

Reverse Gender Gap among International Students in South Korea*

MINJUNG PARK | EWHA WOMANS UNIVERSITY

This article documents an interesting pattern in the gender composition among international students studying in South Korea. The number of international students in South Korean tertiary education has steadily increased, and the increase is much more pronounced for female students than for male students. The ratio of female students to male ones was 0.73 in 1999, surpassed 1 in 2009 and reached 1.34 as of 2022 (57% female and 43% male in 2022). This study empirically shows that this emergence and widening of the reverse gender gap among those choosing South Korea for their tertiary education can be partly explained by the stronger impact of the popularity of Korean pop culture abroad (the so-called Korean Wave) on female students compared to male students. By showing that a host country's soft power can contribute to a reversal of traditional gender gap in education, this article enriches our understanding of international students' destination choice for higher education and its social impact.

Keywords: overseas education, reverse gender gap, Korean wave, soft power

*This work was supported by the National Research Foundation of Korea (NRF) grant funded by the Ministry of Science and ICT (MSIT) (No. RS-2023-00217228).

Introduction

Many people choose to study abroad for a variety of reasons, and researchers have examined various aspects of overseas education, such as the impact of studying abroad on labor market outcomes (Kratz and Netz 2018; Van Mol et al. 2021), whether foreign-educated students foster democracy in their home countries (Spilimbergo 2009), and which factors influence the decision to obtain education abroad as well as destination choice (Mazzarol and Soutar 2002).

In the literature on higher education, it has been well documented that gender gap reversal had become an almost universal phenomenon in domestic tertiary education by 2000, with more women receiving tertiary education (education level beyond high school) than men domestically in most countries (DiPrete and Buchmann 2013; Schofer and Meyer 2005; Vincent-Lancrin 2008). Goldin et al. (2006) discuss some factors that might generate a gender gap reversal in education, such as a higher college wage premium for women, lower non-pecuniary costs of attaining education for girls, and a higher incidence of behavioral problems among boys.

Going to another country for tertiary education is a very different decision from obtaining tertiary education in one's home country, and the drivers of those two decisions might not overlap much. Therefore, it is a priori unclear whether a gender gap reversal, well documented in the prior literature for domestic tertiary education, will be also observed in overseas tertiary education. Sending a child abroad for tertiary education is a significant investment for a family, and given the preference for sons that is observed in some parts of the world, one might actually expect that parents would be more willing to send their sons abroad for tertiary education than daughters, which could result in a usual gender gap for overseas tertiary education, rather than a reverse gender gap. Given the significant social implications of gender gaps in education, such as union formation and economic growth (De Hauw et al. 2017; Klasen and Lamanna 2009; Van Bavel et al. 2018), examining whether a traditional gender gap or its inverse exists in overseas tertiary education is a topic that deserves attention.

In this article, I analyze data on international students studying in South Korea. According to my analysis, more male students came to South Korea for tertiary education in the early years (traditional gender gap), but female students started to outnumber male students around 2008-2009 (emergence of a reverse gender gap), and the difference continued to grow since then

(widening of a reverse gender gap).

In addition to showing the emergence and widening of gender gap reversal among international students in South Korea, which is an interesting finding in and of itself, this research also aims to explain the factors behind the widening reverse gender gap. In doing so, it focuses on the role of the growing popularity of Korean pop culture abroad, such as TV dramas, music, movies, and entertainment, often referred to as the Korean Wave or Hallyu.

Since early 1999, Korean pop culture has become a cultural phenomenon across Asia. A few movies and TV dramas that were released in 1999 and became hugely successful across Southeast Asian countries are thought to be the catalyst. In addition, Korean pop music such as BTS has become very popular in recent years, both in Asia and in many Western countries. According to the push-pull model proposed by Mazzarol and Soutar (2002), the destination choice of international students is influenced by push factors in the home country as well as pull factors in the host country, where the soft power of the host country is considered to be one of the pull factors. Papers have shown that a host country's soft power makes the country an attractive choice for international students (Srikatanyoo and Gnoth 2002; Wei et al. 2019).

It has also been well documented that females are the predominant consumer group of Korean pop culture abroad (Ko et al. 2014; Oh and Lee 2014). Lien et al. (2022) found that female students and tourists are more likely to study and visit Korea than their male counterparts as a result of the Korean Wave. Kang (2023) found that the Korean Wave had a bigger impact on the number of female students than the number of male students among international students studying in South Korea.

