

Determinants of Remittance Behavior among Female Marriage Immigrants in South Korea*

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This study examines determinants of remittance behavior among female marriage immigrants in South Korea, using a nationally representative survey dataset of registered foreigners. We hypothesize a positive relationship between socioeconomic status and remittances and a negative association between duration of stay and remittances. We fit a double hurdle model to produce probit coefficients in one part and OLS results in the other. The probability of sending remittances increases if the women are Vietnamese or Uzbek, work, and earn monthly income at certain levels. The level of remittance decreases with a larger household size but increases with a higher level of income. There are indeed two different mechanisms operative in the decision to remit and level of remittance. Having economic power is likely to increase the chance of maintaining ties with families in their country of origin through remittances. Theoretical and technical development is needed to fully account for the remittance behavior of marriage immigrants.

Keywords: remittance, marriage immigrant, South Korea, double hurdle analysis

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Background

Most studies of factors that affect remittance behavior have been in the field of labor economics. One of the earlier but still dominant frameworks used to explain the mechanisms of remittance behavior is the altruism or self-interest approach (Lucas and Stark 1985). This framework is based on the question of whether immigrant workers remit according to altruistic motives, such as to help their family and relatives, or for their own benefit, with the expectation they will receive an inheritance or other assets upon their return to their home country. As an alternative, Lucas and Stark (1985) suggested the “tempered altruism” or “enlightened self-interest” approach, due to limitations of the altruism or self-interest approach in explaining remittance behavior. According to this approach, a contractual arrangement is formed between the migrant and their family remaining in the place of origin.

Existing studies within these frameworks examine determinants of remittance behavior nearly exclusively among labor migrants in non-Asian contexts. Even though marriage immigrants participate in economic activities and maintain transnational networks, their remittance behavior has not gained much attention. There are few studies of the remittance behavior of marriage immigrants in Asia. Bélanger, Linh, and Duong (2011) examine determinants of remittance behavior among 250 Vietnamese women married to men in other Asian countries through multivariate analysis. Supporting the altruism hypothesis, they find that the women’s individual socioeconomic characteristics, such as employment status, have determining effects on remittance. Some other studies suggest paying attention to dimensions related to gendered aspects and familial obligations as remittance factors in a transnational family. In this perspective, migrant women negotiate between the roles of transnational daughter (of their natal family) and wife and mother (of their marital family), before sending transnational remittances (Yeoh et al. 2013; Thai 2012; Kim 2015b). Remittances operate as a medium to maintain transnational ties.

Remittance by female marriage-based immigrants in South Korea (hereafter “Korea”) have not been a topic of great interest mainly because foreign-born female immigrants have been framed as dependents of their husbands. Studies that exclusively look at mechanisms of remittance behavior of migrant women married to Korean men, particularly those using a nationally representative studies, are rare.

The current study aims to contribute to existing literature in at least two

ways. First, we examine what individual characteristics are associated with the remittance behaviors among female marriage immigrants in Korea. Foreign-born individuals married to nationals of the destination country are likely to be permanent residents. Thus, it may be inappropriate to view female marriage immigrants through the lens of labor migrants. It is unlikely that they expect inheritance or other benefits from their natal household upon their return to original home. We use a nationally representative survey of foreigners in Korea to test our hypotheses for effects of selected socioeconomic variables and duration of stay on remittances. Second, we assume that there are two different mechanisms for deciding whether to remit and the level of remittances. To achieve this aim, we utilize a double hurdle modeling technique. Examining conditional and unconditional effects, we hope to further justify the use of the current model. We also highlight the need for a theoretical framework and technical development for understanding the remittance behaviors of female immigrants as economic actors.

Mechanisms of remittance behaviors

Theoretical frameworks on remittances

Literature on remittance has been predominantly produced by the field of economics with a focus on labor migrants. Lucas and Stark (1985) made their eminent contribution to the theoretical and empirical approaches for studying the remittance behavior of labor migrants, influencing many other studies. The framework of “pure altruism” posits that a migrant’s intention to remit and the level of remittance are based on the migrant’s altruistic feelings for their household in the country they have left behind. Therefore, the decision to remit depends on the origin household’s economic well-being, shocks in the origin household (illness, natural disasters, agricultural failures, etc.), the immigrant’s income level, the number of emigrants in the natal family, and the migrant’s duration of stay in the destination country (Hagen-Zanker and Siegel 2007).

In contrast, the “self-interest” approach suggests that the motive of sending remittance is the potential benefits immigrant workers expect to receive upon their return to home countries. Investments through remittance may increase the chance for migrant workers to inherit their family assets (Lucas and Stark 1985). Thus, the higher the income of both the immigrants

and the receivers of remittance, the larger the remittances (Hagen-Zanker and Siegel 2007).

There are other approaches that are more or less similar or extended versions of this binary framework (Glytsos 2002). Lucas and Stark (1985) suggested the “tempered altruism” or “enlightened self-interest” approach as an alternative to the pure altruism or self-interest theory, due to limitations of these approaches in explaining remittance behavior. According to this alternative approach, a contractual arrangement is formed between the emigrant and the family in the place of origin based on two components: investment and risk.

