beauty products and jewelry, reiterating our earlier demonstration on gender-biased preferences. In addition, we find economically large and statistically significant effects on various kinds of foods and clothing as well as some home appliances such as washing machines and refrigerators. However, the effects are not significant for Aircon, TV and Cars, possibly due to overseas production for proximity to the markets.

Overall, the results in this section demonstrate that there exist significantly positive effects of the Korean wave on exports of consumer goods rather than capital or intermediate goods, which naturally supports the demand-side mechanism. Moreover, that the estimates for the *Korean wave goods* are significantly larger than the estimates for consumer goods ensures the reliability of our results. It is also worthwhile to note that during the decade of 2002-2015 Korea's exports of consumer goods have in general gone downtrend relative to its exports of capital or intermediate goods. This makes the finding of the positive cultural effects on the exports of consumer goods even more riveting. In a way, the Korean wave has helped buck the downward trend of consumer goods exports especially in the category of *Korean wave goods* that are strongly affiliated with the Korean TV soap operas.

5.3 Diffusion of Preferences

In section 3, we proposed two main channels — (i) diffusion of preferences and (ii) advertisement — through which the Kroean wave leads foreign consumers to buy up Korean products. Yet some people are concerned that the above results might be solely driven by the advertisement channel. We argue that this is not the case, because the diffusion of preferences channel works first before advertisement can be applied. To illustrate, Korean cosmetic firms intesively use Korean actresses for advertisement in the destinations where Korean soap operas are highly popular, acknowleging that the Korean wave has generated the demand for the beauty products and that their sales will be boosted if the actresses appear in the advertisement. On the other hand, despite their substantial efforts to penetrate other lucrative markets in France, UK, US, Canada, for example, where the Korean pop culture is not popular, they fail to enlarge their market shares because the demand is weak and because advertisement using the Korean actresses is not at all effective in these countries.

Nonetheless, we attempt to isolate the diffusion of preferences effects by focusing on the products that are typically not advertised through the mass media. First, Korean clothing and foods are rarely advertised in foreign countries. Rather, it appears that 'made in Korea' or 'Korean style' label which emphasizes the origin country is an important factor in boosting their sales in foreign countries, thus associated with the diffusion of preferences channel as detaile in section 3.[25] To illustrate, as shown in Figure 6 survey results, 32% of the 65000 foreign respondents replied that they wanted to purchase products made in Korea even without knowing the brands, after experiencing Korean pop culture. Indeed, we have demonstrated in Table 4 that the growth in Korean TV show exports has significantly positive effects on the growth in Korean clothing exports. Similarly, Table 9 suggested that Korea's exports in most of the food and beverage industries are highly responsive to the Korean wave.

Next, we compile cross-country panel data on South Korea's outward FDI, to examine the relationship between the Korean wave and the flow of services that are not advertised through the mass media in foreign countries. There exist total twenty sectors as listed in Table 10. Similar to the above case of *Korean wave goods*, there are particular service sectors whose sales have reputedely

[25]Though there are some famous Korean clothing brands, those are typically made in and exported from China or Viet Nam. Clothing that are made in and exported from South Korea are mostly individual designer's clothes, as can be seen in Taobao, the largest online shopping mall in China.

benefited from the Korean wave. For example, Figure 6 again shows that more than 25% wanted to have Korean medical services, learn Korean language, and more than 50% wanted to eat and purchase Korean foods, after experiencing Korean pop culture. Using the same sources of the information which helped define the *Korean wave goods* (numerous news articles and government reports), we again classify the Korea's FDI sectors into the *Korean wave service* sectors and the *none Korean wave service* ones. The *Korean wave services* include Korean restaurants, grocery stores, K-pop concerts and performances/events of Korean celebrities, aesthetic and medical clinics, language institutes, hair salons, and etc., which are set up overseas by Koreans.

If the Korean wave has induced the diffusion of foreign consumers' preferences, we expect Korea's FDI in he *Korean wave services* sectors to be positively associated with Korean TV show exports. First, Table 11 provides estimates of equation (4), which exploits cross-country variation only, for each of the seven *Korean wave service* sectors using the log FDI value as a dependent variable. Consistent with our hypothesis, we find that the Korean wave effects are all positive and mostly significant across the *Korean wave service* sectors. The results imply that doubling the TV show exports increases FDI in restuarants and retail/wholesale services by 23% and 41%, respectively, for example. In contrast, as shown in Table 12, the impacts of Korean TV show exports are in general absent in the other remaining sectors, such as agriculture, manufacturing, mining, construction, science and technology, public administration, real estate, and business/finance services. The exceptions are FDI in shipping, electricity, and waste management.[26]

Next, we pool over all the sectors and include the dummy indicating the *Korean wave service* sectors, together with sector-time and destination FEs. This allows us to control for sector-specific time trends and destination-specific factors. Unlike the previous framework for consumer goods trade, we use the log level of Korea's FDI rather than the growth rates as a dependent variable.

[26] As for FDI in shipping, the statistically significant positive correlation with TV show exports is indeed reinforcing our key results, because shipping and transportation services are required to deliver the *Korean wave goods* or materials and equipments used in the *Korean wave services* from Korea. For FDI in electricity and waste management, we suspect that this could be due to the state-controlled nature of Korea Gas Corporation (KOGAS) and Korea Electric Power Corporation (KEPCO), which are respectively the top 4th and 8th Korean multinationals in 2013. South Korea strongly promoted investment in energy during the five years of the Lee Myung Bak administration (2008-2012), and the geographical distribution of these foreign investment tends to coincide with that of the Korean wave. For example, the amount of Korean outward FDI in energy is topped by Asia and reared by Africa and Middle East (Moon and Yin, 2015). Electricity generation (by nuclear or fossil fuels) produces waste at each step of the fuel cycles: mining, fuel preparation, power production, and decommissioning, in gaseous, liquid, and solid forms (Tsyplenkov, 1993). Thus, waste management by environmental regulations is a production process that accompanies energy production. This may help explain the rise of outward Korean FDI in electricity and in waste management that coincides with the countries affected by the Korean wave.

This is because Korea's FDI data at the sectoral level across destinations are quite sparse with many zero entries; taking log difference across two years leads to a large drop in the sample size. The PPML estimation results are reported in Table 13. Consistent with our preliminary finding, during the period of 2002-2015, lagged Korean TV show exports have significantly positive effects on Korean FDI in the *Korean wave service* sectors by an elasticity of 0.12, but the effect on the other sectors reaches zero. The corresponding falsification test results in columns 3 and 4, which show no significant correlation between Korea's *past* FDI data and the future TV show exports, ensures again that our results are not driven by some long-run common factors behind the two variables.[27]

To summarize, this section has demontrated that even the goods and services that are rarely advertised through the mass media can be highly influenced by the Korean wave. That the effects on women's clothing (rarely advertised through the mass media) and beauty products (heavily advertised by famous Korean actresses) are both economically large in similar magnitudes is especailly revealing the strong presence of our first channel, the diffusion of preferences. Finally, our findings on the significantly positive effects of the TV show exports on the *Korean wave service* FDI sectors reinforce the evidence for this channel.

6 Conclusion

This paper documents the Korean Wave phenomenon in which many countries are captivated by the Korean pop culture (especially the Korean TV dramas) in the past two decades. We argue that such sudden increase in exposure to Korean cultures has induced changes of consumer preferences toward Korean goods/services, and stimulates Korean exports and FDI. In particular, if this preference-reshaping hypothesis is a main mechanism, we expect the impact to be stronger: 1) for the female-related products/services, as proportionally more females are documented to spend more hours watching Korean TV programs and hence more intensively exposed to the Korean cultural contents; 2) for the consumer goods than non-consumer goods, as the former has stronger cultural attachments. Third, if consumer preferences are indeed fundamentally revised because

[27]Because the data on the presence of Korean embassy and the size of overseas Koreans are available only since 1995 and 1997, respectively, for the falsification tests, we use the future values for these two variables. We also verify the sensitivity of the results by dropping these two variables from the regressions.

of exposure to the Korean pop culture, we expect products/services with strong cultural contents but not directly marketed by Korean dramas/celebrities to be affected by the Korean wave as well. These include, for example, Korean FDI in restaurants and grocery stores. We empirically test these hypotheses using a panel of data on Korean TV program exports (1998-2014), merchandise exports and FDI. We find clear heterogeneous effects of the Korean wave across: genders, consumer versus non-consumer goods, and FDI in cultural versus non-cultural sectors. These systematic differences in the impact across sectors support the preference-changing hypothesis as the main mechanism in this Korean wave phenomenon, because it is difficult to reconcile these patterns with supply-side shifts or reverse causality.

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A Data Appendix

A.1 South Korea's merchandize exports and outward FDI

Bilateral imports from South Korea at the HS 4-digit product level are downloaded from the UN Comtrade Database for the period of 1991-2015. Outward FDI of South Korea to each destination for the period of 1991-2015 comes from the Export-Import Bank of Korea, a Korean government institution. See https://stats.koreaexim.go.kr/odisas.html.

A.2 Visitors to Korea

A.3 Gravity variables

Data on GDP (current US$) and GDP per capita (current US$) are downloaded from the World Development Indicator of the World Bank. Distance between two countries is measured by *distw* from CEPII; in particular, the measure calculates the weighted average distance between the biggest cities of two countries, using population shares of the cities as weights. The information on RTA is based on the RTA dataset maintained by José de Sousa, and supplemented by the CEPII data on RTA.

Embassy (source, year available)

The size of overseas Koreans is retrieved from the "Report on the present state of overseas Koreans," published by South Korea's Ministry of Foreign Affairs. This report is published every two years $(1997, 1999, \ldots, 2015)$. We intrapolate the series linearly when the data for two adjacent odd years are available; i.e., $Korean_t = (Korean_{t-1} + Korean_{t+1})/2$. As indicated, this series is available only from year 1997 onward.

Exchange rates are sourced from the Penn World Table, and supplemented by the World Bank data when the whole exchange rate series for a country is missing from the Penn World Table. The cross exchange rate (Korean won / national currency) is calculated from the Korean Won/USD and the national currency/USD exchange rates.

The data on the linguistic distance between Korea and the other countries are not readily available. In the dataset provided by Spolaore and Wacziarg (2016), the linguistic distance of Korea to all other countries (except North Korea) is equal to its max, 1, providing no cross-country

variation. In another possible source of data on linguistic proximity by Melitz and Toubal (2014), Korea is not included in the sample. In Ethonologue, the Korean language is considered to be a "language isolate", sharing no genealogical relationship with other languages. However, some studies suggest that it belongs to the Altaic language family, eg. in Chen et al. (2012). Thus, as an alternative measure, we use the language family in Chen et al. (2012, Figure 1) and follow the same procedure as in Spolaore and Wacziarg (2016) to calculate the linguistic distance between two countries.

In particular, we count the number of common nodes that two languages share, and calculate the number of common nodes between the two plurality languages of each country in a pair, CN, and the expected (weighted) number of common nodes between two countries CN^W: $CN^W = \sum_{i=1}^{I}\sum_{j=1}^{J}(s_{1i} \times s_{2j} \times c_{ij})$, where s_{ki} is the share of linguistic group i in country k and c_{ij} is the number of common nodes between langues i and j. The maximal number of common nodes based on the language tree of Chen et al. (2012) is 8, so the linguistic distance is measured by: $TLD = \sqrt{\frac{8-CN}{8}}$ and the weighted linguistic distance TLD^W measured in a similar way with CN replaced by CN^W. The data on s_{ki} is taken from Melitz and Toubal (2014, Table A1, Column LP), who listed the top (most two) native languages in a country and their normalized shares.

A.4 Concordance of HS and BEC

The UN provides concordance between the HS 6-digit and BEC codes. For the entries with n to n mapping, there is no unique correspondence from the HS 6-digit to BEC. In this case, we leave the BEC code as missing. Given this mapping at the HS 6-digit level, we then take the mode of the BEC codes within each HS 4-digit as the corresponding BEC sector.