Based on these findings and discussions of the prior literature, I test a hypothesis that the growing popularity of Korean pop culture abroad contributed to the emergence and widening of the reverse gender gap identified in this article. Using data on country-specific intensity of the Korean Wave and the number of male and female students enrolled in South Korean tertiary education from each country of origin, I empirically show that the number of female students from a specific country of origin responds much more strongly to the intensity of the Korean Wave in their home country compared to their male counterparts from the same country. This indicates that the stronger impact of the Korean Wave on females compared to males is *partly* responsible for the reverse gender gap observed in this research. A back-of-the-envelope calculation suggests that about 16% of the observed expansion of the reverse gender gap can be explained by the

increasing popularity of Korean pop culture abroad and its greater impact on female students. A subgroup analysis further reveals that this effect is observed among undergraduate students, but not among graduate students, and this might indicate that going abroad for an advanced degree (master's or Ph.D.) is a decision mostly driven by academic considerations, without much room for "softer" considerations such as cultural attractiveness of the host country.

This paper contributes to a few strands of literature. The first is the literature on gender gaps in higher education. In addition to the previously mentioned articles that documented a reverse gender gap among those obtaining tertiary education in their home countries, some researchers have shown an over-representation of women in study abroad programs, which are school-supported programs including exchange programs, short-term language programs, and international internships (Hurst 2019; Van Mol 2022). This research differs in its scope of analysis, as it examines regular degree-seeking students and exchange students. Since the decisions to study abroad are more investment- and time-intensive for these students, showing that a reverse gender gap exists among this core group of international students is a meaningful finding.

The second is the literature that studies cultural power as a factor in international student mobility. Extensive prior work examined which factors influence international students' choice of destination (Abbas et al. 2021; Mazzarol and Soutar 2002) and studied culture in particular as a possible factor (Srikatanyoo and Gnoth 2002; Wei et al. 2019). There are also studies that specifically examined the influence of the Korean Wave on international students and found that the Korean Wave had a greater impact on female students than male students (Kang 2023; Lien et al. 2022). While the current study shares similarities with Kang (2023) and Lien et al. (2022) in that it also examines differential impacts of the Korean Wave on female students vs. male students, it makes a distinctive contribution by uncovering a relationship between the gender-specific effects of the Korean Wave and the gender gap reversal identified in this article. By providing the first empirical evidence that the host country's soft power can contribute to a reversal of the traditional gender gap in education, this study enriches our understanding of international students' destination choice for higher education and its social impact.

Finally, this study broadly relates to the literature on how women and men respond differently to soft power and communications (medium to convey soft power). In various domains, women were found to respond more

strongly to communications and cultural influence compared to men. For instance, women were found to be more likely to purchase a product in response to its green marketing communications compared to men (Correia et al. 2023), and Septyanti and Hananto (2017) found that a product from a foreign country with a positive image was more favorably evaluated by women than men. This article's finding that women are more responsive to a country's positive image projected by its cultural power, just as they are more responsive to a brand's positive image projected by its green marketing communications, suggests that exploring gender differences could yield useful insights into effective communication campaigns.

The rest of the paper proceeds as follows. In Section 2, I describe the empirical analysis and discuss the findings and their implications. Section 3 concludes the paper.

Empirical Analysis

In this section, I start by examining how the number of international students going to South Korea for tertiary education has changed over time, separately for each gender. Using data from the Korean Educational Development Institute, Table 1 shows the number of international students in a degree program at the tertiary level in South Korea from 1999 to 2022, including exchange students as well as regular degree-seeking students but excluding short-term language program participants. There were only 3,418 such students in 1999, but by 2022 the figure had increased to 124,803, exhibiting a 36-fold increase.

A pattern that stands out from Table 1 is that the increase was much greater for female students than male students. In 1999, there was 0.73 female for every male among international students enrolled in South Korean tertiary education, but the female-to-male ratio increased over time such that there was 1.34 female student for every male student in 2022. Put differently, while the number of male students increased from 1,971 in 1999 to 53,284 in 2022, a 27-fold increase, the number of female students increased from 1,447 in 1999 to 71,519 in 2022, a 49-fold increase.

Seeing the pattern in Table 1 leaves one to wonder whether such a reverse gender gap in the composition of international students in the tertiary education system might be observed in countries other than Korea. The first and second columns in Table 2 show the percentage of males among foreign students in the US and Japan, respectively. For the US, the reported gender