Regarding risks, a co-insurance agreement on sending and receiving remittances can alleviate unemployment-related hardships or other risks in the destination country and economic risks in the origin country. This kind of agreement is mutually beneficial for both immigrants and their household members in their country of origin (Lucas and Stark 1985). For example, immigrants who are going through a prolonged period of unemployment may ask the household in the home country for monetary support. Similarly, family members in the agricultural sector may expect support from emigrant(s) to deal with crop failures.

A contractual agreement can also be based on the idea of a “loan payment” for human capital investments and financial help for migration expenses made for a migrant worker by the household (Lucas and Stark 1985; Poirine 1997). Migrants are willing to compensate their family members for the monetary support the family has provided for their education in the home country or for the costs of initial settlement in the destination country. This agreement is implicit between an immigrant and their family members. Basic assumptions of the loan payment approach include regular remittances (and thus no decay in remittances) and that the remittance amount is dependent on the amount of the initial familial investment. In other words, immigrants would want to pay back what they owe their parents or other family members.

Marriage migration in Korea

The theories in the previous section are based on studies of remittance behaviors among labor immigrants. In general, female immigrants married to a national of another country are considered “foreign-brides” or dependents of the husband’s household, not independent individuals participating in economic activities. Marriage migration in Korea increased

greatly in scale in the early 1990s after diplomatic relations with China were established in 1992 which also generated an expansion of economic cooperation. This watershed change enabled massive immigration flows of Korean-Chinese women to Korea for the purpose of marrying rural Korean men. Since the year 2000, the pool of marriage immigrants has expanded to include South Asian countries. The peak year for international marriages was 2005, in which they constituted 13.5 percent of the total number of marriages. Rural Korean men were not able to find a Korean spouse due to the gender imbalance of the local marriage market and domestic women's avoidance of rural areas. Female immigrants' destinations expanded to include suburban and urban areas (Kim 2015a).

According to Statistics Korea (KOSIS 2019), as of 2018, international marriages between a Korean person and a foreign-born person accounted for about 8.8 percent out of the total number of marriages (257,622) in Korea. Among those, marriages between a Korean man and foreign woman accounted for around 73 percent of the total, with the rest being between a Korean woman and a foreign man. During the period between 1990 and 2018, the aggregate number of international marriages is over 607,000 (Kim 2015a, pp. 46-50; KOSIS 2019). Important push-pull factors in sending countries for this type of migration include a need to earn higher income outside the home country and send remittances back home, a desire to escape current economic difficulties, and a "marriage migration culture" which pressures women who remain (Lee 2013). Even though an economic need is not the only reason for these female immigrants to move to Korea, it is still considered a critical pull factor for their decision to move to Korea.

Remittance behaviors among female immigrants

There are a few studies that explore the remittance behavior of female marriage immigrants through the lenses of altruism or self-interest or even offer whole new approaches. Through a household survey in Vietnam, Bélanger, Linh, and Duong (2011) find that Vietnamese female marriage immigrants contribute to their natal families through remittances. Moreover, their individual characteristics, such as economic participation, age, and duration in the receiving country, are more important determinants of the probability of remittances than characteristics of their origin household, such as the poverty level back home. The study results support the altruism theory, finding insufficient evidence for the self-interest theory.

Most female marriage immigrants in Korea are from Asian countries. It

is useful to take the lenses of filial piety or obligations in the transnational family context as an explanatory tool for remittance even after marriage. Studies by Thai (2012) and Singh, Rogertson, and Cabraal (2012) reveal that remittances are often considered family money; remittances are either thought of as dutiful gifts or necessary support for the family economy of those who remained in the country of origin. Remittances work as a medium to maintain family ties across country lines. Sending remittances is one of the crucial ways for these immigrants to fulfil familial obligations and meet the familial expectations.

Stories become more complex when gender is considered. Thai (2012) illuminated the complex situation transnational daughters/wives have to overcome prior to remitting. They have to negotiate between the two roles of a dutiful daughter and a daughter-in-law. In addition, they must properly distribute money with their husband's consent, as similarly shown in the studies of Yeoh et al. (2013) and Kim (2015b) on Vietnamese female immigrants. In a non-Asian but relevant setting, Abrego (2009) found that in Salvadoran transnational families immigrant women are more consistent senders than men are. Thus, children left in the origin countries thrived more when receiving money from mothers than fathers. An implication of this is that gender differences exist in remittance behaviors.

To date, there has been little theoretical or technical development in research on the remittance behavior of female immigrants married to nationals in Korea. Previous research on this topic has used data that are not necessarily nationally representative. Remittance behaviors have been closely examined in the studies of Kim (2015b) and Yun (2017), based on in-depth interviews of female marriage immigrants in Korea. Further, a study by Jang (2010) uses participant observation and interview methods to study remittance behaviors of emigrants in Vietnam. When it comes to quantitative studies, the remittance behavior of female marriage immigrants in Korea is generally discussed as a side topic or in a small section, as in Lim (2005), Seol et al. (2005), and Kim, Lee, and Hwang (2016). Existing Korean studies suggest a potential decay in remittances or less frequent remittances with a longer stay in Korea and among certain ethnicities (Yun 2017; Kim, Lee, and Hwang 2016).

Moreover, national-level survey datasets with transnational characteristics (e.g., interactions with origin households or socioeconomic information on the origin households) of international migrants including marriage immigrants have not been fully developed. This might have limited possibilities for quantitative research on remittances.