Table 1: Female versus Male Tourists to South Korea

	Percentage of Female visitors			log Number of Female visitors			log Number of Male visitors			log Number of Tourists		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
$\ln TVshowExp_{c,t}$	1.989***	0.134	0.0455	0.222***	0.0201**	0.0173*	0.128***	0.0102**	0.0101*	0.189***	0.0101*	0.00672
	(0.521)	(0.122)	(0.113)	(0.0590)	(0.00858)	(0.00894)	(0.0435)	(0.00439)	(0.00482)	(0.0544)	(0.00481)	(0.00505)
$Popular_c$			1.890***			0.0581			0.00212			0.0712*
$\times \ln TVshowExp_{c,t}$			(0.356)			(0.0363)			(0.0302)			(0.0366)
$\ln Population_{c,t}$	-5.313***	14.40**	12.52*	0.190	2.103**	2.045**	0.436**	1.563***	1.561***	0.383*	1.867***	1.796***
	(1.045)	(6.165)	(6.575)	(0.194)	(0.706)	(0.706)	(0.166)	(0.437)	(0.428)	(0.195)	(0.535)	(0.537)
$\ln GDPperCapita_{c,t}$	-4.997***	8.021***	6.546***	0.420	1.055***	1.010***	0.627***	0.727***	0.726***	0.608**	1.017***	0.962***
	(1.661)	(0.963)	(0.958)	(0.249)	(0.138)	(0.125)	(0.205)	(0.111)	(0.0973)	(0.244)	(0.156)	(0.142)
$\ln Dist_c$	-4.729***			-1.111***			-0.925***			-1.021***		
	(1.592)			(0.184)			(0.133)			(0.158)		
$RTA_{c,t}$	-1.092	2.210***	2.217***	0.230	0.341***	0.341***	0.243	0.223***	0.223***	0.176	0.241***	0.241***
	(1.943)	(0.422)	(0.440)	(0.206)	(0.0487)	(0.0499)	(0.162)	(0.0306)	(0.0307)	(0.196)	(0.0332)	(0.0345)
$Embassy_{c,t}$	-5.060	-2.024**	-1.569	-0.567	0.0858	0.0998	-0.391	0.105**	0.105**	-0.452	0.0205	0.0376
	(4.796)	(0.794)	(0.900)	(0.391)	(0.0804)	(0.0869)	(0.257)	(0.0395)	(0.0419)	(0.307)	(0.0690)	(0.0680)
$\ln Koreans_{c,t}$	1.795*	-0.0757	0.122	0.238*	0.0536	0.0596	0.137	-0.00555	-0.00533	0.102	-0.102**	-0.0949**
	(0.920)	(0.664)	(0.642)	(0.135)	(0.0450)	(0.0478)	(0.107)	(0.0315)	(0.0306)	(0.130)	(0.0407)	(0.0426)
$\ln ExRate_{c,t}$		2.252	2.721		-0.0911	-0.0767		-0.187	-0.187		-0.175	-0.158
		(2.868)	(2.905)		(0.291)	(0.286)		(0.179)	(0.173)		(0.253)	(0.249)
cons.	172.1***	-247.7**	-214.4*	13.49***	-28.94**	-27.92**	8.306**	-17.19**	-17.16**	10.30**	-22.61**	-21.36**
	(27.53)	(99.13)	(106.4)	(3.910)	(11.39)	(11.45)	(3.221)	(6.887)	(6.775)	(3.784)	(8.465)	(8.576)
Obs.	403	391	391	403	391	391	403	391	391	403	391	391
R^2	0.728	0.974	0.976	0.900	0.988	0.988	0.909	0.990	0.990	0.892	0.987	0.987
Year FE	Y	N	N	Y	N	N	Y	N	N	Y	N	N
Country FE	N	Y	Y	N	Y	Y	N	Y	Y	N	Y	Y

Notes: OLS estimation of equations (4) and (5). Each observation is an origin country (of the tourists) and a year. $Popular_c = 1$ if the country c's popularity index is 4 (popular), or 5 (very popular). Standard errors are clustered by origin country (for year FE regressions) or by year (for country FE regressions). Sample is restricted to origin countries whose GDP per capita in 2015 is more than US$4000. The symbols *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Table 2: Selected HS Industries

Panel A. *Korean Wave Goods* HS industries

HS code	Description
16	Meat, fish and seafood food preparations nes
17	Sugars and sugar confectionery
18	Cocoa and cocoa preparations
19	Cereal, flour, starch, milk preparations and products
20	Vegetable, fruit, nut, etc food preparations
21	Miscellaneous edible preparations
22	Beverages, spirits and vinegar
3304	Beauty, make-up and skin care preparations
3305	Hair preparations
3307	Shaving and toilet preparations nes, deodorizers
3402	Organic surface active agent, preparation, except soa
4202	Trunks, suit-cases, camera cases, handbags, etc
4203	Clothing, accessories of leather, composition leather
61	Articles of apparel, accessories, knit or crochet
62	Articles of apparel, accessories, not knit or crochet
7113	Jewellery and parts, containing precious metal
7117	Imitation jewellery
8415	Air conditioning equipment, machinery
8418	Refrigerators, freezers and heat pumps nes
8450	Household, laundry-type washing machine, washer-drier
8517	Electric apparatus for line telephony, telegraphy
8528	Television receivers, video monitors, projectors
8703	Motor vehicles for transport of persons (except buses)

Panel B. Textiles and Textile Articles (section XI, classified by UN)

HS code	Description
50	Silk
51	Wool, animal hair, horsehair yarn and fabric thereof
52	Cotton
53	Vegetable textile fibres nes, paper yarn, woven fabri
54	manmade filaments
55	manmade staple fibres
56	Wadding, felt, nonwovens, yarns, twine, cordage, etc
57	Carpets and other textile floor coverings
58	Special woven or tufted fabric, lace, tapestry etc
59	Impregnated, coated or laminated textile fabric
60	Knitted or crocheted fabric
61	*Articles of apparel, accessories, knit or crochet*
62	*Articles of apparel, accessories, not knit or crochet*
63	Other made textile articles, sets, worn clothing etc

Panel C. Women's and Men's Clothing (HS61 & 62)

HS code	Description
6102	Womens, girls overcoats, etc, knit or crochet
6104	Womens, girls suit, dress, skirt, etc, knit or crochet
6106	Womens, girls blouses & shirts, knit or crochet
6108	Womens, girls underwear, nightwear, etc knit, crochet
6202	Womens, girls overcoats, capes, windjackets etc, wove
6204	Womens, girls suits, jacket, dress, skirt, etc, wove
6206	Womens or girls' blouses, shirts and shirt-blouses
6208	Womens, girls underwear, nightwear, not knit, crochet
6101	Mens, boys overcoats, capes, cloak, etc, knit, crochet
6103	Mens, boys suits, jackets, trousers etc knit or crochet
6105	Mens, boys shirts, knit or crochet
6107	Mens, boys underwear, nightwear, etc, knit or crochet
6201	Mens, boys overcoats, capes, windjackets etc, woven
6203	Mens or boys suits, jackets, trousers etc not knit
6205	Men's or boys' shirts

Notes: (i) Panel A: *Korean Wave Goods* indicate the subset of consumer goods that are renowned for their boosted sales overseas largely due to the Korean wave. (ii) Panel B: Section XI (classified by the UN) represents textiles and textile articles.

Table 3: Korea's Beauty Product Exports (in log)

	(1)	(2)	(3)
$\ln TVshowExp_{c,t}$	0.396***	0.251***	0.0496*
	(0.0820)	(0.0593)	(0.0284)
$Popular_c$			0.318***
$\times \ln TVshowExp_{c,t}$			(0.0756)
$\ln GDP_{c,t}$	0.212**	1.621***	1.458***
	(0.0837)	(0.240)	(0.162)
$\ln Dist_c$	-0.117		
	(0.152)		
$RTA_{c,t}$	-0.457	0.427***	0.515***
	(0.387)	(0.0937)	(0.136)
$Embassy_{c,t}$	0.309	0.156	0.484
	(0.657)	(0.386)	(0.366)
$\ln Koreans_{c,t}$	-0.0525	-0.0426	-0.110
	(0.109)	(0.225)	(0.228)
$\ln ExRate_{c,t}$		-0.0348	0.0901
		(0.421)	(0.344)
cons.	3.020*	-23.87***	-23.08***
	(1.744)	(4.265)	(3.447)
Obs.	1297	1276	1276
R^2	0.675	0.862	0.886
Year FE	Y	N	N
Country FE	N	Y	Y

Notes: PPML estimation of equations (4) and (5). Each observation is an export destination country and a year. *Beauty product* includes cosmetics, skin-care, and hair products. $Popular_c = 1$ if the country's popularity index is 4 (popular), or 5 (very popular). Standard errors are clustered by export destination (column 1) or by year (columns 2 & 3). Missing trade values are not replaced by zeros. The symbols *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Table 4: Women's versus Men's Clothing Exports of South Korea

Dependent variables: decadal changes in exports of HS-4digit indutries in textiles and textile articles (in log)

	Panel A. For period of exposure						Panel B. Falsification Tests for period of pre-exposure					
	2002-2015			stacked (2002-2007, 2007-2015)			1991-2001			stacked (1991-1996, 1996-2001)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
$WomensClothing_i$	0.345**	0.307**	0.226***	0.271***	0.249***	0.204***	-0.00227	0.00473	0.00631	-0.0455	-0.0203	-0.0407
$\times\Delta \ln TVshowExp_c$	(0.137)	(0.137)	(0.0562)	(0.0740)	(0.0750)	(0.0488)	(0.156)	(0.167)	(0.104)	(0.0738)	(0.0713)	(0.0502)
$MensClothing_i$	0.272***	0.241***	0.188***	0.132*	0.114	0.145***	-0.186	-0.188	-0.186	0.0286	0.0330	0.00550
$\times\Delta \ln TVshowExp_c$	(0.0895)	(0.0900)	(0.0534)	(0.0759)	(0.0745)	(0.0544)	(0.214)	(0.225)	(0.127)	(0.0554)	(0.0533)	(0.0431)
$\Delta \ln TVshowExp_c$	0.0497	-0.0280*		0.0294	-0.0201*		-0.00658	0.0203		0.0715**	0.00489	
	(0.0486)	(0.0150)		(0.0354)	(0.0103)		(0.0618)	(0.0304)		(0.0282)	(0.0120)	
$\Delta GoodsExpTrend_c$		0.968***			1.000***			0.923***			0.963***	
		(0.0247)			(0.0132)			(0.0582)			(0.0220)	
$\Delta \ln GDP_c$	0.754***	0.0183		1.128***	0.00217		0.736*	-0.125		1.094***	0.0220	
	(0.156)	(0.0213)		(0.231)	(0.0397)		(0.384)	(0.125)		(0.242)	(0.106)	
$\Delta \ln ExRate_c$	-0.469***	0.0232		0.268	0.0666*		-0.110**	0.0306		-0.355***	-0.00196	
	(0.161)	(0.0301)		(0.198)	(0.0357)		(0.0525)	(0.0185)		(0.0880)	(0.0241)	
$\Delta \ln Koreans_c$	0.234**	-0.0218		0.131	-0.0370***		0.0686	0.0200		0.0511	-0.0250	
	(0.103)	(0.0174)		(0.0801)	(0.0106)		(0.112)	(0.0306)		(0.0975)	(0.0318)	
cons.	-2.232***	-1.337***	-0.263	-0.632	0.560	1.117	-2.887***	-3.122***	-3.587***	-2.223***	-2.071***	-1.907***
	(0.190)	(0.0580)	(0.272)	(0.634)	(0.491)	(0.866)	(0.244)	(0.0856)	(0.368)	(0.396)	(0.390)	(0.363)
Obs.	2768	2768	3877	7196	7196	8418	1501	1501	1502	4505	4505	4538
R^2	0.184	0.249	0.253	0.123	0.196	0.125	0.204	0.235	0.238	0.154	0.202	0.183
Industry FE	Y	Y	Y				Y	Y	Y			
Industry × Period FE				Y	Y	Y				Y	Y	Y
Country FE	N	N	Y	N	N	Y	N	N	Y	N	N	Y

Notes: OLS estimation of equation (6) using the Women's and Men's clothing dummies. Pooled over HS-4digit industries in Section XI (classified by the UN), which represents textiles and textile articles. Each observation is a destination country – HS4 industry (and a period for the two-period stacked regressions). Falsification tests explore the relationship between the *future* changes in Korea's TV show exports and the *past* changes in exports of HS4 industries. Standard errors are clustered by export destination in columns 1&2, and robust in column 3 (same for the remaining columns). The symbols *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Table 5: UN Broad Economic Categories

1 - Food and beverages

- 11 - Primary
  - 111 - Mainly for industry
  - **112 - Mainly for household consumption**
- 12 - Processed
  - 121 - Mainly for industry
  - **122 - Mainly for household consumption**

2 - Industrial supplies not elsewhere specified

- 21 - Primary
- 22 - Processed

3 - Fuels and lubricants

- 31 - Primary
- 32 - Processed
  - 321 - Motor spirit
  - 322 - Other

4 - Capital goods (except transport equipment), and parts and accessories thereof

- 41 - Capital goods (except transport equipment)
- 42 - Parts and accessories

5 - Transport equipment and parts and accessories thereof

- **51 - Passenger motor cars**
- 52 - Other
  - 521 - Industrial
  - 522 - Non-industrial
- 53 - Parts and accessories

6 - Consumer goods not elsewhere specified

- **61 - Durable**
- **62 - Semi-durable**
- **63 - Non-durable**

7 - Goods not elsewhere specified

99 - All categories

Note: Consumer goods are highlighted in boldface.