TABLE 1
INTERNATIONAL STUDENTS IN SOUTH KOREAN TERTIARY EDUCATION

Year	Male students (%)		Female students (%)		Total	Female-to-male ratio
1999	1,971	(57.67%)	1,447	(42.33%)	3,418	0.73
2000	2,273	(57.11%)	1,707	(42.89%)	3,980	0.75
2001	2,614	(55.74%)	2,076	(44.26%)	4,690	0.79
2002	3,126	(54.12%)	2,650	(45.88%)	5,776	0.85
2003	4,158	(52.22%)	3,804	(47.78%)	7,962	0.91
2004	5,883	(52.90%)	5,238	(47.10%)	11,121	0.89
2005	8,184	(52.54%)	7,393	(47.46%)	15,577	0.90
2006	11,759	(51.98%)	10,865	(48.02%)	22,624	0.92
2007	16,843	(52.54%)	15,213	(47.46%)	32,056	0.90
2008	20,702	(51.01%)	19,883	(48.99%)	40,585	0.96
2009	24,840	(49.10%)	25,751	(50.90%)	50,591	1.04
2010	28,720	(47.87%)	31,280	(52.13%)	60,000	1.09
2011	30,284	(47.58%)	33,369	(52.42%)	63,653	1.10
2012	28,491	(47.02%)	32,098	(52.98%)	60,589	1.13
2013	26,933	(47.49%)	29,782	(52.51%)	56,715	1.11
2014	25,207	(47.00%)	28,429	(53.00%)	53,636	1.13
2015	25,458	(45.67%)	30,281	(54.33%)	55,739	1.19
2016	27,834	(44.11%)	35,270	(55.89%)	63,104	1.27
2017	31,005	(43.04%)	41,027	(56.96%)	72,032	1.32
2018	36,934	(42.93%)	49,102	(57.07%)	86,036	1.33
2019	43,535	(43.44%)	56,680	(56.56%)	100,215	1.30
2020	49,551	(43.85%)	63,452	(56.15%)	113,003	1.28
2021	52,336	(43.61%)	67,682	(56.39%)	120,018	1.29
2022	53,284	(42.69%)	71,519	(57.31%)	124,803	1.34

Data source: Statistical Yearbook of Education (1999-2022), Korean Educational Development Institute.

composition is among foreign students on F-1 or M-1 visas. These include all international students in primary, secondary and tertiary US schools, with the vast majority at the tertiary level (about 92 percent of all F-1 and M-1 students pursued a degree in higher education in 2021). The reported figures on the US also include short-term language program participants. For Japan, the reported gender composition is among foreign students in tertiary

TABLE 2
% MALE AMONG INTERNATIONAL STUDENTS IN OTHER COUNTRIES

Year	US	Japan
2014	56%	55%
2015	55%	56%
2016	57%	56%
2017	57%	56%
2018	56%	56%
2019	56%	55%
2020	56%	55%
2021	56%	56%

Data sources: SEVIS by the Numbers (2014-2021), US Immigration and Customs Enforcement; Annual Survey of International Students in Japan (2014-2021), Japan Student Services Organization.

education, including short-term language program participants. While these slight differences in data coverage across the three countries make comparison less than perfect, we can still meaningfully examine whether a similar reverse gender gap exists in countries other than Korea, and if so, whether the gap is similarly widening in those countries.

From the first column in Table 2, we see that there are a greater number of males compared to females among international students in the US and that the percentage of males is stable at 55-57 percent throughout the reported time periods. In other words, there is no evidence of a reverse gender gap, and there is also no indication that the predominance of male students is lessening over time. We also find a similar pattern among international students studying in Japan. There are more male students than female ones, and the percentage of males stays at 55-56 percent during the reported time periods. These patterns suggest that a gender gap reversal in overseas tertiary education is not a universal phenomenon and that there are likely idiosyncratic factors about South Korea that led to the emergence and widening of the reverse gender gap observed in Table 1.

Any plausible explanation for the observed pattern should involve factors that affect men and women differentially. While factors such as exchange rate, geographic distance between the country of origin and South Korea and the gross domestic product (GDP) level of the country of origin could explain the overall number of students seeking tertiary education in South Korea or its changes over time, they are less likely to affect men and

women differentially and thus are unlikely to be adequate explanations for the widening reverse gender gap of Table 1.

One possible explanation is the recent phenomenon of the reverse gender gap in domestic tertiary education observed in many countries. That is, the widening reverse gender gap observed among international students in South Korean tertiary education might be driven by factors in their home countries that also lead to the reverse gender gap in the home countries' domestic tertiary education. While it is hard to explain why such domestic changes would affect those going to South Korea but not those going to the US or Japan, it is still worthwhile to examine this possible explanation.

If the widening reverse gender gap among international students in South Korean tertiary education is indeed driven by the same factors that lead to the reverse gender gap in domestic tertiary education of those students' home countries, we might expect that countries of origin that exhibit larger increases in the female-to-male ratio in their domestic tertiary education are likely to exhibit larger increases in the female-to-male ratio among their nationals who go to South Korea for tertiary education. To formally test this idea, I compute the average yearly change in the female-to-male ratio among students in South Korean tertiary education and the average yearly change in the female-to-male ratio among students in domestic tertiary education for each of the 14 countries that sent the largest number of students to South Korea for tertiary education as of 2021.¹ Data on country-specific gender composition among students in South Korean tertiary education are obtained from annual publications by the Korea Immigration Service and are available from 2009 to 2021 (KIS 2009-2021). Data on female-to-male ratios in domestic tertiary education for the 14 countries of origin from 2009 to 2021 are obtained from the United Nations (UIS 2009-2021).