Conceptual framework and hypotheses

Common micro-level determinant variables of the decision to remit and the level of remittance used in previous research on labor migrants are largely divided into two types: characteristics of natal families¹ and characteristics of immigrants in destination regions. Immigrants' individual characteristics in destination contexts include employment status, income, duration of stay, education, age, ethnic origin, marital status, household size, and intentions to return (OECD 2006; Carling 2008; Lianos and Cavounidis 2010).

Employment status has varying outcomes in different studies. Being employed yields a positive effect on the propensity to remit in Hoti (2015), as well as on the amount of remittances in Holst and Schrooten (2006) and Jena (2016). However, Menjívar et al. (1998) show that for Salvadoran and Filipino immigrants who work in Los Angeles, the number of hours worked does not have significant effects on either the likelihood of remittance or the level of remittances.

According to the altruism theory, income should have a positive effect on remittances. On average, earning a higher income is shown to be positively related to remittance behavior (Kang, Kang, and Sung 2015; Menjívar et al. 1998; Niimi, Pham, and Reilly 2009). Massey and Basem (1992) find that for immigrants in Mexican communities in the U.S., the amount of income earned during their stay in the U.S. is not significant for their remittance propensity, but is positively related to the amount they remit.

Under altruism assumptions, the remittance decay hypothesis suggests that remittances are initially low, followed by an increase in remittances after immigrants' adjustment period, and then an eventual decline (Grieco 2004). This inverted U-shape pattern of remittance has been tested multiple times with different results. For instance, Brown (1997) finds that for the Tongan community the effect of time was not significant on remittances, while for the Western Samoan community the effect was positive at the 0.10 level. Meanwhile, González-Ferrer, Beauchemin, and Serrano (2015) show that Senegalese men do not necessarily reduce their propensity to remit after the adjustment period while Senegalese women do. Bettin and Lucchetti (2016)

¹ Characteristics related to natal families in countries of origin commonly include household income, family assets, perceived financial situation, communication with the emigrant, remittance history, and presence of another emigrant (Carling 2008; Bélanger, Linh, and Duong 2011; Hagen-Zanker and Siegel 2007). These characteristics are not further discussed in this article due to their unavailability in our current dataset. Our article attempts to test the association of individual characteristics of female marriage immigrants with their remittance behaviors.

find an inverted U-shape on remittance propensity over time using a sample from the German Socio-Economic Panel (SOEP). Indeed, there is room for further discussion on the effect of time on remittances.

In some studies, immigrants' education has a positive effect on the propensity of remitting, while in other studies the effects are negative or not significant. For example, Bettin and Lucchetti (2016) find that migrants' levels of education have a positive effect on the propensity to remit, but their years of education have a negative nonlinear effect. Similarly, Niimi, Pham, and Reilly (2009) report a positive effect from having obtained a higher level of education among Vietnamese internal migrants. In contrast, Hoti (2015) does not find any significant effects of education in his study of Kosovo emigrants' remittance behavior. Meanwhile, Bartolini (2015) and Niimi, Ozden, and Schiff (2010) show that highly educated individuals remit less compared to those with lower levels of education. We aim to test the positive effect of education level on remittances among marriage immigrants based on the repayment hypothesis, as tested in Bollard, McKenzie, Morten, and Rapoport (2009) and Bettin et al. (2016), based on our assumption that familial obligations and repayment motives are at work for female marriage immigrants.

Age seems to be positively related to remittances (Carling 2008), but in a nonlinear fashion in Holst and Schrooten (2006) and Menjívar et al. (1998). However, it has a negative effect on remittance in Bartolini (2015). Ethnic or national origin, in general, is a source of variation in remittance likelihoods (Clark and Drinkwater 2007) or amounts (Bartolini 2015; Lianos and Pseiridis 2014). A larger household size for an immigrant in the destination region is associated with a smaller amount of remittance (Lianos and Pseiridis 2014; Holst and Schrooten 2006). Living with a spouse is usually negatively associated with remittances (Soltero 2009; Carling 2008; Vanwey 2004), but it shows a positive effect in Lianos and Pseiridis (2014). Having a foreign spouse is shown to be associated with a lower amount of remittance (Bartolini 2015).

There is not a guarantee that these frequently used determinants will work for marriage immigrant women in the same ways that they do for migrant workers. Indeed, foreign-born women married to Korean nationals are likely to live in Korea permanently unless they experience marital disruption or other serious destabilizing circumstances. In contrast, according to Batista and Umblijs (2016), migrant workers send a larger amount of remittance especially when they are under temporary contract with higher wage risks. Moreover, those migrants tend to remit to people

with greater monetary resources in the origin (Batista and Umblis 2016). Alternatively, they may save money and return home with funds or equivalent goods accumulated during their stay (Glytsos 2002). In either of the two circumstances above, the framework of self-interest may be a better tool for explaining the actions of migrant workers.

We generate three hypotheses relevant to the current study based on findings from previous studies.

- (1) Being employed and having a higher income are positively associated with the level of remittances, controlling for other variables.
- (2) The longer the duration of stay, the smaller the amount of remittances, controlling for other variables.
- (3) Level of education received in the home country is positively associated with the level of remittances, controlling for other variables.