Table 6: Korea's Exports: Consumer Goods versus Intermediate/Capital Goods
Dependent variables: decadal changes in exports of HS-4digit indutries (in log)

	Panel A. For period of exposure						Panel B. Falsification Tests for period of pre-exposure					
	2002-2015			stacked (2002-2007, 2007-2015)			1991-2001			stacked (1991-1996, 1996-2001)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
$ConsumerGoods_i$	0.163***	0.155***	0.110***	0.0807***	0.0764**	0.0679***	0.0332	0.0258	0.0232	0.00608	0.00917	0.00104
$\times\Delta \ln TVshowExp_c$	(0.0379)	(0.0391)	(0.0145)	(0.0286)	(0.0302)	(0.0126)	(0.0496)	(0.0636)	(0.0326)	(0.0226)	(0.0224)	(0.0139)
$\Delta \ln TVshowExp_c$	-0.000557	-0.0320***		-0.0198	-0.0179**		-0.0317	-0.0109		0.0400	0.00328	
	(0.0314)	(0.00945)		(0.0266)	(0.00815)		(0.0457)	(0.0157)		(0.0268)	(0.00917)	
$\Delta GoodsExpTrend_c$		1.008***			1.003***			0.863***			0.996***	
		(0.0257)			(0.0184)			(0.0479)			(0.0350)	
$\Delta \ln GDP_c$	0.753***	0.0285		1.051***	-0.0107		0.575	-0.108		0.986***	0.0404	
	(0.159)	(0.0238)		(0.183)	(0.0277)		(0.339)	(0.115)		(0.175)	(0.0974)	
$\Delta \ln ExRate_c$	-0.456***	0.0465		0.0740	0.0261		0.0201	0.0237*		-0.0226	0.0138	
	(0.167)	(0.0465)		(0.136)	(0.0251)		(0.0582)	(0.0135)		(0.0682)	(0.0193)	
$\Delta \ln Koreans_c$	0.229**	-0.0325		0.181**	-0.0130		-0.0257	-0.0606*		-0.0161	-0.0619*	
	(0.108)	(0.0238)		(0.0760)	(0.0127)		(0.114)	(0.0322)		(0.0739)	(0.0336)	
cons.	3.855***	3.667***	4.763***	-0.711	-0.667	0.204	1.171***	0.945***	1.212***	-0.100	-0.0683*	-1.358***
	(0.0967)	(0.0195)	(0.393)	(0.936)	(0.863)	(0.882)	(0.218)	(0.107)	(0.152)	(0.0961)	(0.0377)	(0.302)
Obs.	17179	17179	23172	44874	44874	52150	8356	8356	8363	25334	25334	25510
R^2	0.243	0.271	0.276	0.152	0.181	0.150	0.296	0.313	0.315	0.177	0.198	0.190
Industry FE	Y	Y	Y				Y	Y	Y			
Industry × Period FE				Y	Y	Y				Y	Y	Y
Country FE	N	N	Y	N	N	Y	N	N	Y	N	N	Y

Notes: OLS estimation of equation (6). Pooled over all the HS-4digit industries. Each observation is a destination country – HS4 industry (and a period for the two-period stacked regressions). Falsification tests explore the relationship between the *future* changes in Korea's TV show exports and the *past* changes in exports of HS4 industries. Standard errors are clustered by export destination in columns 1&2, and robust in column 3 (same for the remaining columns). The symbols *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Table 7: Korea's Exports: *Korean Wave Goods* versus the others

Dependent variables: decadal changes in exports of HS-4digit indutries (in log)

	2002-2015			stacked (2002-2007, 2007-2015)			2002-2007			2007-2015		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
$KoreanWaveGoods_i$	0.263***	0.253***	0.182***	0.145***	0.140***	0.108***	0.139**	0.131**	0.133***	0.146***	0.147***	0.0871***
$\times\Delta \ln TVshowExp_c$	(0.0596)	(0.0622)	(0.0207)	(0.0378)	(0.0398)	(0.0191)	(0.0552)	(0.0572)	(0.0312)	(0.0504)	(0.0523)	(0.0246)
$\Delta \ln TVshowExp_c$	0.0126	-0.0198***		-0.0145	-0.0132**		-0.0499	-0.0153**		0.0257	-0.0118	
	(0.0288)	(0.00612)		(0.0249)	(0.00522)		(0.0387)	(0.00595)		(0.0259)	(0.00840)	
$\Delta GoodsExpTrend_c$		1.009***			1.003***			1.005***			0.989***	
		(0.0253)			(0.0184)			(0.0269)			(0.0217)	
$\Delta \ln GDP_c$	0.755***	0.0296		1.052***	-0.0105		0.902***	-0.0657		1.035***	0.0278	
	(0.159)	(0.0234)		(0.183)	(0.0277)		(0.306)	(0.0464)		(0.233)	(0.0335)	
$\Delta \ln ExRate_c$	-0.460***	0.0431		0.0727	0.0249		0.484*	0.123**		-0.121	-0.0179	
	(0.166)	(0.0465)		(0.136)	(0.0251)		(0.260)	(0.0568)		(0.145)	(0.0207)	
$\Delta \ln Koreans_c$	0.230**	-0.0313		0.181**	-0.0131		0.192*	-0.00831		0.234**	-0.0127	
	(0.108)	(0.0229)		(0.0758)	(0.0125)		(0.0997)	(0.0156)		(0.104)	(0.0157)	
cons.	3.837***	3.650***	4.736***	-0.724	-0.679	0.197	-0.500	-0.633	0.321	-1.721*	-1.593*	-0.903
	(0.0961)	(0.0180)	(0.395)	(0.941)	(0.866)	(0.883)	(0.951)	(0.863)	(0.926)	(0.975)	(0.949)	(0.954)
Obs.	17179	17179	23172	44874	44874	52150	23670	23670	23941	21204	21204	28209
R^2	0.244	0.272	0.276	0.152	0.181	0.150	0.166	0.195	0.197	0.140	0.166	0.160
Industry FE	Y	Y	Y				Y	Y	Y	Y	Y	Y
Industry × Period FE				Y	Y	Y						
Country FE	N	N	Y	N	N	Y	N	N	Y	N	N	Y

Notes: OLS estimation of equation (6) using the *Korean Wave Goods* dummy. Pooled over all the HS-4digit industries. Each observation is a destination country – HS4 industry (and a period for the two-period stacked regressions). Standard errors are clustered by export destination in columns 1&2, and robust in column 3 (same for the remaining columns). The symbols *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Table 8: Falsification Tests of Table 7 (*Korean Wave Goods* versus the others)
Dependent variables: decadal changes in exports of HS-4digit indutries (in log)

	1991-2001			stacked (1991-1996, 1996-2001)			1991-1996			1996-2001		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
$KoreanWaveGoods_i$	0.00870	-0.00162	-0.00836	0.000614	0.00673	-0.00516	-0.131	-0.110	-0.120**	0.0326	0.0193	0.0263
$\times\Delta \ln TVshowExp_c$	(0.0606)	(0.0818)	(0.0502)	(0.0380)	(0.0359)	(0.0199)	(0.111)	(0.108)	(0.0526)	(0.0357)	(0.0357)	(0.0216)
$\Delta \ln TVshowExp_c$	-0.0245	-0.00437		0.0415	0.00491		0.0547	0.00890		0.0162	0.00664	
	(0.0421)	(0.0103)		(0.0258)	(0.00724)		(0.0353)	(0.0152)		(0.0294)	(0.00898)	
$\Delta GoodsExpTrend_c$		0.864***			0.996***			0.893***			1.025***	
		(0.0486)			(0.0350)			(0.0665)			(0.0387)	
$\Delta \ln GDP_c$	0.581*	-0.103		0.987***	0.0415		1.263***	0.100		0.765***	0.0491	
	(0.340)	(0.117)		(0.175)	(0.0970)		(0.269)	(0.132)		(0.208)	(0.120)	
$\Delta \ln ExRate_c$	0.0194	0.0231		-0.0226	0.0137		-0.157**	0.0120		0.102	-0.00615	
	(0.0582)	(0.0137)		(0.0681)	(0.0193)		(0.0648)	(0.0262)		(0.0990)	(0.0293)	
$\Delta \ln Koreans_c$	-0.0267	-0.0616*		-0.0163	-0.0622*		0.0789	-0.0487*		-0.188*	-0.0451	
	(0.114)	(0.0319)		(0.0739)	(0.0336)		(0.0664)	(0.0244)		(0.103)	(0.0703)	
cons.	1.155***	0.930***	1.214***	-0.104	-0.0724**	-1.359***	-0.181	-0.0646	0.355***	0.214	0.106	-1.487
	(0.208)	(0.0980)	(0.151)	(0.0936)	(0.0340)	(0.302)	(0.173)	(0.0582)	(0.0926)	(1.321)	(1.347)	(1.358)
Obs.	8356	8356	8363	25334	25334	25510	7739	7739	7746	17595	17595	17764
R^2	0.296	0.313	0.315	0.177	0.198	0.190	0.251	0.258	0.260	0.141	0.165	0.166
Industry FE	Y	Y	Y				Y	Y	Y	Y	Y	Y
Industry × Period FE				Y	Y	Y						
Country FE	N	N	Y	N	N	Y	N	N	Y	N	N	Y

Notes: Falsification tests explore the relationship between the *future* changes in Korea's TV show exports and the *past* changes in exports of HS4 industries. OLS estimation of equation (6) using the *Korean Wave Goods* dummy and the *future* changes in Korea's TV show exports. Pooled over all the HS-4digit industries. Each observation is a destination country – HS4 industry (and a period for the two-period stacked regressions). Standard errors are clustered by export destination in columns 1&2, and robust in column 3 (same for the remaining columns). The symbols *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Table 9: Korea's Exports in *Korean Wave Goods* HS industries (in log)