I then compute the correlation between the two changes. If the widening reverse gender gap observed among international students in South Korean tertiary education is driven by the same factors that drive education choices in their home countries, we would expect to find a positive and significant correlation between the two measures. However, the correlation between the two measures is -0.2 and is not statistically significant (p-value of 0.52). Therefore, factors that lead to a reverse gender gap in domestic tertiary education, whatever they might be, do not seem to drive the reverse gender

¹ In descending order, those countries are China, Vietnam, Uzbekistan, Mongolia, Nepal, Japan, Pakistan, Indonesia, India, Bangladesh, United States, Myanmar, Germany, and Malaysia.

gap among international students in South Korean tertiary education.

To understand what then might be driving the pattern in Table 1, I perform a regression analysis where the dependent variable is the number of international students (for males and females separately) in South Korean tertiary education for each country of origin. I include as explanatory variables factors that might influence the decision to go to South Korea for tertiary education, such as the home country's exchange rate against the Korean currency, the home country's GDP, the home country's population, and the value of Korean cultural products exported to that country. Since the main focus of this analysis is on the different trajectory between male and female students, I allow these explanatory variables to possibly affect the number of male students and female students differentially. To control for the temporal shocks that affect both genders across all countries of origin in a similar fashion, I include year fixed effects in the regression. To control for time-invariant factors that affect both genders from a given country in a similar fashion, I also include fixed effects for countries of origin. The unit of observation is a specific gender from a specific country of origin in a given year. The estimating equation is as follows:

$$Y_{gct} = \beta_0 + \delta_0 F_{gct} + \beta_1 KWAVE_{ct} + \delta_1 F_{gct} KWAVE_{ct} + \beta_2 x_{ct} + \delta_2 F_{gct} x_{ct} + \beta_3 CountryFE_c + \beta_4 TimeFE_t + \epsilon_{gct} \quad (1)$$

Y_{gct} is the number of students of gender g from country c who are in South Korean tertiary education in year t . Y_{gct} includes not just those who begin their study in year t , but also those who began their study in an earlier year and are still studying in South Korea as of year t . It would be preferable to perform analysis separately for regular degree-seeking international students and exchange students since they are likely to differ in characteristics and motivations, but the data limitations prevent this. Thus, Y_{gct} includes both types of students. F_{gct} is a dummy variable that is equal to 1 if the unit under investigation is female and 0 if male. $KWAVE_{ct}$ is the value of Korean TV programs exported to country c , averaged over four years from $t - 4$ to $t - 1$. We use this average based on the past few years because the dependent variable also includes those whose study began a few years ago, given the typical length of four (two) years for an undergraduate (master's) degree. The use of average based on the past four years for $KWAVE$ also allows us to capture the idea that the popularity of foreign culture is unlikely to lead to an immediate increase in the number of students heading toward that country for tertiary education since students need to prepare for the

relevant entrance exam of the destination country, etc. An ideal measure of *KWAVE* would capture not only the exports of TV programs but also the exports of movies, music, etc., but due to data availability, the value of TV program exports is used as a proxy for overall cultural exports. By including both $KWAVE_{ct}$ and its interaction with the female dummy $F_{gct}KWAVE_{ct}$ in the regression, I allow for differential impacts of the Korean Wave on the two genders. Specifically, the parameter on the interaction term δ_1 represents the additional effect (positive or negative) of the Korean Wave on the number of female students going to Korea for tertiary education above and beyond the effect on the number of male students. If the estimate of δ_1 is positive and statistically significant, we could infer that South Korea's soft power contributed to the reverse gender gap among international students in the South Korean tertiary education. Thus, δ_1 is the parameter of main interest in this analysis.

x_{ct} includes the exchange rate, GDP, and population of country c in year t . As before, the interactions of these variables with the female dummy are included to allow for possibly differential impacts of those factors on males and females in their decision to pursue higher education in South Korea. $CountryFE_c$ represents fixed effects of country c and controls for time-invariant factors that might influence the number of students choosing South Korea for their tertiary education such as distance between country c and Korea, cultural similarity between the countries due to historical ties, etc. $TimeFE_t$ represents year fixed effects, which control for shocks in year t that affect both genders in all countries similarly, such as the COVID-19 pandemic. Finally, ϵ_{gct} captures idiosyncratic shocks for gender g of country c in year t .

Since country fixed effects and year fixed effects are included in the regression, the regression will only rely on temporal variation that differs across countries to identify the parameters of the model. In other words, the regression will examine whether countries of origin that experienced a greater increase in the popularity of Korean pop culture (and thus whose import of the Korean cultural products increased more over time) also witnessed a greater increase in the number of people who go to South Korea for their tertiary education, and, if so, whether such a pattern is stronger for females compared to males.