Data and methodology

Data and sample description

The present study uses the microdata set from the *2017 Survey on Immigrants' Living Conditions and Labour Force* (KOSIS 2017), a nationally representative survey of registered foreigners and naturalized persons living in Korea. Sampling weights are included as an adjustment to the stratified simple random sampling. The data structure is cross-sectional in its nature. The total sample size of this survey data is 14,000, a 1.2 percent sample of the total registered foreigners as of 2017. For our study purposes, however, we only use the data of foreign-born females who are married to Korean nationals at the time of the survey. The study sample consists of 1,962 female immigrants who are in Korea on a spousal visa or who have been naturalized and married to a male Korean national. This survey dataset is crucial for the current study because it has not only the remittance information (participation, level of remittance, and frequency) for people of foreign origin, but also their demographic, socioeconomic, and marital family characteristics.

A continuous dependent variable is obtained indicating the level of annual remittances converted into U.S. dollars. A zero outcome means that a person did not remit during the previous year. Explanatory variables are retrieved as follows based on previous literature: ethnic origins, age, duration

TABLE 1
DIFFERENTIALS IN REMITTANCE BEHAVIOR BY MAJOR PREDICTOR VARIABLES

Variables (categories)	Remittance (yes = 1) percentage (%)	Average amount of remittance (USD)
Observations	1,962	613
Ethnic Origin		
Korean Chinese	14	470
Han Chinese	14	401
Vietnamese	35	779
Uzbek	46	1,167
Age		
Age 19 to 39	34	795
Age 40 to 49	21	573
Age 50 or above	14	461
Duration of stay		
0 to 69 months	30	757
70 to 119 months	33	777
120 months or above	25	662
Education		
Primary or less	40	980
Junior high	33	758
High school or above	28	684
Household members		
1 to 2	32	1,311
3	34	740
4 or above	30	619
Work status		
Worked	48	1,148
Not worked	9	191
Husband's work status		
Worked	32	728
Not worked	28	540
Monthly income		
Below 879 USD	13	197
879 to 1,757 USD	49	1,195
1,758 to 2,636 USD	49	1,626
2,637 USD or above	23	1,275

of stay, number of household members, education, employment status, employment status of the spouse, and monthly income. Due to data limitations, characteristics of the households in the country of origin are not available. A basic description of the variables of the dataset for the current study is presented in Table 1.

Migrant women in the sample are divided into four categories by ethnic (national) origin: Korean Chinese, Han Chinese, Vietnamese, and Uzbek. There are larger proportions of remitters among the Vietnamese (35 percent) and the Uzbek (46 percent) compared to migrants from China (14 percent).² Conditional on sending remittances, average amounts of remittances differ depending on ethnic background. In our sample, Han Chinese women send the smallest amount of remittances, and Uzbeks send the largest.

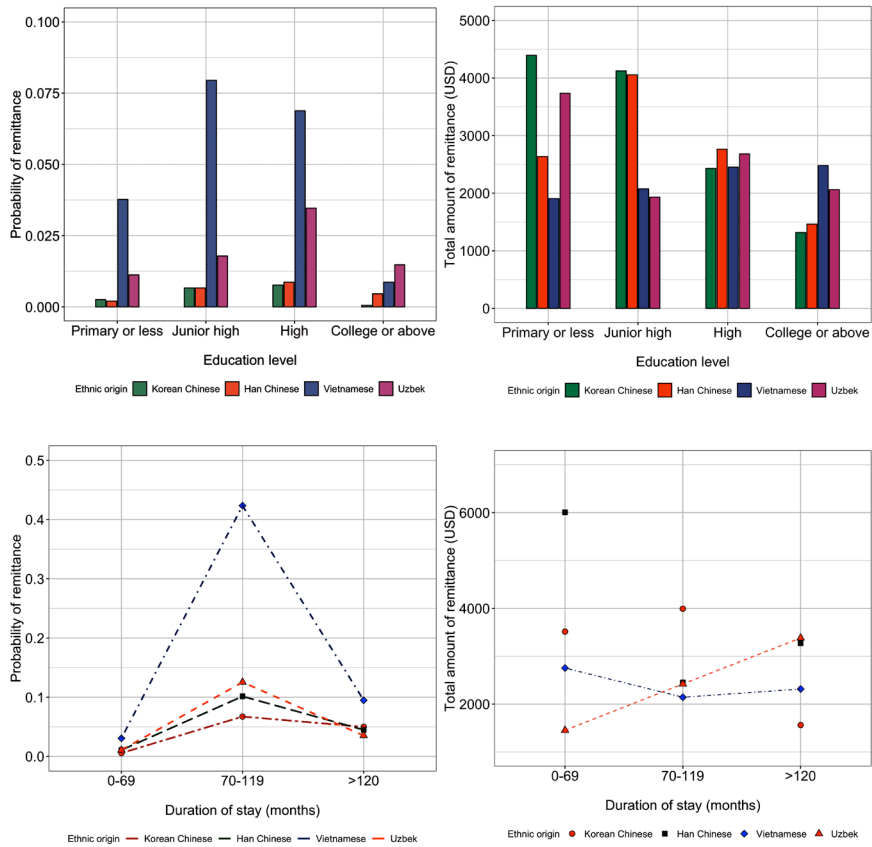
Age seems to be negatively associated with the percentage of migrants who remit and average remittance levels (See Table 1). In terms of duration of stay, the percentage of remitters and the average amount of remittance for migrants who stay in Korea for 5 to 10 years are larger than they are for migrants in other duration categories.³ While the percentage of remitters rarely fluctuates across the number of household members, the average amounts of remittances decrease with additional household members. A negative association seems to prevail between education and both the percentage of remitters and average levels of remittances. Respondents' ages were coded into categories in the raw dataset.