	Beauty Products				Jewelry		Clothes & Bags				Food		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
	hs3304	hs3305	hs3307	hs3402	hs7113	hs7117	hs61	hs62	hs4202	hs4203	hsFOOD	hs16	hs17
$\ln TVshowExp_{c,t}$	0.580***	0.368***	0.472***	0.0388	0.718***	0.294***	0.142**	0.283**	0.231	0.226***	0.345***	0.321***	0.259
	(0.0703)	(0.0726)	(0.0720)	(0.0416)	(0.190)	(0.0647)	(0.0630)	(0.120)	(0.147)	(0.0744)	(0.0843)	(0.124)	(0.181)
$\ln GDP_{c,t}$	0.235**	0.0384	0.458***	0.157**	0.464**	0.900***	1.316***	0.435**	0.690***	1.070***	0.441***	1.408***	-0.0836
	(0.117)	(0.131)	(0.117)	(0.0785)	(0.183)	(0.0862)	(0.178)	(0.215)	(0.159)	(0.193)	(0.132)	(0.288)	(0.162)
$\ln Dist_c$	0.256	0.355***	-0.477***	-0.833***	0.472	0.164**	0.0115	0.600***	0.0252	-0.306***	-0.302	-0.729***	-1.038**
	(0.186)	(0.117)	(0.138)	(0.133)	(0.296)	(0.0693)	(0.109)	(0.158)	(0.250)	(0.0903)	(0.187)	(0.158)	(0.431)
$RTA_{c,t}$	-0.740*	-0.507	-0.294	0.217	-0.0773	-0.400	0.0327	-1.082**	0.280	-0.00313	-0.105	0.0630	-0.689
	(0.419)	(0.330)	(0.247)	(0.206)	(0.334)	(0.496)	(0.246)	(0.538)	(0.584)	(0.472)	(0.284)	(0.388)	(0.510)
$Embassy_{c,t}$	0.400	-1.089**	1.037***	0.444	3.499**	1.109***	0.281	-0.0376	0.773	1.597*	0.729	1.874***	2.483
	(0.729)	(0.480)	(0.316)	(0.353)	(1.518)	(0.340)	(0.352)	(0.544)	(0.848)	(0.870)	(0.531)	(0.610)	(1.579)
$\ln Koreans_{c,t}$	-0.156	0.258**	-0.322***	0.192***	-0.442*	-0.191***	-0.152	0.122	-0.0594	-0.129	-0.0168	-0.471*	0.00584
	(0.109)	(0.106)	(0.112)	(0.0665)	(0.267)	(0.0620)	(0.103)	(0.0763)	(0.133)	(0.133)	(0.139)	(0.245)	(0.334)
cons.	-2.363	-0.474	-1.658	9.999***	-9.980**	-12.57***	-16.63***	-4.823	-6.422**	-13.14***	1.615	-15.45**	14.84***
	(2.071)	(2.544)	(2.219)	(1.433)	(4.059)	(1.589)	(3.151)	(2.974)	(2.611)	(3.788)	(2.926)	(6.126)	(2.627)
Obs.	1120	920	925	1092	709	1121	1392	1400	1336	1077	1403	923	905
R^2	0.596	0.746	0.861	0.880	0.344	0.841	0.961	0.942	0.761	0.958	0.877	0.884	0.274
Year FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Notes: PPML estimation of equations (4). Standard errors are clustered by the export destination. Missing trade values are not replaced by zeros. The symbols *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Table 9 (continued): Korea's Exports in *Korean Wave Goods* HS industries (in log)

	Food					Refrigerator	Washing Machine	Telephone	Aircon	TV	Car
	(14) hs18	(15) hs19	(16) hs20	(17) hs21	(18) hs22	(19) hs8418	(20) hs8450	(21) hs8517	(22) hs8415	(23) hs8528	(24) hs8703
$\ln TVshowExp_{c,t}$	0.358***	0.311***	0.457***	0.313***	0.395***	0.0786**	0.188***	0.0560	0.0232	-0.00446	0.00463
	(0.118)	(0.0833)	(0.123)	(0.0843)	(0.123)	(0.0309)	(0.0503)	(0.0742)	(0.0465)	(0.0761)	(0.0436)
$\ln GDP_{c,t}$	0.896***	0.421***	1.119***	0.215*	0.489**	0.575***	0.499***	0.578***	0.548***	0.899***	0.632***
	(0.293)	(0.150)	(0.317)	(0.123)	(0.190)	(0.0683)	(0.104)	(0.185)	(0.109)	(0.207)	(0.0800)
$\ln Dist_c$	-1.647***	0.0328	-0.635***	-0.0339	-0.478*	0.786***	0.873***	-0.00178	0.353**	0.306	1.070***
	(0.399)	(0.211)	(0.207)	(0.240)	(0.282)	(0.0840)	(0.0921)	(0.152)	(0.177)	(0.223)	(0.252)
$RTA_{c,t}$	-0.321	-0.159	1.085***	-0.258	-0.190	0.104	-0.269	0.0531	0.0873	-0.149	-0.241
	(0.555)	(0.296)	(0.408)	(0.241)	(0.356)	(0.151)	(0.241)	(0.308)	(0.216)	(0.166)	(0.182)
$Embassy_{c,t}$	2.791***	-0.447	0.594	-0.298	2.053**	-0.300	-1.672***	0.188	0.468	0.270	-0.306
	(0.833)	(0.463)	(0.641)	(0.398)	(0.799)	(0.320)	(0.389)	(0.435)	(0.330)	(0.339)	(0.441)
$\ln Koreans_{c,t}$	-0.586*	0.107	-0.266	0.137	-0.118	0.159***	0.142*	0.206**	0.0878	-0.0771	0.190***
	(0.317)	(0.142)	(0.242)	(0.139)	(0.203)	(0.0406)	(0.0790)	(0.101)	(0.0664)	(0.124)	(0.0548)
cons.	-0.462	-1.866	-11.88*	2.581	-1.035	-9.697***	-9.154***	-3.307	-5.171***	-10.96***	-10.43***
	(4.908)	(3.188)	(6.275)	(2.714)	(4.817)	(1.159)	(2.141)	(2.922)	(1.902)	(3.873)	(2.115)
Obs.	579	1103	970	1212	1067	1483	1336	1398	1458	1460	1564
R^2	0.916	0.889	0.911	0.778	0.834	0.879	0.830	0.857	0.750	0.478	0.928
Year FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Notes: PPML estimation of equations (4). Standard errors are clustered by the export destination. Missing trade values are not replaced by zeros. The symbols *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Table 10: Korea's FDI Sectors

Korean Wave Service Sectors	
Restaurant	Restaurant/accomodation business
Retail & Wholesale	Grocery stores, retail/wholesale business
Entertainment & Leisure	Concerts, performances, arts, leisure services
Broadcasting	Broadcasting, publishing, communication and information service
Medical	Medical clinics
Education service	Educational services industry
Personal service	Personal service business such as hair salons
Non-*KoreanWaveService* Sectors	
Agriculture	Agriculture, forestry, fisheries
Business management	Business facilities management, business support services
Construction	Construction
Finance	Finance, insurance
Manufacturing	Manufacturing industries
Mining	Mining industry
Public Administration	Public, defense, social security administration
Science and Technology	Services associated with science and technology
Shipping	Shipping, transportation
Leasing & Real Estate	Leasing, real estate business
Electricity & Gas	Electricity, gas, water supply
Waste management	Waste treatment, environmental restoration

Notes: Data are from The Export-Import Bank of Korea, which belongs to the Korean government. See https://stats.koreaexim.go.kr/odisas.html.

Table 11: Korea's outward FDI in *KoreanWaveService* sectors (in log)

	(1) Restaurant	(2) Retail & Wholesale	(3) Entertain. & Leisure	(4) Broadcast.	(5) Medical	(6) Education service	(7) Personal service
$\ln TVshowExp_{c,t}$	0.232**	0.414***	0.659***	0.682***	0.413	0.326*	0.298*
	(0.107)	(0.142)	(0.124)	(0.107)	(0.257)	(0.171)	(0.165)
$\ln GDP_{c,t}$	-0.0792	0.433***	-0.138	0.314***	-0.0552	0.0510	0.336***
	(0.168)	(0.132)	(0.133)	(0.106)	(0.160)	(0.199)	(0.128)
$\ln Dist_c$	0.590***	0.581**	0.186	0.797***	1.189***	0.781**	0.757***
	(0.165)	(0.233)	(0.230)	(0.169)	(0.317)	(0.306)	(0.222)
$RTA_{c,t}$	1.285***	0.0753	-0.584	0.253	0.0831	0.248	0.422
	(0.244)	(0.323)	(0.539)	(0.269)	(0.735)	(0.583)	(0.468)
$Embassy_{c,t}$	2.830***	1.689	3.912***	1.406***	1.936	-0.485	1.091
	(0.605)	(1.311)	(0.872)	(0.448)	(2.011)	(0.595)	(1.183)
$\ln Koreans_{c,t}$	0.583***	-0.0651	0.194	-0.0371	0.448	0.452***	0.431**
	(0.124)	(0.140)	(0.139)	(0.0952)	(0.278)	(0.121)	(0.195)
cons.	-2.348	-6.655***	0.453	-10.67***	-11.65*	-6.553**	-12.58***
	(1.974)	(2.144)	(2.641)	(2.192)	(6.135)	(2.633)	(2.556)
Obs.	1082	1082	1082	1082	1082	1082	1082
R^2	0.824	0.668	0.663	0.794	0.803	0.787	0.893
Year FE	Y	Y	Y	Y	Y	Y	Y

Notes: PPML estimation of equation (4). Missing FDI values are replaced by zeros. Standard errors are clustered by FDI destination. The symbols *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Table 12: (continued) Korea's outward FDI in non-*KoreanWaveService* sectors (in log)

	(8) Agriculture	(9) Business manage-ment	(10) Construction	(11) Finance	(12) Manufact.	(13) Mining	(14) sciTech	(15) Leasing & Real Estate	(16) Public admin.	(17) Shipping	(18) Electricity & Gas
$\ln TVshowExp_{c,t}$	0.0141	0.0694	-0.0443	0.263	-0.0405	0.139	0.122	0.121	-0.451	0.422***	0.173*
	(0.0905)	(0.112)	(0.0890)	(0.222)	(0.117)	(0.138)	(0.159)	(0.153)	(0.356)	(0.154)	(0.105)
$\ln GDP_{c,t}$	-0.166	0.380*	-0.112	0.250*	0.132	0.0429	0.604***	0.151	-0.367	0.261**	0.146
	(0.140)	(0.197)	(0.153)	(0.137)	(0.147)	(0.159)	(0.200)	(0.133)	(0.257)	(0.132)	(0.132)
$\ln Dist_c$	0.0643	-0.0484	-0.158	0.441	-0.579**	1.270***	0.288	0.579***	-1.764***	0.635*	-0.0960
	(0.308)	(0.271)	(0.248)	(0.357)	(0.260)	(0.283)	(0.407)	(0.194)	(0.321)	(0.335)	(0.438)
$RTA_{c,t}$	1.023	1.385***	1.150***	0.374	0.799***	-0.0857	1.072	0.636	3.867**	0.972	-0.345
	(0.773)	(0.373)	(0.328)	(0.722)	(0.291)	(0.567)	(0.891)	(0.538)	(1.550)	(0.645)	(0.442)
$Embassy_{c,t}$	3.257***	1.265	-0.322	0.0818	0.388	-1.047	-0.112	-1.580		1.713	-0.178
	(1.037)	(0.940)	(0.788)	(1.888)	(0.858)	(0.866)	(1.508)	(1.437)		(1.382)	(1.143)
$\ln Koreans_{c,t}$	0.410***	0.0779	0.441***	0.122	0.453**	0.326**	-0.0607	0.375**	1.662***	-0.0390	0.0528
	(0.138)	(0.137)	(0.133)	(0.262)	(0.192)	(0.157)	(0.182)	(0.177)	(0.502)	(0.169)	(0.155)
cons.	3.656	-3.134	9.840***	-3.740	10.86***	-4.371	-8.377**	-0.615	20.91***	-7.309**	-1.526
	(3.687)	(3.212)	(2.857)	(4.771)	(2.264)	(2.868)	(3.856)	(3.430)	(4.162)	(3.312)	(4.564)
Obs.	1082	1082	1082	1082	1082	1082	1082	1082	433	1082	970
R^2	0.070	0.073	0.183	0.496	0.600	0.417	0.296	0.516	0.983	0.418	0.223
Year FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Notes: PPML estimation of equation (4). Missing FDI values are replaced by zeros. Standard errors are clustered by FDI destination. The symbols *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Table 13: Korea's outward FDI: *KoreanWaveService* sectors versus the others