Data on the number of international students in South Korea separately for each gender from each country of origin are obtained from the Korea Immigration Service and are available from 2009 to 2021. Data on the value of South Korean TV program exports are obtained from the annual

publications on content industry statistics by the Ministry of Culture, Sports and Tourism, and are available for 26 countries only.² As a result, the estimation sample covers those 26 countries from 2009 to 2021. The GDP of each country of origin is obtained from the World Bank. Exchange rates represent the value of the local currency measured in Korean currency and are obtained from the Bank of International Settlements. Population data are from the World Bank.³ While the number of international students, population, GDP and exchange rates are available for all 26 countries across all years 2009-2021, data on the value of South Korean TV program exports are missing for some countries in some years. Thus, although the number of observations in the regression should be 676 (26 countries \times 13 years \times 2 genders), the actual number of observations used in the regression will be slightly lower than that.

Table 3 shows summary statistics of the estimation sample. The table shows that in the estimation sample there were on average 1,182 female students from each country of origin in 2009, which by 2021 had increased to 2,146. In comparison, there were on average 1,071 male students from each country of origin in 2009, and by 2021 there were on average 1,366 male students from each country of origin. We also see that the average value of Korean TV program exports to each country in the sample increased from \$5.7 million in 2009 to \$11.7 million in 2021.

Table 4 shows the estimation results. The first column in Table 4 reports the parameter estimates when no interaction variables are included, meaning all the factors—exchange rate, population and GDP of the home country as well as the popularity of Korean pop culture in the home country—are assumed to have the same effect on both male and female students. The parameter estimate on the Korean Wave variable is not significant, suggesting that countries in which Korean pop culture has become more popular over time do not witness any greater increase in the number of their nationals who choose South Korea for tertiary education, compared to countries in which the popularity of Korean pop culture has not grown. The parameter estimate on GDP indicates that the countries whose GDP has grown more over the sample period experienced a smaller increase in the number of their

² In the alphabetical order, those countries are Brazil, Cambodia, Canada, China, France, Germany, Hong Kong (SAR, China), Hungary, Indonesia, Italy, Japan, Kazakhstan, Malaysia, Mongolia, Myanmar, Netherlands, Philippines, Romania, Russia, Singapore, Spain, Taiwan, Thailand, United Kingdom, United States, and Vietnam.

³ For Taiwan, which is not covered by the World Bank, data on population are obtained from the United Nations instead.

TABLE 3
SUMMARY STATISTICS

Variables	Mean	Standard deviation	No. Obs
No. of male students (in 1,000)	1.093	3.932	338
No. of female students (in 1,000)	1.594	5.623	338
KWAVE (in \$ million)	7.768	18.372	305
Population (in million)	125.04	262.78	338
GDP (in \$ trillion)	2.210	4.038	338
Exchange rate (in thousand KRW)	0.508	0.605	338
No. of countries	26		
Sample years	From 2009 to 2021		
Avg No. of male students in 2009 (in 1,000)	1.071		
Avg No. of male students in 2021 (in 1,000)	1.366		
Avg No. of female students in 2009 (in 1,000)	1.182		
Avg No. of female students in 2021 (in 1,000)	2.146		
Avg KWAVE in 2009 (in \$ million)	5.665		
Avg KWAVE in 2021 (in \$ million)	11.700		

Data sources: (Number of international students for each gender) Yearbook of Korea Immigration Statistics (2009-2021), Korea Immigration Services; (Value of South Korean TV program exports) Annual Publications on Content Industry Statistics (2009-2021), Ministry of Culture, Sports and Tourism; (Population for Taiwan) World Population Prospects (2009-2021), United Nations; (Population for all other countries) Population Estimates and Projections (2009-2021), World Bank; (GDP) National Accounts Data (2009-2021), World Bank; (Exchange rate) Effective Exchange Rate Indices (2009-2021), Bank of International Settlements.

nationals who go to South Korea for tertiary education. An increase in GDP could lead to either direction—the fact that people from wealthier countries can better afford getting a degree abroad would result in a positive coefficient, while the fact that people might decide to stay in their home countries for tertiary education as their countries' GDP and accordingly the quality of domestic tertiary education improve would result in a negative coefficient. The negative parameter estimate on GDP seems to indicate that the latter effect dominates. The parameter estimate on the female dummy is positive and significant, and the magnitude of the estimate indicates that for a given country of origin in a given year, on average there are 550 more female