Almost half of those who work remit, while only 9 percent of those who do not work remit. Being employed is associated with larger average remittance amounts. Monthly income categories have a more complex distribution of remitters and levels of remittance. The lowest income level is related to the lowest percentages and average amounts of remittances. A little less than 50 percent of immigrant women earning an income in the next two higher categories send remittances. The largest remittances are sent by women in the highest income range.

For a more intuitive understanding of the data, we visualize preliminary results of analyses by major indicators. In Figure 1, the chart for the

² Even though there are larger sample sizes of the Vietnamese (1,077) and Uzbek (336) in our dataset than the Korean Chinese (241) and Han Chinese (308), it is likely that the actual proportions are different from those of our study sample. The original survey dataset sampled the entire population of registered foreigners in Korea. However, only female marriage immigrants are included in our sample.

³ Respondents' ages and duration of stay in Korea were originally coded into categories in the raw dataset. As they are not intervals, we were not able to test nonlinear relationships of these variables.

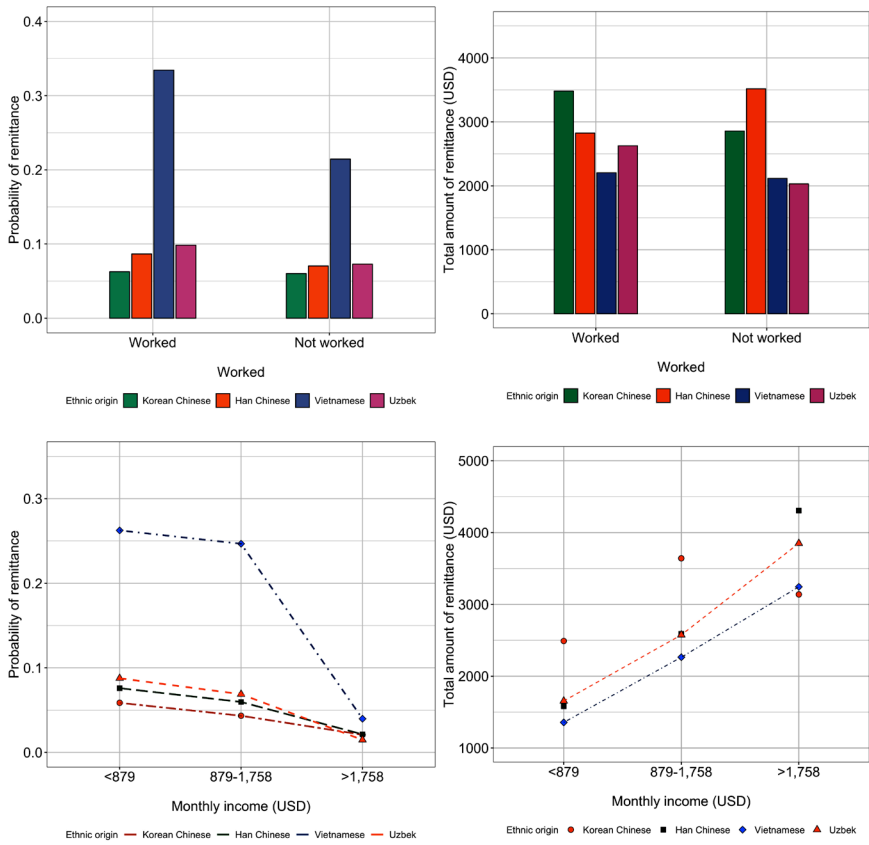


Note.—In the plot for average amount of remittance by duration of stay, remittance levels with observations fewer than 20 are not connected with lines.

FIG. 1.—Probability of Remittance and Average Amount of Remittance by Education and Duration of Stay

probability of remittance by duration shows an upward pattern during the period from 0 to 10 years for all ethnic groups, with the overwhelmingly higher probabilities for Vietnamese women for all periods of stay. Amounts of remittances fluctuate throughout the three periods. There is an upward trend for Uzbeks with an increase of 2,000 USD throughout the whole period, while for Vietnamese women the amount of change is smaller.

The analysis by education tells us that there are variations by ethnic origin in the remittance behavior among the sample population. The



Note.—In the plot for average amount of remittance by monthly income, remittance levels with observations fewer than 20 are not connected with lines.

FIG. 2.—Probability of Remittance and Average Amount of Remittance by Employment and Monthly Income

probabilities of remittance for Vietnamese women are the highest followed by the Uzbek women across educational levels except college or above. Those who have obtained college-level education or above have the smallest probabilities of remittance. Nonetheless, the probabilities analyzed by education in general are not as high (all less than 10 percent) as those plotted against by other variables. In terms of the total amount of remittance, ethnic variations still exist. Korean Chinese immigrants send the largest amount of remittances among the people with junior high school education or less.