	FDI 2002-2015		Falsification Tests: FDI 1991-2001		
	(1)	(2)		(3)	(4)
$KoreanWaveService_i$	0.123***	0.126***	$KoreanWaveService_i$	0.00160	0.00173
$\times \ln TVshowExp_{c,t}$	(0.0164)	(0.0164)	$\times \ln TVshowExp_{c,t+12}$	(0.0405)	(0.0418)
$\ln TVshowExp_{c,t}$	0.0208	0.0232	$\ln TVshowExp_{c,t+12}$	-0.0597	-0.0673
	(0.0340)	(0.0366)		(0.146)	(0.165)
$\ln GDP_{c,t}$	-0.672***	-0.525***	$\ln GDP_{c,t}$	-0.0708	-0.0562
	(0.151)	(0.139)		(0.405)	(0.424)
$\ln ExRate_{c,t}$	0.558*	0.180	$\ln ExRate_{c,t}$	0.153	0.136
	(0.315)	(0.363)		(0.113)	(0.109)
$RTA_{c,t}$	0.00116	0.0668	$RTA_{c,t}$		
	(0.0920)	(0.0842)			
$Embassy_{c,t}$	-2.503***		$Embassy_{c,t}$	-2.627***	
	(0.519)			(0.539)	
$\ln Koreans_{c,t}$	0.622***		$\ln Koreans_{c,t+12}$	0.526	
	(0.134)			(0.364)	
cons.	3.020*	-23.87***	cons.	6.501	6.890
	(1.744)	(4.265)		(7.714)	(10.30)
Obs.	1297	1276	Obs.	9531	9531
R^2	0.675	0.862	R^2	0.661	0.653
Sector×Year FE	Y	Y	Sector×Year FE	Y	Y
Country FE	Y	Y	Country FE	Y	Y

Notes: PPML estimation. Pooled over all FDI sectors with country and sector-year fixed effects. Each observation is a sector-country-year. Standard errors are clustered by year. The indicator $KoreanWaveService_i$ equals one if the sector i is one of the *Korean Wave Service* sectors listed in Table 10. The symbols *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Table 14: Korea's Exports: Consumer Goods versus Intermediate/Capital Goods
Dependent variables: decadal changes in exports of HS-4digit indutries (in log)

	Panel A. For period of exposure						Panel B. Falsification Tests for period of pre-exposure					
	2002-2015			stacked (2002-2007, 2007-2015)			1991-2001			stacked (1991-1996, 1996-2001)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
$ConsumerGoods_i$	0.105***	0.0981***	0.0687***	0.0527**	0.0472**	0.0495***	0.0334	0.0309	0.0280	0.00959	0.0105	-0.00106
$\times\Delta \ln TVshowExp_c$	(0.0251)	(0.0252)	(0.0112)	(0.0209)	(0.0217)	(0.00960)	(0.0289)	(0.0371)	(0.0249)	(0.0197)	(0.0194)	(0.0102)
$\Delta \ln TVshowExp_c$	-0.000534	-0.0316***		-0.0211	-0.0187**		-0.0289	-0.00649		0.0392	0.00260	
	(0.0315)	(0.00945)		(0.0265)	(0.00816)		(0.0466)	(0.0153)		(0.0266)	(0.00937)	
$\Delta GoodsExpTrend_c$		1.005***			1.021***			0.896***			0.976***	
		(0.0218)			(0.0117)			(0.0509)			(0.0247)	
$\Delta \ln GDP_c$	0.754***	0.0183		1.076***	-0.0171		0.619*	-0.115		0.954***	0.00712	
	(0.156)	(0.0213)		(0.182)	(0.0222)		(0.350)	(0.0930)		(0.169)	(0.0896)	
$\Delta \ln ExRate_c$	-0.469***	0.0232		0.0938	0.0483**		0.0110	0.0207*		-0.0317	0.0119	
	(0.161)	(0.0301)		(0.136)	(0.0192)		(0.0568)	(0.0111)		(0.0626)	(0.0154)	
$\Delta \ln Koreans_c$	0.234**	-0.0218		0.180**	-0.0180**		0.00244	-0.0250		-0.00283	-0.0384*	
	(0.103)	(0.0174)		(0.0744)	(0.00896)		(0.111)	(0.0206)		(0.0661)	(0.0211)	
cons.	3.853***	3.671***	4.586***	-0.717	-0.666	0.159	1.139***	0.907***	1.215***	-0.0855	-0.0489	-0.256
	(0.0966)	(0.0171)	(0.307)	(0.936)	(0.861)	(0.880)	(0.230)	(0.105)	(0.136)	(0.0948)	(0.0370)	(0.823)
Obs.	20233	20233	27404	52924	52924	61618	9900	9900	9915	30287	30287	30519
R^2	0.244	0.273	0.278	0.151	0.183	0.150	0.299	0.318	0.319	0.175	0.197	0.188
Industry FE	Y	Y	Y				Y	Y	Y			
Industry × Period FE				Y	Y	Y				Y	Y	Y
Country FE	N	N	Y	N	N	Y	N	N	Y	N	N	Y

Notes: OLS estimation of equation (6). Pooled over all the HS-4digit industries. Each observation is a destination country – HS4 industry (and a period for the two-period stacked regressions). Falsification tests explore the relationship between the *future* changes in Korea's TV show exports and the *past* changes in exports of HS4 industries. Standard errors are clustered by export destination in columns 1&2, and robust in column 3 (same for the remaining columns). The symbols *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Table 15: Korea's Exports: *Korean Wave Goods* versus the others

Dependent variables: decadal changes in exports of HS-4digit indutries (in log)

	2002-2015			stacked (2002-2007, 2007-2015)			2002-2007			2007-2015		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
$KoreanWaveGoods_i$	0.188***	0.179***	0.129***	0.105***	0.103***	0.0839***	0.0921**	0.0854**	0.0864***	0.111**	0.116**	0.0723***
$\times\Delta \ln TVshowExp_c$	(0.0458)	(0.0479)	(0.0179)	(0.0276)	(0.0292)	(0.0166)	(0.0356)	(0.0370)	(0.0270)	(0.0422)	(0.0441)	(0.0213)
$\Delta \ln TVshowExp_c$	0.0167	-0.0159**		-0.0138	-0.0130***		-0.0504	-0.0163***		0.0274	-0.00976	
	(0.0284)	(0.00599)		(0.0243)	(0.00415)		(0.0384)	(0.00430)		(0.0250)	(0.00679)	
$\Delta GoodsExpTrend_c$		1.005***			1.022***			1.017***			1.015***	
		(0.0218)			(0.0117)			(0.0167)			(0.0147)	
$\Delta \ln GDP_c$	0.757***	0.0207		1.077***	-0.0177		0.952***	-0.0387		1.040***	-0.0143	
	(0.157)	(0.0209)		(0.182)	(0.0222)		(0.305)	(0.0316)		(0.230)	(0.0298)	
$\Delta \ln ExRate_c$	-0.466***	0.0267		0.0943	0.0488**		0.478*	0.128***		-0.0952	0.00937	
	(0.161)	(0.0307)		(0.136)	(0.0190)		(0.265)	(0.0386)		(0.143)	(0.0186)	
$\Delta \ln Koreans_c$	0.235**	-0.0205		0.180**	-0.0177**		0.196**	-0.00780		0.223**	-0.0300**	
	(0.103)	(0.0168)		(0.0743)	(0.00892)		(0.0955)	(0.01000)		(0.107)	(0.0122)	
cons.	3.830***	3.649***	4.544***	-0.735	-0.680	0.147	-0.527	-0.651	0.617	-1.729*	-1.588*	-0.971
	(0.0966)	(0.0154)	(0.309)	(0.941)	(0.864)	(0.881)	(0.953)	(0.864)	(0.891)	(0.976)	(0.948)	(0.949)
Obs.	20233	20233	27404	52924	52924	61618	27994	27994	28323	24930	24930	33295
R^2	0.244	0.274	0.279	0.152	0.183	0.150	0.166	0.197	0.198	0.139	0.168	0.162
Industry FE	Y	Y	Y				Y	Y	Y	Y	Y	Y
Industry × Period FE				Y	Y	Y						
Country FE	N	N	Y	N	N	Y	N	N	Y	N	N	Y

Notes: OLS estimation of equation (6) using the *Korean Wave Goods* dummy. Pooled over all the HS-4digit industries. Each observation is a destination country – HS4 industry (and a period for the two-period stacked regressions). Standard errors are clustered by export destination in columns 1&2, and robust in column 3 (same for the remaining columns). The symbols *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Table 16: Falsification Tests of Table 7 (*Korean Wave Goods* versus the others)
Dependent variables: decadal changes in exports of HS-4digit indutries (in log)

	1991-2001			stacked (1991-1996, 1996-2001)			1991-1996			1996-2001		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
$KoreanWaveGoods_i$	-0.00500	-0.0132	-0.0153	0.0101	0.0126	-0.00348	-0.0676	-0.0501	-0.0519	0.0334	0.0204	0.0156
$\times\Delta \ln TVshowExp_c$	(0.0510)	(0.0686)	(0.0428)	(0.0302)	(0.0280)	(0.0173)	(0.0657)	(0.0655)	(0.0458)	(0.0290)	(0.0283)	(0.0188)
$\Delta \ln TVshowExp_c$	-0.0154	0.00693		0.0420*	0.00546		0.0510	0.00594		0.0180	0.00645	
	(0.0419)	(0.00875)		(0.0244)	(0.00531)		(0.0386)	(0.00947)		(0.0266)	(0.00607)	
$\Delta GoodsExpTrend_c$		0.897***			0.976***			0.892***			0.994***	
		(0.0507)			(0.0247)			(0.0503)			(0.0278)	
$\Delta \ln GDP_c$	0.628*	-0.107		0.955***	0.00814		1.214***	0.0307		0.748***	0.0302	
	(0.349)	(0.0936)		(0.169)	(0.0886)		(0.268)	(0.0833)		(0.198)	(0.108)	
$\Delta \ln ExRate_c$	0.0104	0.0200*		-0.0319	0.0116		-0.165**	0.00732		0.0885	-0.00634	
	(0.0565)	(0.0112)		(0.0625)	(0.0154)		(0.0689)	(0.0199)		(0.0938)	(0.0231)	
$\Delta \ln Koreans_c$	0.00210	-0.0254		-0.00280	-0.0384*		0.112*	-0.0123		-0.189**	-0.0441	
	(0.111)	(0.0202)		(0.0661)	(0.0211)		(0.0652)	(0.0167)		(0.0903)	(0.0419)	
cons.	1.108***	0.877***	1.218***	-0.0924	-0.0560*	-0.256	-0.155	-0.0346	0.294***	0.214	0.112	-0.396
	(0.216)	(0.0936)	(0.133)	(0.0902)	(0.0300)	(0.824)	(0.182)	(0.0375)	(0.0845)	(1.324)	(1.350)	(1.555)
Obs.	9900	9900	9915	30287	30287	30519	9167	9167	9182	21120	21120	21337
R^2	0.299	0.318	0.319	0.175	0.197	0.188	0.247	0.254	0.256	0.141	0.166	0.165
Industry FE	Y	Y	Y				Y	Y	Y	Y	Y	Y
Industry × Period FE				Y	Y	Y						
Country FE	N	N	Y	N	N	Y	N	N	Y	N	N	Y

Notes: Falsification tests explore the relationship between the *future* changes in Korea's TV show exports and the *past* changes in exports of HS4 industries. OLS estimation of equation (6) using the *Korean Wave Goods* dummy and the *future* changes in Korea's TV show exports. Pooled over all the HS-4digit industries. Each observation is a destination country – HS4 industry (and a period for the two-period stacked regressions). Standard errors are clustered by export destination in columns 1&2, and robust in column 3 (same for the remaining columns). The symbols *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