TABLE 4
REGRESSION RESULTS

	Spec 1	Spec 2	Spec 3	Spec 4
F	0.550 (0.123) ***	0.286 (0.097) ***	-0.272 (0.181)	-0.824 (0.297) ***
KWAVE	0.029 (0.029)	0.012 (0.026)	0.020 (0.014)	0.021 (0.014)
F × KWAVE		0.034 (0.009) ***	0.018 (0.005) ***	0.017 (0.005) ***
Exch. rate	0.240 (0.610)	0.240 (0.586)	0.234 (0.508)	0.206 (0.522)
F × Exch. rate			0.012 (0.138)	0.069 (0.130)
Pop	0.047 (0.034)	0.047 (0.032)	0.044 (0.024) *	0.044 (0.023) *
F × Pop			0.006 (0.001) ***	0.006 (0.001) ***
GDP	-0.375 (0.201) *	-0.375 (0.197) *	-0.338 (0.112) ***	-0.334 (0.110) ***
F × GDP			-0.074 (0.029) **	-0.082 (0.028) ***
Country FE	Included	Included	Included	Included
Year FE	Included	Included	Included	
F × Year FE				Included
No. Obs	610	610	610	610
R ²	0.9173	0.9210	0.9446	0.9453

Inside the parentheses are standard errors.

*** significant at 1% level, ** significant at 5% level, * significant at 10% level

international students enrolled in the South Korean tertiary education system compared to male international students.

The second column of Table 4 shows estimation results from a specification where an interaction between the female dummy and the Korean Wave variable is added. The results show that the lack of the Korean Wave's influence on the number of international students observed in the first column of Table 4 in fact masked the true impact. When the popularity of the Korean Wave was allowed to differentially impact male students and female students, the parameter estimate on the interaction between the female dummy and the Korean Wave becomes positive and significant, while the parameter estimate on the standalone Korean Wave term is still insignificant, indicating that a growing popularity of Korean pop culture in home countries

leads to a greater number of female students going to South Korea for tertiary education but has no effect on the number of male students going to South Korea for tertiary education.

The magnitude of the parameter estimate on $F \times KWAVE$, combined with the fact that the parameter estimate on $KWAVE$ is not statistically different from zero, indicates that a \$1 million increase in $KWAVE$ for a country would lead to 34 more female students from the country choosing South Korea for tertiary education, all else equal, but no change in the number of male students. From Table 3 we saw that the average increase in the number of female students per country over the sample period was greater than that for male students by 669 [(2,146-1,182) - (1,366-1,071)]. We also saw that the average increase in $KWAVE$ per country over the sample period was about \$6 million. Since \$6 million \times 34 more female students per \$1 million is 204, which is about 30% of 669, this back-of-the-envelope calculation suggests that about 30% of the observed expansion of the reverse gender gap among international students in South Korean tertiary education from 2009 to 2021 can be explained by the increasing popularity of Korean pop culture abroad and its greater impact on female students. We also see that accounting for the impact of the Korean Wave on the gender composition reduces the parameter estimate on the standalone female dummy by about half (the parameter estimate on the standalone female dummy is 0.286 in the second column compared to 0.550 in the first).

The third column shows estimation results from a specification where other control variables are also allowed to have differential impacts on male students and female students. The results indicate that some of the other control variables impact female students and male students differentially, but most importantly, the parameter estimate on the interaction between the female dummy and $KWAVE$ still remains positive and significant. Its magnitude is reduced by about 50% compared to the second column. The magnitude of the parameter estimate in the third column implies that about 16% of the observed expansion of the reverse gender gap among international students in South Korean tertiary education from 2009 to 2021 can be explained by the increasing popularity of Korean pop culture abroad and its greater impact on female students, an effect smaller than what we found in the second column, but still a significant contributor.⁴

⁴ As a robustness check, I estimated an alternative model where the female-to-male ratio for a country of origin in a given year is used as the dependent variable, and found that the parameter estimate on $KWAVE$ is positive and statistically significant.

While the inclusion of year fixed effects accounts for temporal shocks that affect both genders in all countries similarly, one might consider them to be inadequate. For instance, women's empowerment, which can be thought of as a temporal shock that affects men and women differently, could have contributed to a greater increase in the number of female students (compared to male students) going to South Korea for tertiary education, and such an effect would not be captured by the year fixed effect. To ensure that the main finding of the paper is not confounded by an omission of such gender-specific temporal shocks, I re-ran the third column of Table 4 while including year fixed effects separately for each gender (which is identical to including interactions between the female dummy and year dummies) and report the results in the fourth column of Table 4. The gender-specific year fixed effects will capture all factors common to all home countries that could have contributed to the observed emergence and widening of the reverse gender gap, such as women's empowerment.

The results in the fourth column of Table 4 show that the estimated parameter on the interaction between the female dummy and *KWAVE* still remains positive and significant, with almost no change in its magnitude. In other words, the growing popularity of Korean pop culture abroad and its differential impact on female vs. male students is still found to be a partial but meaningful contributor to the emergence and widening of the reverse gender gap among international students in South Korean tertiary education.