Especially for those in the primary education or less category, there is a 2,500-dollar difference between Korean Chinese and Vietnamese migrants. Among those with a junior high education, Korean Chinese and Chinese women send the largest amounts. Even though the propensity of remittances among female immigrants from China is the lowest, they send the largest amounts of remittances. Vietnamese and the Uzbek migrants send steady amounts of remittances across educational levels, compared to immigrants from China.

In Figure 2, the probability of Vietnamese women sending remittances is about 33 percent among those who work versus about 20 percent among those who do not work. For other ethnic categories, probabilities of remitting are only slightly higher when immigrants work. In terms of amounts of remittances, for all of ethnic groups the average remittances are higher for immigrants who are working compared to those not working, except for Chinese women.

Regarding monthly income, the larger the monthly income, the smaller the probability of remittance for all ethnic groups. In contrast, for all ethnic groups, the amounts of remittances tend to increase as the monthly income increases. This suggests that income has a negative effect on the decision to remit, while it has an opposite effect on the level of remittance.

Double hurdle model

Approaches such as logistic model (See Brown 1997; Bélanger, Linh, and Duong 2011) and probit model (Cragg 1971; Brown and Jimenez-Soto 2014) have been used to model participation in remitting. To deal with a censored, limited dependent variable, tobit models (Tobin 1958) have also been widely used to model the level of remittance due to their simplicity and utility (Wooldridge 2008). Censoring zero observations as “corner solutions,” it assumes that the same mechanisms are at work for the decision to remit and the level of remittance. Recently, alternative specification techniques such as double hurdle modeling have been used in order to more appropriately deal with zero observations in remittances (Burke 2009; Croissant, Carlevaro, and Hoareau 2018).

Double hurdle models, sometimes called two-tier, two-part, or two-stage models, gained popularity after they were used by Cragg (1971). The advantage of a double hurdle model is that two different processes are fit into one model, in this case the decision to remit (probit equation) and the level of

remittance (OLS equation). Double hurdle models have several different forms such as the sample selection model, the so-called “Heckman model (Heckman 1979),” Cragg’s “double hurdle model (Cragg 1971; Burke 2009),” and the “two-part model.” A Heckman model adjusts the potential non-random selection of a sample with an inverse Mills ratio (equivalent to an extra variable added in the OLS regression equation for adjusting errors caused by non-random selection). The two-part model technique (Belotti et al. 2015) in this study is similar to Cragg’s double hurdle model except that there is no assumption about the relationship between the errors of binary outcomes and the OLS regression outcomes (Belotti et al. 2015). Further, it allows for easy extraction of marginal and conditional and unconditional effects (Belotti et al. 2015) for more intuitive interpretations. Specifically, an unconditional effect is an average change (or total effect) associated with each predictor variable in amounts of remittance among all individuals, regardless of their participation in remittance, including those whose remittance is zero. In contrast, conditional effects are only obtained for those who participate in remitting. We will be able to see the overall effects of independent variables on remittances including both zero and positive amounts or if the effects are only conditional on decision to remit.

In the first part, the probability of sending remittance is fitted as shown below.

$$\begin{aligned}
 R &= x_i\beta + u, & u &\sim N(0, 1) \\
 \text{Prob}[R > 0 \mid x_i] &= \text{Prob}(x_i\beta + \varepsilon > 0 \mid x_i) = \Phi(x_i\beta)
 \end{aligned}
 \tag{1}$$

In equation (1), Φ is the cumulative normal density distribution function. Next, the second hurdle function is set up with a logged dependent variable as below,

$$\ln(T) = x_i\beta + v, \quad v \sim N(0, \sigma^2)
 \tag{2}$$

where $T > 0$

In equation (2), x_i is a vector of predictor variables, β parameters to be estimated, and σ the standard deviation. The term x_i can be either different or the same in (1) and (2). Our model utilizes the same vector of independent variables. The dependent variable outcome, the level of remittance, follows a log-normal distribution and guarantees positive values. We expect that predictors affecting the participation in remittance and the level of

remittance are different (Piracha and Saraogi 2012).

A double hurdle model of remittances

We report raw coefficients of the independent variables in both parts of the model. Table 2 displays the model coefficients of the double hurdle model. For the probit equation part on the left, Vietnamese, Uzbek, employment, and the two income level variables are statistically significant. Being Vietnamese or Uzbek increases the probability of sending a remittance. Those who are employed have a higher propensity of remittance compared to those who are not, as we expected. In terms of monthly income, those whose income is in the first range or the second range have higher probabilities of sending remittances compared to those whose income is in the reference category. Meanwhile, duration of stay and level of education are not significantly related to the probability of remittance, which is different from our expectations.

We fit an OLS regression model for the level of remittance in the second part. Because it follows a log-normal distribution, it is difficult to directly interpret the effects of variables. However, it is safe to say that having a household of 4 members or more in Korea is negatively associated with levels of remittance. This result is in line with one of the altruistic determinants; having a larger sized marital family would discourage immigrants from sending more money to their families in their countries of origin. Next, all of the income categories have positive signs increasing in magnitude, compared to the reference category. This result is also expected based on altruistic assumptions. In contrast to our expectation, duration of stay and education effects turn out to be insignificant.

The mechanisms for participation in remittance and the level of remittance are different, as we assumed. For participation in remittance, ethnic background, monthly income, and employment status are important determinants, while number of household members and monthly income are significant determinants of level of remittance. Indeed, female marriage immigrants in Korea seem to overcome two different hurdles, namely, whether they will remit and how much they will remit.