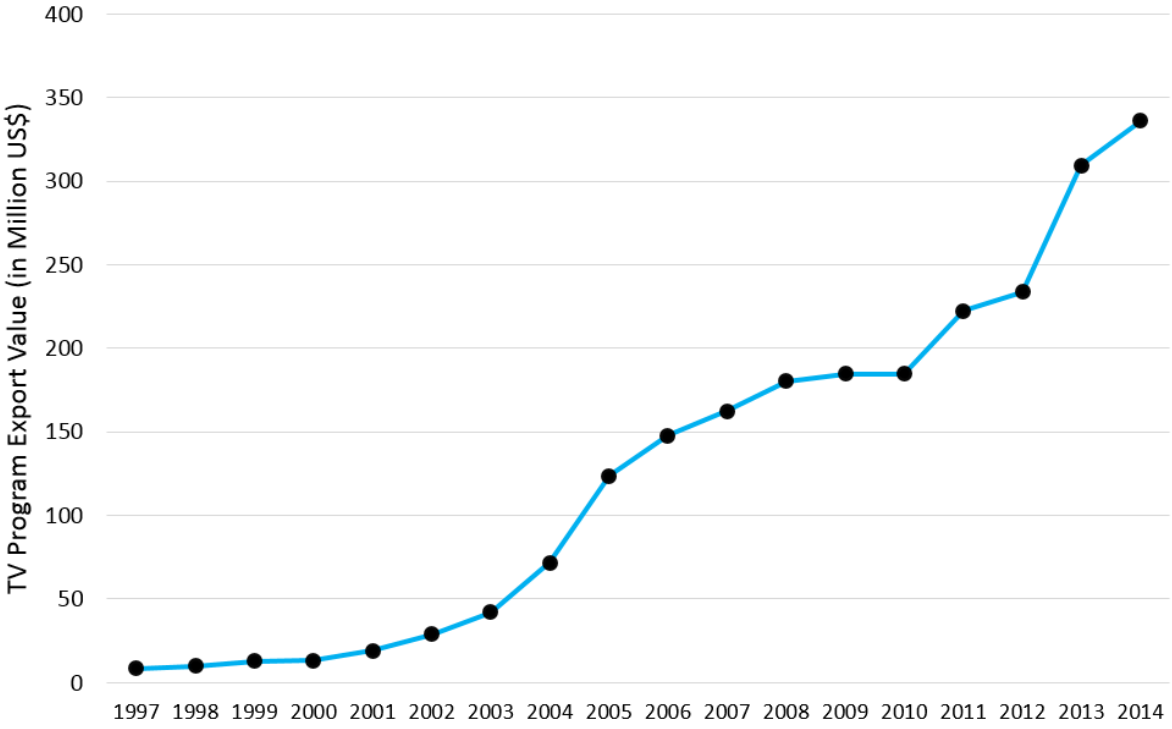


Figure 1: TV Program Exports of South Korea

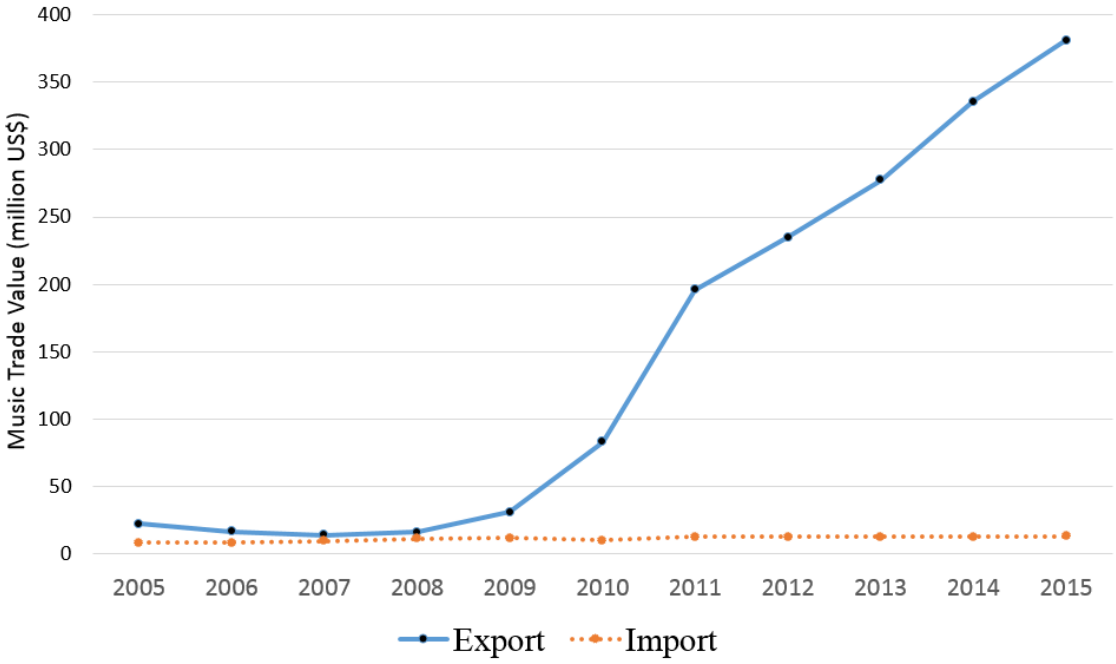


Figure 2: Music Exports and Imports of South Korea

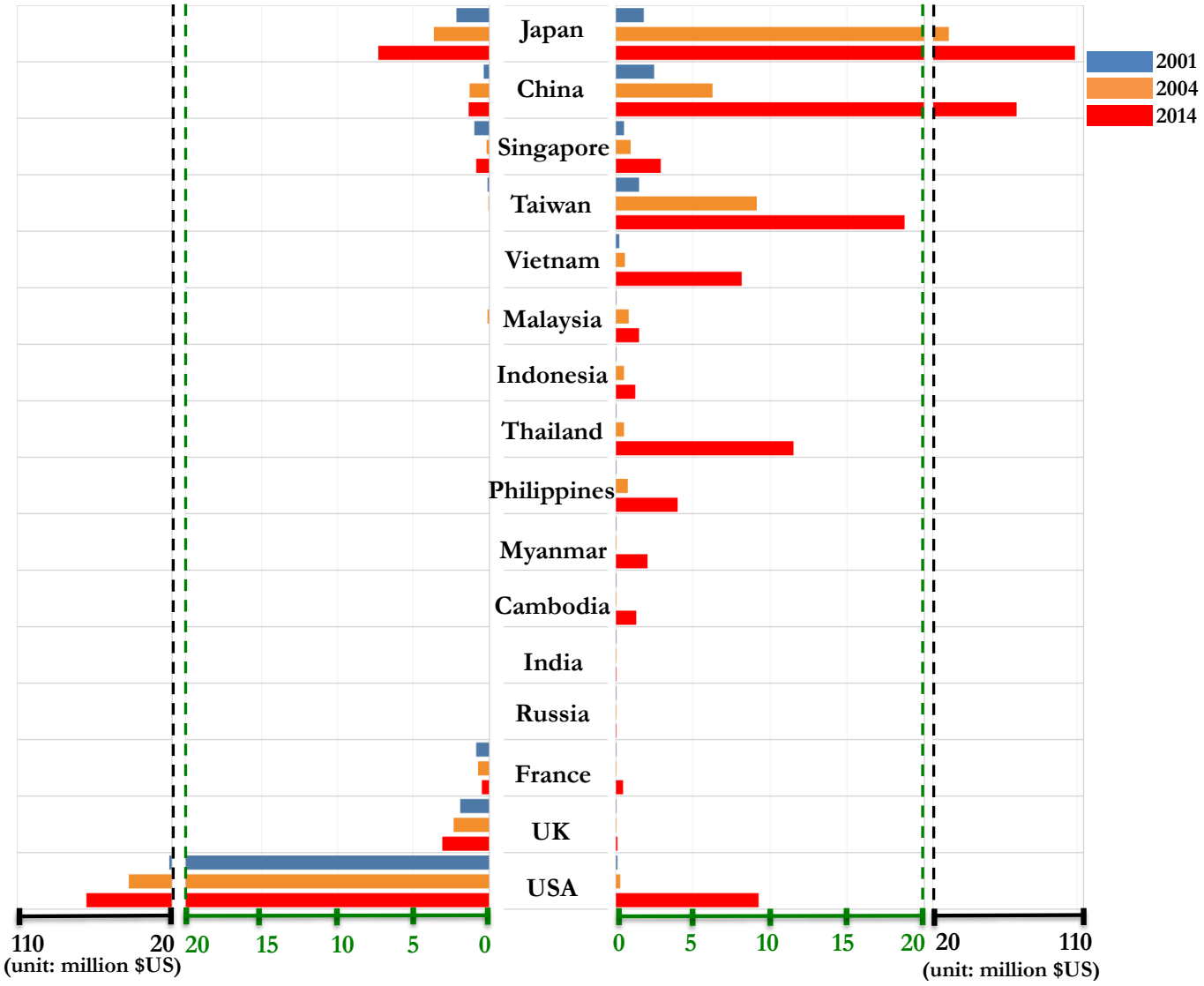


Figure 3: Korea's TV Program Exports across selected Destinations (in 2001, 2004, and 2014)