Finally, I perform subgroup analysis by examining undergraduate students and graduate students separately and report the results in Table 5. The results in Table 5 (which estimate Spec 3 and Spec 4 of Table 4 separately for undergraduate students and graduate students) indicate that the Korean Wave and its greater impact on female students play a role in explaining the widening reverse gender gap among undergraduate students, while the Korean Wave does not play any role in explaining the widening reverse gender gap among graduate students. In fact, the estimates show that neither the number of male graduate students nor the number of female graduate students is affected by the intensity of the Korean Wave in their home countries. This might indicate that going abroad for an advanced degree (master's or Ph.D.) is a decision mostly driven by academic considerations, without much room for "softer" considerations such as cultural attractiveness of the host country.

TABLE 5
REGRESSION RESULTS – UNDERGRADUATES VS. GRADUATES

	Undergraduate students		Graduate students	
	Spec 3	Spec 4	Spec 3	Spec 4
F	-0.163 (0.156)	-0.524 (0.237) **	-0.111 (0.046) **	-0.294 (0.13) **
KWAVE	0.029 (0.013) **	0.03 (0.013) **	-0.008 (0.006)	-0.008 (0.006)
F × KWAVE	0.016 (0.004) ***	0.015 (0.004) ***	0.003 (0.002)	0.002 (0.002)
Exch. rate	0.230 (0.41)	0.213 (0.417)	-0.003 (0.182)	-0.013 (0.188)
F × Exch. rate	0.030 (0.123)	0.066 (0.116)	-0.013 (0.04)	0.007 (0.04)
Pop	-0.001 (0.018)	0.066 (0.116)	0.042 (0.009) ***	0.042 (0.009) ***
F × Pop	0.004 (0.001) ***	0.004 (0.001) ***	0.003 (0.0004) ***	0.003 (0.0004) ***
GDP	-0.466 (0.113) ***	-0.464 (0.113) ***	0.121 (0.061) **	0.123 (0.06) **
F × GDP	-0.047 (0.027) *	-0.052 (0.027) *	-0.028 (0.016) *	-0.032 (0.015) **
Country FE	Included	Included	Included	Included
Year FE	Included		Included	
F × Year FE		Included		Included
No. Obs	610	610	610	610
R ²	0.9232	0.9237	0.9456	0.9469

Inside the parentheses are standard errors.

*** significant at 1% level, ** significant at 5% level, * significant at 10% level

Conclusion

In this paper, I present a novel empirical pattern on how gender composition among international students in South Korean tertiary education changed over time and further show that South Korea's soft power, in the form of its pop culture, was partly responsible for the observed temporal change in the gender composition. In future work I plan to examine whether a similar gender gap reversal appears in other countries, and if so, what might be the key drivers behind such phenomena.

(Submitted: November 14, 2023; Revised: January 23, 2024; Accepted: February 22, 2024)

References

Abbas, Jawad, Uthman Alturki, Misbah Habib, Ahmed Aldraiweesh, and Waleed Mugahed Al-Rahmi. 2021. "Factors Affecting Students in the Selection of

- Country for Higher Education: A Comparative Analysis of International Students in Germany and the UK." *Sustainability* 13(18) 10065.
- Bank of International Settlements. 2009-2021. *Effective Exchange Rate Indices*. Retrieved from <https://data.bis.org/topics/XRU/data?q=%22Exchange+rates+series%22&filter=FREQ%3DA>
- Correia, Elisabete, Sara Sousa, Clara Viseu, and Manuela Larginho. 2023. "Analysing the Influence of Green Marketing Communication in Consumers' Green Purchase Behaviour." *International Journal of Environmental Research and Public Health* 20(2) 1356.
- De Hauw, Yolien, André Grow, and Jan Van Bavel. 2017. "The Reversed Gender Gap in Education and Assortative Mating in Europe." *European Journal of Population* 33(4): 445-474.
- DiPrete, Thomas A. and Claudia Buchmann. 2013. *The Rise of Women: The Growing Gender Gap in Education and What It Means for American Schools*. New York: Russell Sage Foundation.
- Goldin, Claudia, Lawrence Katz, and Ilyana Kuziemko. 2006. "The Homecoming of American College Women: The Reversal of the College Gender Gap." *The Journal of Economic Perspective* 20(4): 133-156.
- Hurst, Allison L. 2019. "Class and Gender as Predictors of Study Abroad Participation among US Liberal Arts College Students." *Studies in Higher Education* 44(7): 1241-1255.
- Japan Student Services Organization. 2014-2021. *Annual Survey of International Students in Japan*. Retrieved from <https://www.studyinjapan.go.jp/en/statistics/zaiseki/index.html>.
- Kang, Sojeong. 2023. "Using the Gravity Model to Determine the Impact of Hallyu on International Students' Decisions to Attend South Korean Universities." Unpublished Manuscript.
- Klasen, Stephan and Francesca Lamanna. 2009. "The Impact of Gender Inequality in Education and Employment on Economic Growth: New Evidence for a Panel of Countries." *Feminist Economics* 15(3): 91-132.
- Ko, Nusta Carranza, Song No, Jeong-Nam Kim, and Ronald Gobbi Simões. 2014. "Landing of the Wave: Hallyu in Peru and Brazil." *Development and Society* 43(2): 297-350.
- Korea Immigration Services (KIS). 2009-2021. *Yearbook of Korea Immigration Statistics*. Retrieved from <https://www.immigration.go.kr/immigration/1570/subview.do>.
- Korean Educational Development Institute. 1999-2022. *Statistical Yearbook of Education*. Retrieved from <https://kess.kedi.re.kr/eng/publ/list?itemCode=02&srvSeq=&menuSeq=0&division=&word=>.
- Kratz, Fabian and Nicolai Netz. 2018. "Which Mechanisms Explain Monetary Returns to International Student Mobility?" *Studies in Higher Education* 43(2): 375-400.