Table 2 does not show any significant effect of the length of stay in Korea on remittance; there is no sign of a decay effect or an inverted U-shape of remittances over time, as was suggested in the altruism interpretation, which assumed that the longer the duration of stay, the smaller the amount of

TABLE 2
DOUBLE HURDLE MODEL ANALYSIS OF REMITTANCE DECISION AND REMITTANCE LEVEL

Variables	First part (Probit)		Second part (OLS regression)	
	b	s.e.	b	s.e.
Ethnic origin (ref: Korean Chinese)				
Han Chinese	-0.02	0.23	0.01	0.23
Vietnamese	0.70**	0.22	-0.11	0.22
Uzbek	1.26**	0.22	-0.02	0.22
Age (ref: Age 19 to 39)				
Age 40 to 49	-0.06	0.22	0.31	0.19
Age 50 or above	0.35	0.33	-0.14	0.28
Duration of stay (ref: <69 months)				
70 to 119 months	0.15	0.21	-0.15	0.22
120 months or above	-0.23	0.26	-0.45	0.26
Education (ref: Primary or less)				
Junior high	0.17	0.22	-0.19	0.17
High school or above	-0.16	0.20	0.01	0.18
Household members (ref: 1 or 2)				
3	-0.21	0.22	-0.19	0.16
4 or above	-0.36	0.22	-0.52**	0.15
Work status (ref: Not worked)				
Worked	0.54*	0.23	-0.18	0.15
Husband's work status (ref: Not worked)				
Worked	0.19	0.21	-0.18	0.17
Monthly income (ref: Below 879 USD)				
879 to 1,757 USD	0.87**	0.20	0.66**	0.12
1,758 to 2,636 USD	1.17**	0.27	1.16**	0.16
2,637 USD or above	0.14	0.32	1.70**	0.42
(Constant)	-1.98**	0.39	7.71**	0.36
Observations	1,962		613	
Pseudo R ² / R ² adjusted	0.24		0.26	
Wald χ^2 / F Statistic	216.66**		8.59**	

Note 1.—*p<0.05; **p<0.01.

2.—The amount of remittance is log-transformed.

remittances. To double check if duration has an effect, we produced another set of model results, with the original reference category switched to the category of the longest duration. The result was similar. In addition, we do not find support for effects of education, thus negating this aspect of the repayment interpretation which supposed that the more educated the migrant, the larger the remittances. This result implies that there are hidden factors influencing remittances by female marriage immigrants, undiscovered in our current study setting. Nonetheless, the effect of the category for “high school education or above” is positive in direction while not significant. This provides us a possibility that an alternative result to support our hypothesis on education could have been yielded with a larger sample size.

Marginal effects of independent variables

An advantage of using a double-hurdle model is that we can easily generate marginal effects from both parts of the model for a more intuitive understanding of the results. We present the average marginal effects of the first part of the model (probit results) in Table 3.

In the probit part, average marginal effects of being Vietnamese and Uzbek are a 19 percent and 35 percent increase, respectively, in remittance probabilities, compared to being Korean Chinese. This tells us that ethnic variations exist in the propensity to remit. For those who work, a 13 percent increase in remittance is expected, compared to those who do not work. The propensity of remitting tends to increase by 23 percent and 32 percent for those whose income is in the second and third ranges, respectively, compared to those in the reference category. These two economic indicators boost the chance of remitting on average, except for the last income category. Having an income in the highest range does not necessarily encourage or discourage female marriage immigrants to remit.

We now show marginal effects of the OLS regression results (See Table 3). Each conditional effect tells us the average increase or decrease associated with an independent variable in the amount of remittances among those who remit. In contrast, an unconditional effect is the overall effect of each variable on the amount of remittances ranged from zero to the highest, regardless of immigrants’ participation in remitting. We compare conditional and unconditional marginal effects of the OLS part of the model.

Having a household size of four or above is associated with a reduction in remittance levels by about 1,035 USD for the conditional model and 686

TABLE 3
MARGINAL EFFECTS OF INDEPENDENT VARIABLES ON REMITTANCE DECISION
AND REMITTANCE LEVEL

Variables	First part (Probit)	Second part (OLS regression)	
	Marginal effect	Unconditional effect	Conditional effect
Ethnic origin (ref: Korean Chinese)			
Han Chinese	0.00	-0.42	2.32
Vietnamese	0.19**	366.67	459.08
Uzbek	0.35**	826.70*	990.65*
Age (ref: Age 19 to 39)			
Age 40 to 49	-0.01	242.71	411.63
Age 50 or above	0.09	107.31	100.28
Duration of stay (ref: -69 months)			
70 to 119 months	0.04	-21.19	-62.28
120 months or above	-0.06	-444.18*	-681.14*
Education (ref: Primary or less)			
Junior high	0.04	-45.85	-104.85
High school or above	-0.04	-115.87	-157.76
Household members (ref: 1 or 2)			
3	-0.05	-281.67	-424.88
4 or above	-0.09	-686.19**	-1,035.25**
Work status (ref: Not worked)			
Worked	0.13*	239.93	297.23
Husband's work status (ref: Not worked)			
Worked	0.04	-21.89	-69.96
Monthly income (ref: Below 879 USD)			
879 to 1,757 USD	0.23**	1,228.85**	1,553.62**
1,758 to 2,636 USD	0.32**	3,597.18**	4,692.72**
2,637 USD or above	0.04	4,096.38	6,551.38

Note 1.—Amounts of remittance that have been log-transformed are now re-transformed to raw values in dollars.