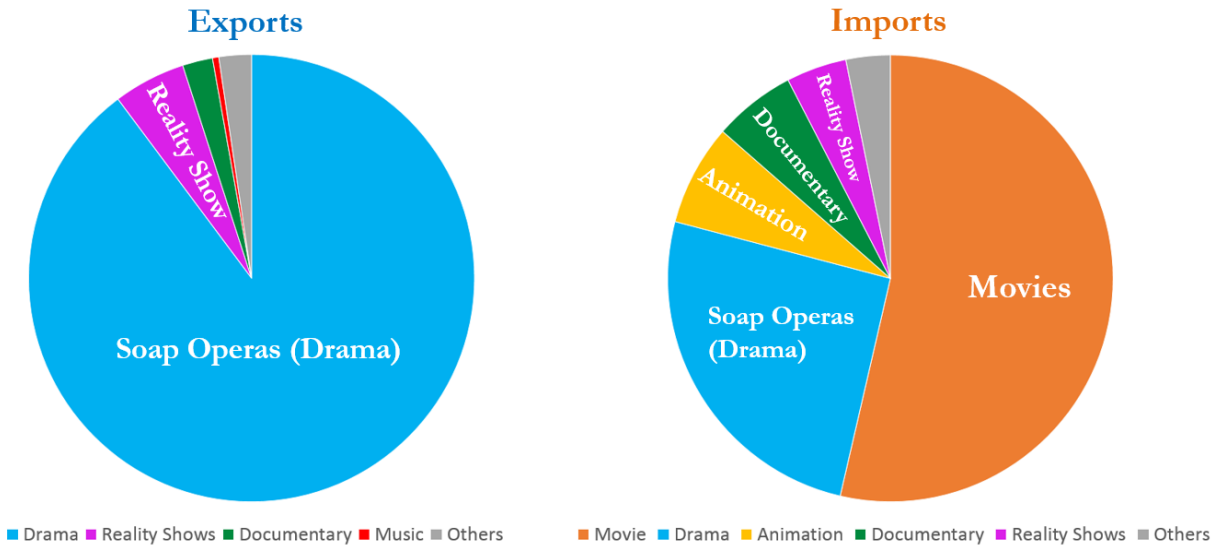


Figure 4: Genre Composition of TV Show Exports and Imports of South Korea

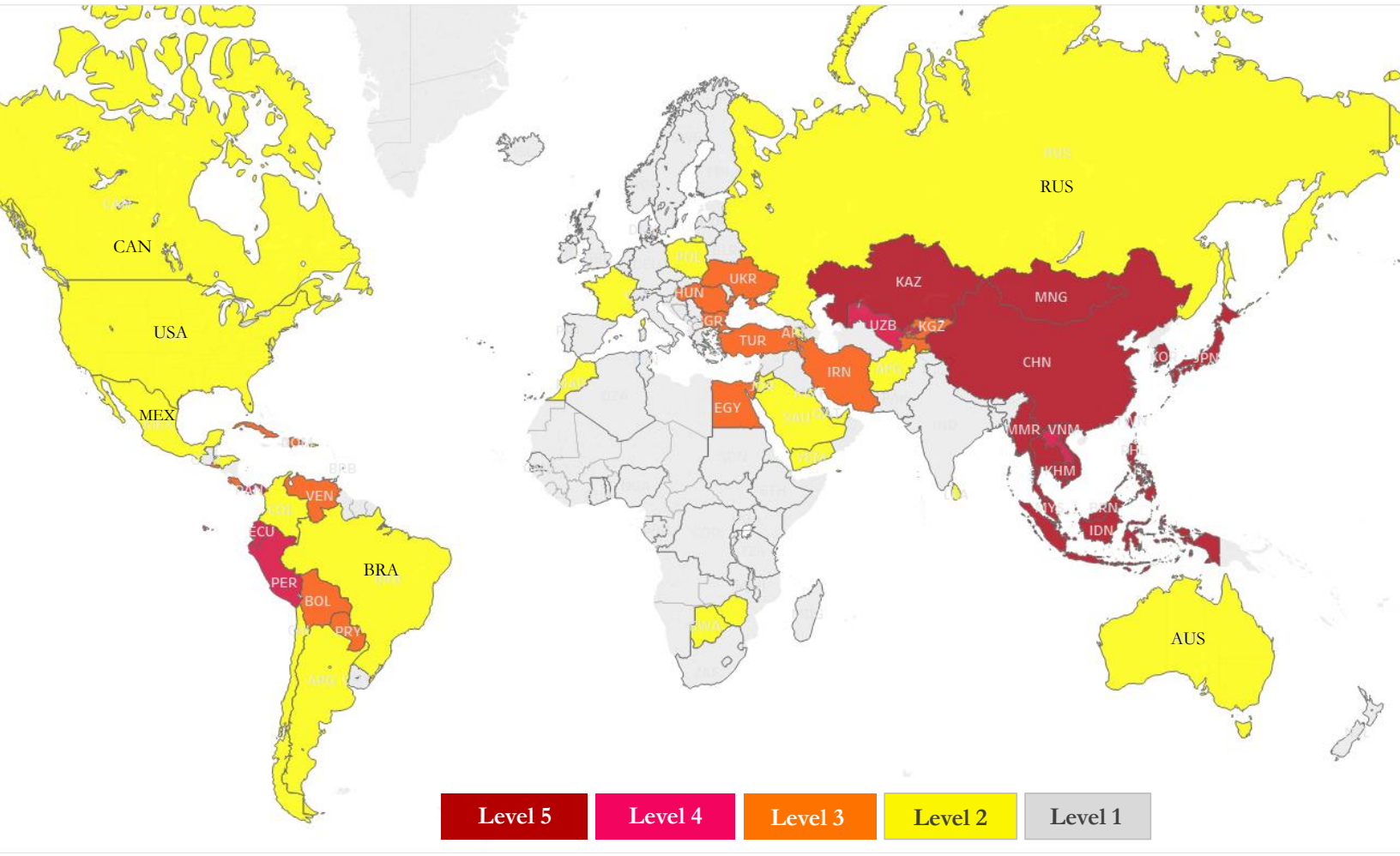


Figure 5: Popularity Index World Map (e.g., Level5: very popular; Level1: not interested)

Survey Results (N = 6500), by *KOFICE 2015*

Question: After experiencing Korean pop culture (TV dramas, K-pop, Movies), how have your preferences for the following Korean Products and Services changed?

Asia & Oceania (N = 3600)							America (N = 900)		Europe (N = 1200)			Middle East (N = 400)	Africa (N = 400)
China	Japan	Taiwan	Thailand	Malaysia	Indonesia	Australia	USA	Brazil	France	UK	Russia	UAE	South Africa
600	600	600	400	600	400	400	500	400	400	400	400	400	400

Figure 6: Survey Results published by KOFICE 2015

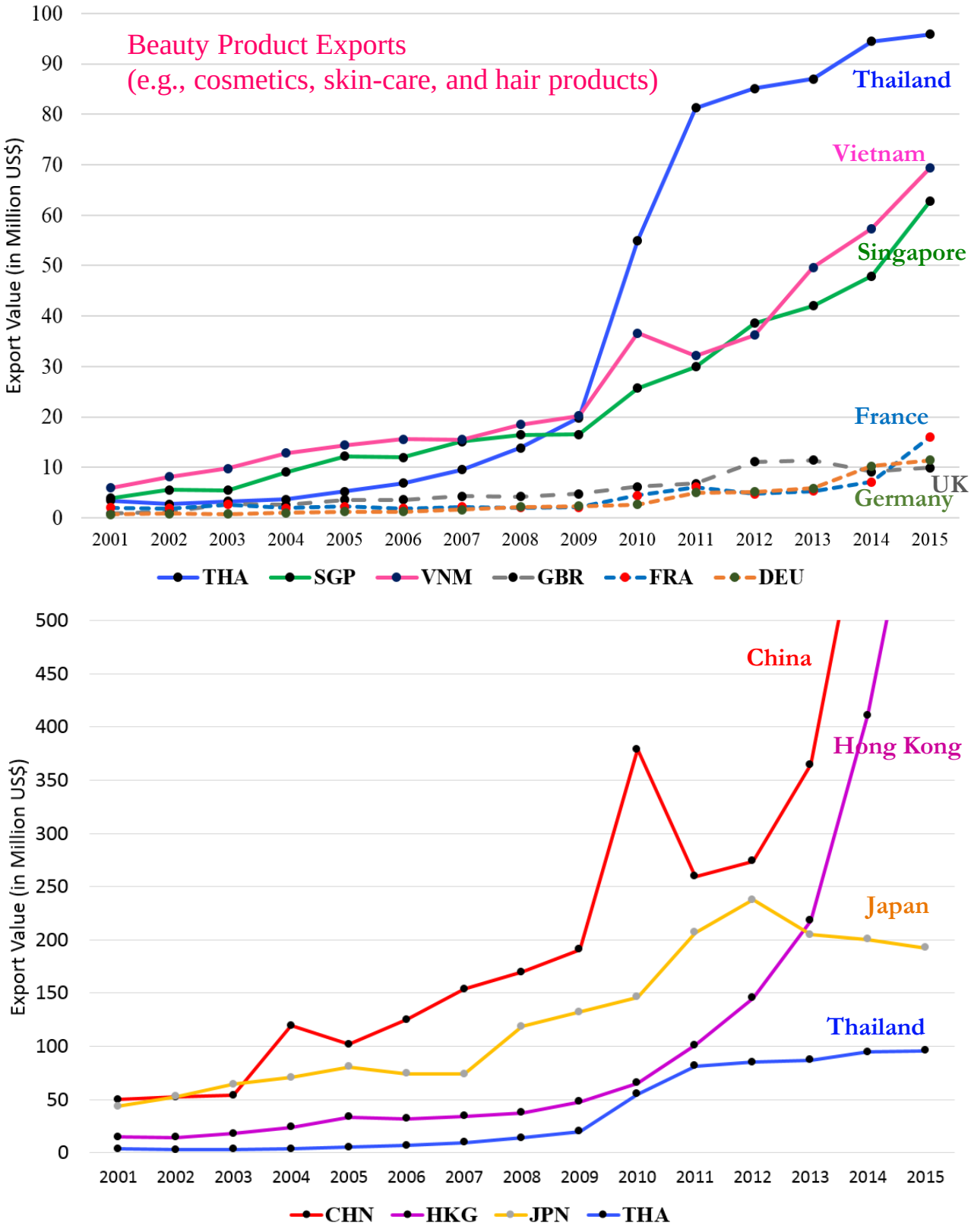


Figure 7: Growth of Beauty Product Exports from South Korea to Selected Destinations