- Lien, Donald, Peilan Tang, and Erika Zuloaga. 2022. "Effects of Hallyu and King Sejong Institute on International Trade and Services in Korea." *The International Trade Journal* 36(1): 6-23.
- Mazzarol, Tim and Geoffrey N. Soutar. 2002. "'Push-Pull' Factors Influencing International Student Destination Choice." *International Journal of Educational Management* 16(2):82-90.
- Ministry of Culture, Sports and Tourism. 2009-2021. *Annual Publications on Content Industry Statistics*. Retrieved from <https://www.kocca.kr/kocca/bbs/list/B0158948.do?menuNo=204156>.
- Oh, Ingyu and Choong-Mook Lee. 2014. "A League of Their Own: Female Supporters of Hallyu and Korea-Japan Relations." *Pacific Focus* 29(2): 284-302.
- Schofer, Evan and John W. Meyer. 2005. "The Worldwide Expansion of Higher Education in the Twentieth Century." *American Sociological Review* 70(6): 898-920.
- Septyanti, Astrid Vega and Arga Hananto. 2017. "Country of Origin Image and Brand Equity from Gender Perspective: Do They Matter?" *Asia Pacific Management and Business Application* 6(2): 89-106.
- Spilimbergo, Antonio. 2009. "Democracy and Foreign Education." *The American Economic Review* 99(1): 528-543.
- Srikatanyoo, Natthawut and Juergen Gnoth. 2002. "Country Image and International Tertiary Education." *Journal of Brand Management* 10: 139-146.
- UNESCO Institute for Statistics (UIS). 2009-2021. *Gender Statistics*. Retrieved from <https://apiportal.uis.unesco.org/bdds>.
- United Nations. 2009-2021. *World Population Prospects*. Retrieved from <https://population.un.org/dataportal/data/indicators/49/locations/158/start/1990/end/2030/table/pivotbylocation?df=029f4964-b169-4987-88d4-729d2f267726>.
- US Immigration and Customs Enforcement. 2014-2021. *SEVIS by the Numbers*. Retrieved from <https://www.ice.gov/foia-category/student-and-exchange-visitor-program>.
- Van Bavel, Jan, Christine R. Schwartz, and Albert Esteve. 2018. "The Reversal of the Gender Gap in Education and Its Consequences for Family Life." *Annual Review of Sociology* 44: 341-360.
- Van Mol, Christof. 2022. "Exploring Explanations for the Gender Gap in Study Abroad: A Case Study of the Netherlands." *Higher Education* 83:441-459.
- Van Mol, Christof, Kim Carls, and Manuel Souto-Otero. 2021. "International Student Mobility and Labour Market Outcomes: An Investigation of the Role of Level of Study, Type of Mobility, and International Prestige Hierarchies." *Higher Education* 82: 1145-1171.
- Vincent-Lancrin, Stéphan. 2008. "The Reversal of Gender Inequalities in Higher Education: An Ongoing Trend." *In Higher Education to 2030, Vol. 1: Demography, Educational Research and Innovation*. OECD Publishing. Paris.
- Wei, Hao, Ran Yuan, and Laixun Zhao. 2019. "Cultural Factors and Study

- Destinations of International Students.” *China & World Economy* 27(6): 26-49.
- World Bank. 2009-2021. *National Accounts Data*. Retrieved from <https://data.worldbank.org/indicator/NY.GDP.MKTP.CD>.
- World Bank. 2009-2021. *Population Estimates and Projections*. Retrieved from <https://databank.worldbank.org/source/population-estimates-and-projections>.

Minjung Park is professor at the Department of Economics at Ewha Womans University. She received her Ph.D. in economics from Stanford University in 2007. She is an empirical microeconomist with specialties in empirical industrial organization, microeconometrics and marketing. Her main research interest lies in firm behavior in a competitive marketplace and various strategies used by firms to attain a competitive edge. In her work, she employs structural models to analyze how firms respond to institutional and market incentives and how the strategic interactions influence market structure and consumer welfare. [E-mail: minjung_park@ewha.ac.kr]