2.—Significance levels are provided for marginal effects. Significance levels of the original regression coefficients in Table 2 and those of the marginal estimates in Table 3 can differ.

USD for the unconditional model, compared to the reference category. The marginal effect of having a large family in Korea is greater when female immigrants have overcome the first hurdle (decision to remit), as compared to when the effect is considered as a total effect on all individuals including those with zero remittances.

Compared to the reference range, earning a monthly income in the first range on average increases the remittance level by about 1,554 USD (conditional) and 1,229 USD (unconditional), while earning an income in the second range increases the remittance level to a greater degree by about 4,693 USD (conditional) and 3,597 USD (unconditional). Notably, the highest income range is associated with a greatest increase in remittances by 6,551 USD (conditional) and 4,095 USD (unconditional) on average (See Table 3).

There are differences between conditional effects and unconditional effects, as shown in Table 3. Conditional on remitting, the marginal effects of independent variables on amounts of remittances are larger than the overall (unconditional) effects. This means that for the people who overcome the first hurdle deciding to remit, their remittance amounts are associated with independent variables at greater magnitudes, compared to people with remittances including both zero and positive amounts.

Discussion and concluding remarks

It has been more than two decades since large numbers of foreign-born women began to arrive in South Korea for marriage purposes. Because of the structural gender imbalance in the marriageable population, cross-border marriages between Korean men and foreign-born women are likely to continue occurring (Kim 2006, 2012; Abel and Heo 2018). Adaptation of these female immigrants to Korean society has been a topic of interest to the Korean government. However, their adaptation in terms of economic activities has not attracted much attention. They are still not widely considered as economic actors, despite their participation in the labor market. We suggest an alternative to the simplified view of immigrant women as wives or daughter-in-laws. We explore how their economic status in Korea is associated with their remittance behavior. Further, remittances are not only financial support for their families in their home countries, but also a way of maintaining their transnational ties with those family members. These women may still need to negotiate with their marital family members

concerning their remittances. However, they are more likely to have their say with respect to their own incomes.

The current study applies an extended altruism approach to analyze the remittance behavior of female marriage immigrants in Korea. Using a nationally representative survey dataset, we attempt to examine determinants of their remittance behavior with hypotheses related to their socioeconomic characteristics and duration of stay in Korea. We fit a double hurdle model, assuming that there are two different mechanisms operative in the decision to remit and the decision as to the amount of remittances. Indeed, we confirm through our analysis that the two processes (or two hurdles to overcome) are determined by different factors.

The effect of income on remittance levels appears as expected; it positively affects remittance behavior. Both the length of marriage immigrants' stay in Korea (a determinant supposed to have a negative effect) and their educational level (a determinant supposed to have a positive effect) effects appear to be trivial in our study. This implies that there might be effects of other potential variables uncaptured in the current study setting. For education, it is possible that highly educated individuals might have come from households belonging to higher social strata, lowering the need for remitting or for remitting larger remittances to their families back home. Further, the effect could have been canceled out in the main analysis result, after controlling for other socioeconomic variables such as income. Nevertheless, the positive direction of the "High school education or above" category predicting the amount of remittances tells us that a larger sample size might have yielded a different result from those presented here.

We recognize that transnational characteristics related to households in home countries may enable us to explore dynamics behind remittance patterns even further. This is not done in our current study because the dataset is restricted to individual characteristics relevant to the migrant's lives in Korea. As studies on female marriage migrants in Asia with a gendered approach reveal, their remittances may well depend on negotiations between conflicting expectations of them in their roles as daughter and daughter-in-law. Decision-making regarding remittances might be performed not according to the remitter's own judgement, but may also be determined in the transnational family setting where remittances are considered family money.

Another limitation to our study is that we were not able to capture other channels of remittances. The dataset we used in the present study only asked the respondents whether they make official wire transfers for remittances.

The existence of other informal and formal channels is more than possible because bank transfers can be expensive. For example, a report by the OECD (2006) discusses various channels of remittance flows, which include transfers through hand delivery, mail, intermediaries, credit unions, and money transfer companies. Especially for Chinese migrants, money transfer through intermediaries are called “fei ch’ien (flying money or coin)” or “chits/chops,” which do not involve any physical delivery of money, reducing the risk of money being stolen during delivery (OECD 2006, 11). Because the data only enabled us to look into formal transfer channels, we are not certain if the Chinese immigrants in our dataset also utilize this transfer system. We hope that we will be able to explore various channels for remittance transfers in the near future.

Nevertheless, we have taken a step forward exploring the rarely studied topic of remittance behavior among female marriage immigrants in Korea. Suggestions for future research are to further develop questionnaires capturing more transnational characteristics, such as household economic status and the presence of other emigrants in the natal family. Further, future researchers may need to theorize context-specific frameworks that are different from those for labor migrants in order to better study immigrant women’s transnational interactions.

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Data availability

Raw data were generated at the Microdata Integrated Service, Statistics Korea (<https://mdis.kostat.go.kr/>). Derived data supporting the findings of this study are available on request.

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