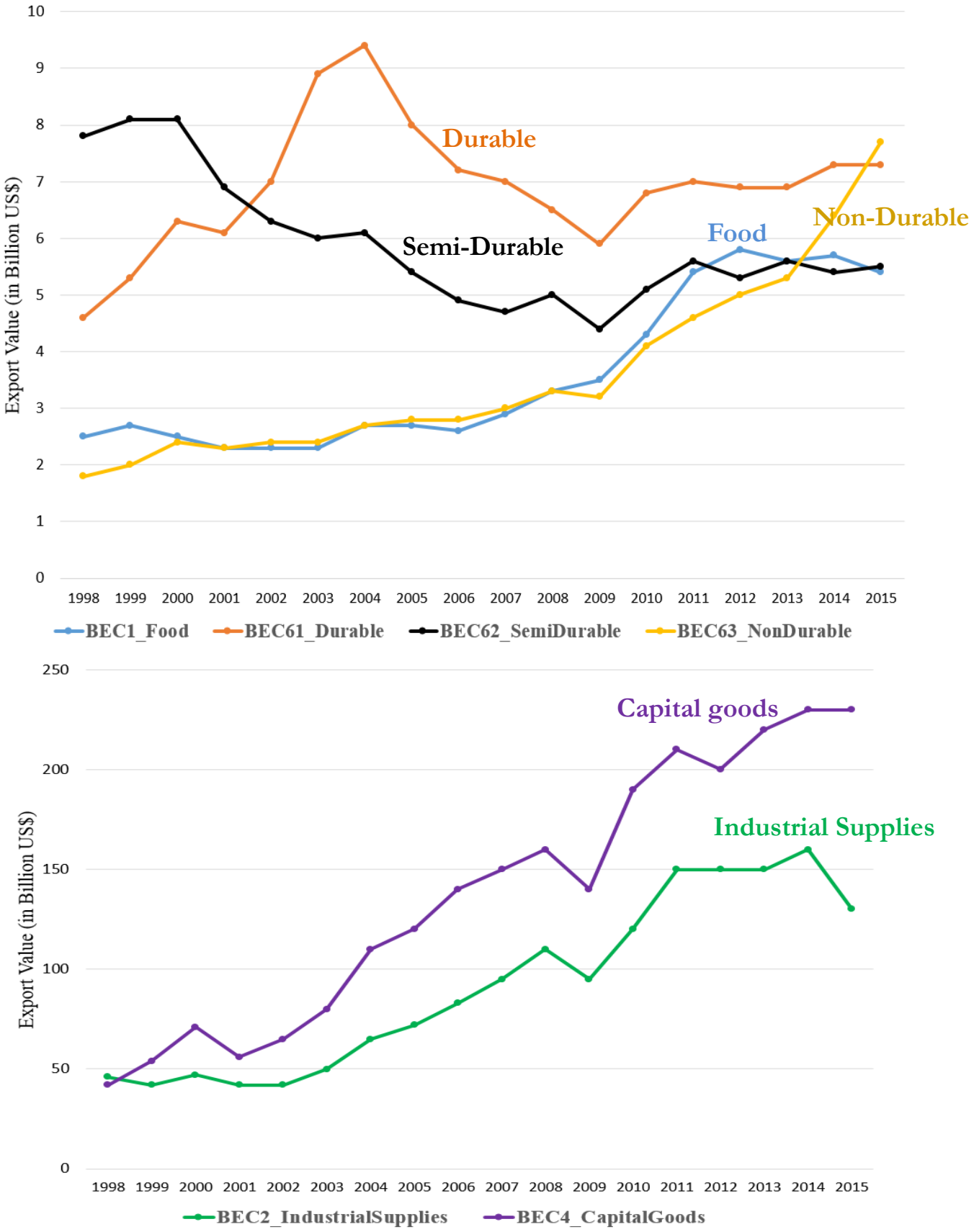


Figure 8: Korea's Export Trends in the selected BEC Categories

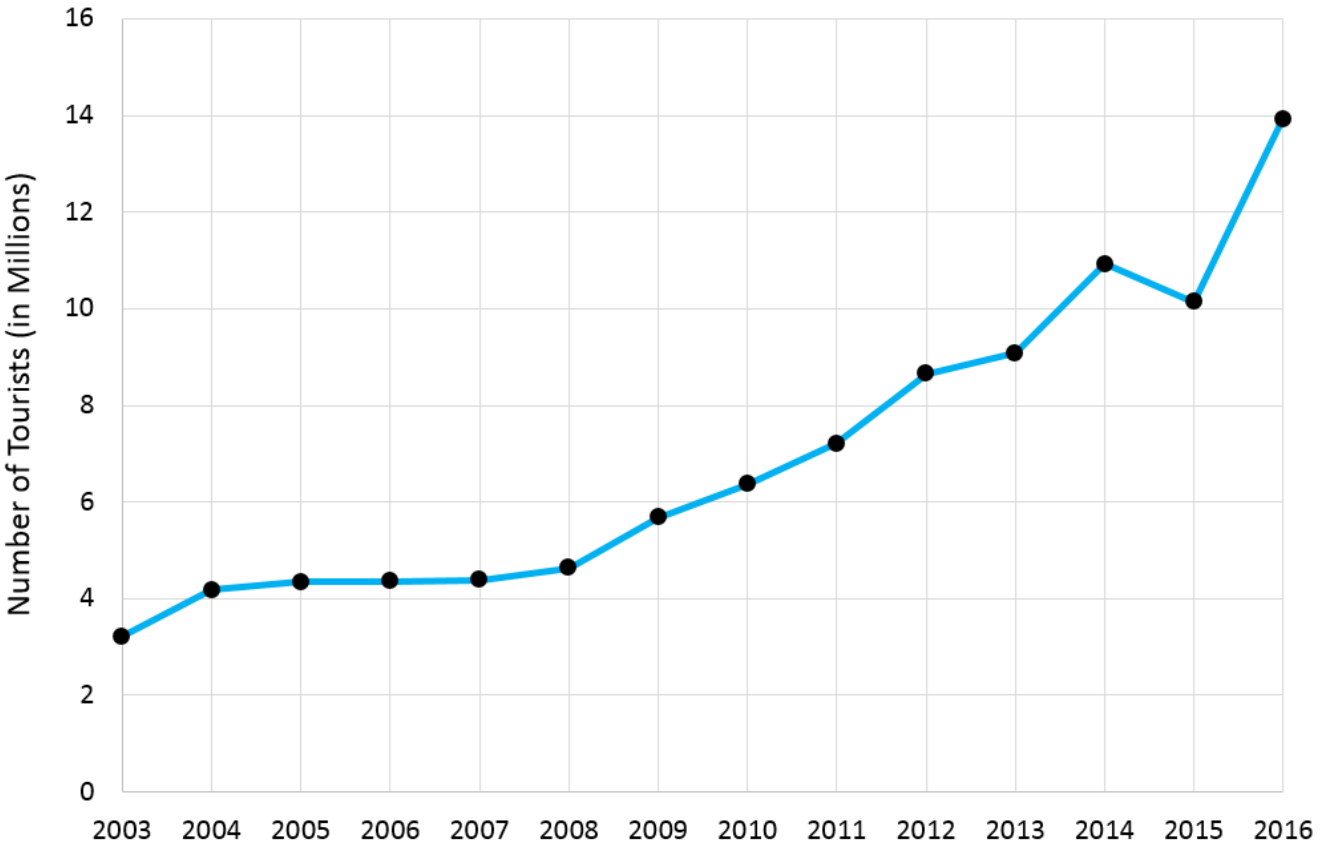


Figure 9: Growth in the number of Foreign Tourists to South Korea

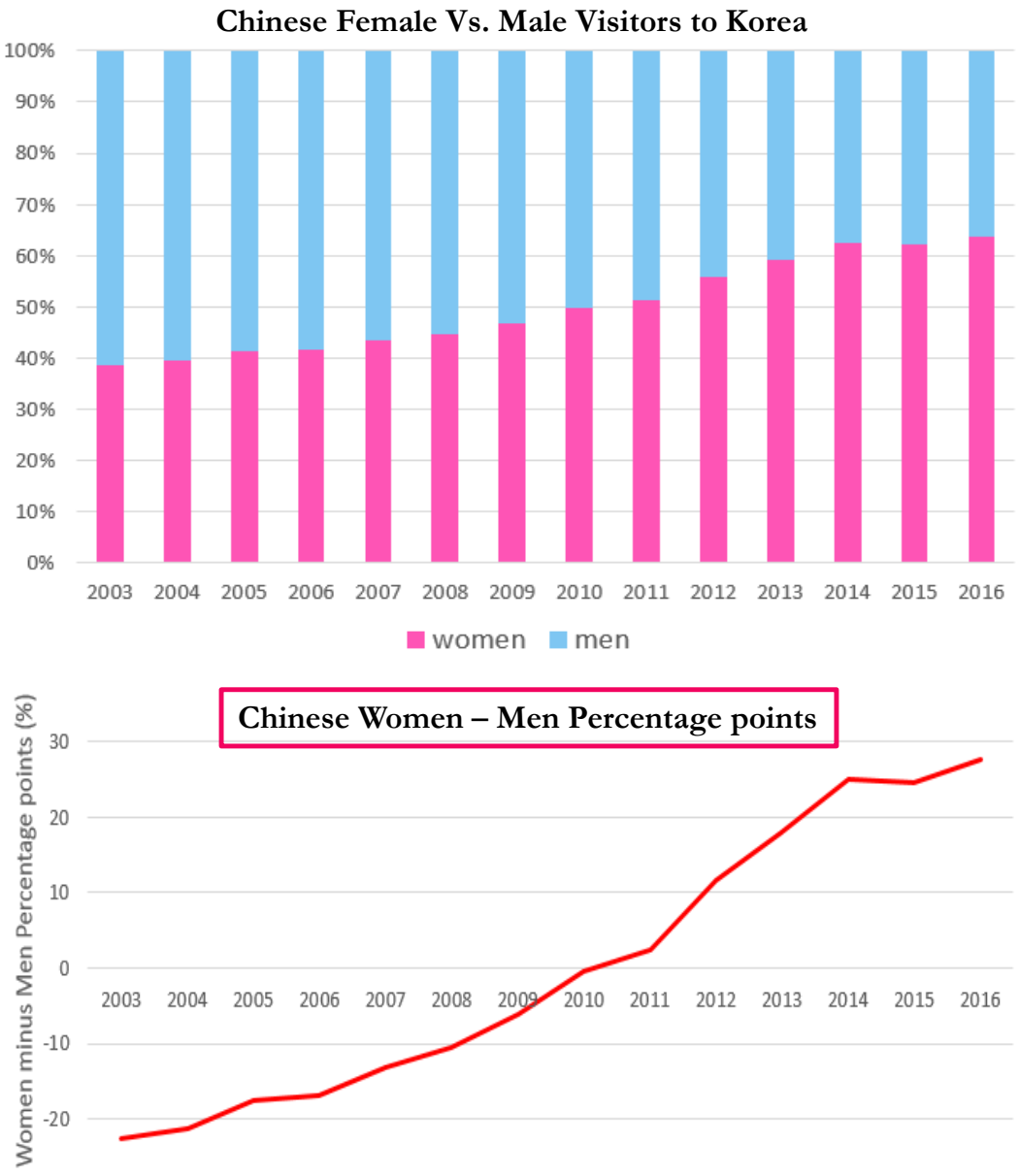
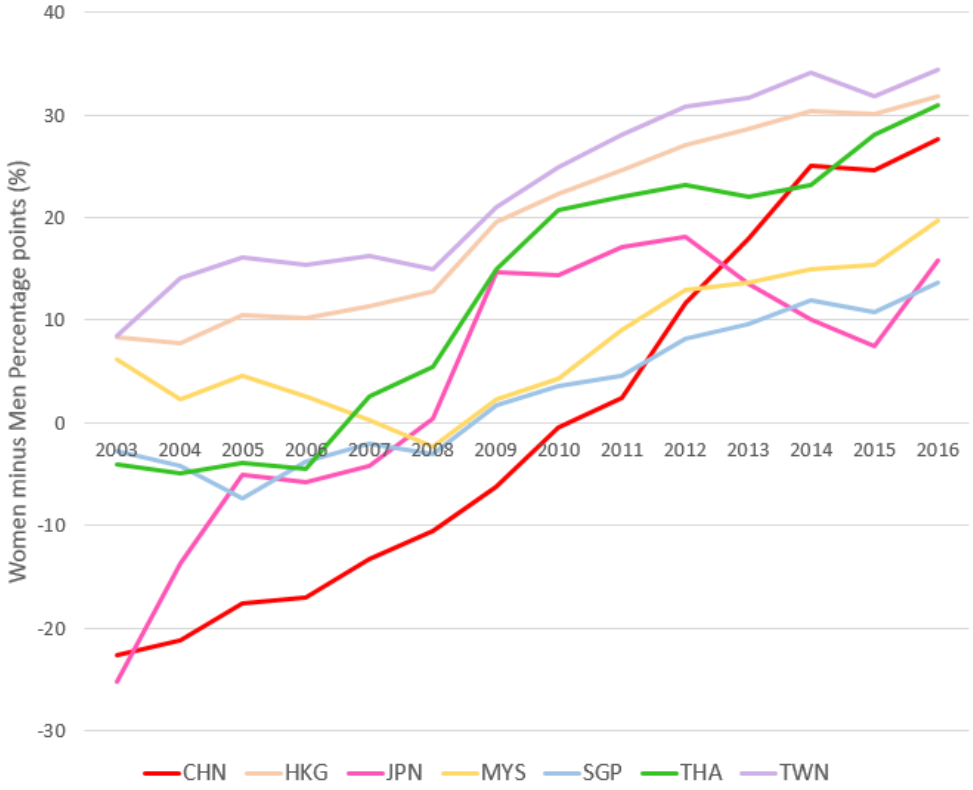


Figure 10: Increasing Ratio of Female Visitors during 2003-2016)

➢ **Women visit South Korea more than Men in highly influenced countries by the Korean Wave:**

Women – Men Percentage points in Visitors from the Korean Wave intensive countries (Popularity Level 5 – Very Popular)



Top 20 Origins of International Tourists Visiting South Korea (Excluding Low-Income countries below $4,000 per capita GDP)

Rank	Country	Number of Visitors to South Korea (2015)
1	**China**	7,752,022
2	**Japan**	2,270,396
3	**Taiwan**	823,417
4	USA	811,417
5	**Hong Kong**	642,338
6	**Thailand**	417,800
7	**Malaysia**	286,738
8	**Singapore**	203,463
9	Russia	177,583
10	Canada	162,803
11	Australia	147,467
12	UK	116,905
13	Germany	98,542
14	France	84,415

Figure 11: Women Minus Men Percentage Points of Visitors in Highly Influenced Countries by the Korean Wave

➢ **Men visit South Korea more than Women in not influenced countries by the Korean Wave:**

Women – Men Percentage points in Visitors from the countries where the Korean pop culture is not popular. (Popularity Level 2 - Recognized)

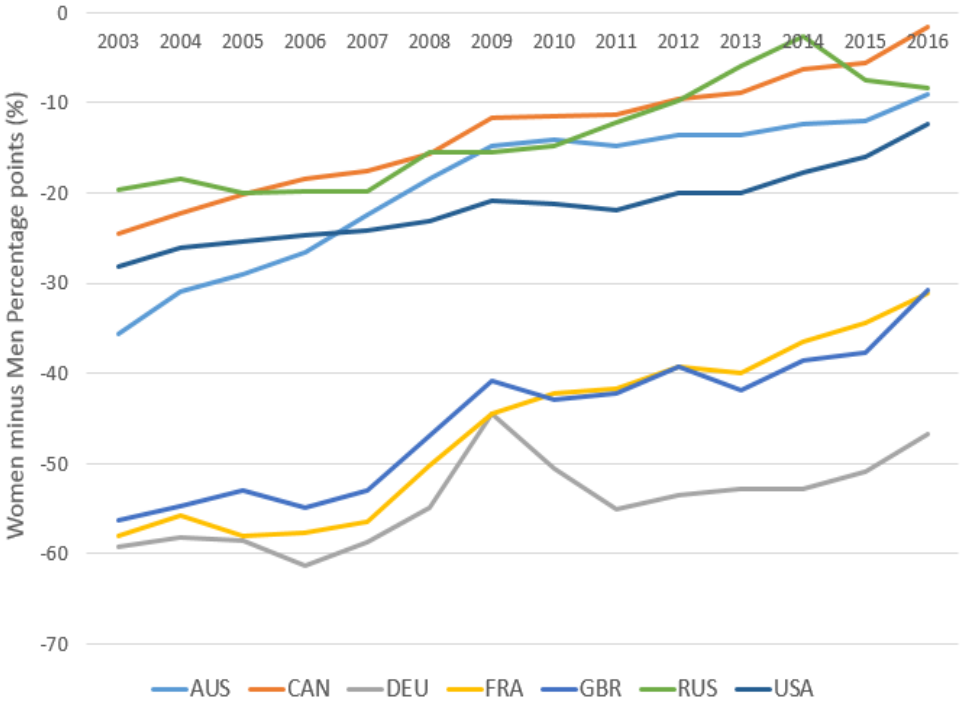


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Figure 12: Men Minus Women Percentage Points of Visitors in Highly Influenced Countries by the Korean Wave