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Financial Literacy and Remittances: The Case of Mongolian Migrants in Japan

Enerelt Murakami*

Abstract

This paper examines determinants of financial literacy and its effect on remittances among a rarely studied group – Mongolian migrants in Japan, a small but actively remitting population who have special financial needs related to remittances. Using primary surveys targeting both Mongolian migrants in Japan and their families staying in Mongolia, financial literacy of migrants are measured by a combination of three competencies: financial knowledge, financial behavior, and financial attitudes. Financial literacy of Mongolian migrants in Japan is primarily influenced by factors such as income, proficiency in the Japanese language, and educational attainment. Interestingly, while overall financial literacy does not seem to affect the decision to send remittances or the amount sent, individuals with stronger financial attitudes are less inclined to send remittances. This finding suggests that remittances are frequently utilized for immediate consumption rather than being allocated towards long-term financial goals.

Keywords: financial literacy, migrants, remittances

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1.Introduction

Labor migration from a developing country to a developed country allows migrants to experience immediate and large income gains that can exceed those from any development policy in their home countries. As of 2022, remittances have become the largest source of external financing for developing countries, reaching $626 billion US dollars and exceeding foreign direct investment, official development assistance, and portfolio investment flows (World Bank 2022). They have been resilient to the COVID-19 pandemic shock, dropping slightly by 0.8 percent in 2020 and bouncing back strongly with 10 percent growth in 2021. At the micro level, remittances are an important source of livelihood for household members who remain in their home countries. At the same time, there is growing concern that remittances are creating dependency behavior among recipients and are not being used in productive activities that would help migrants and their families escape poverty permanently and contribute to the long-term sustainable development of their home countries.

One of the main reasons remittances are not used in productive activities is that many migrants and their families lack financial literacy and the ability to save and invest appropriately. Sending international remittances involves a special type of financial transaction that requires migrants to be familiar with the different methods available for remittances and the costs implied by each, in addition to deciding whether to remit and how much to remit, given their own costs of living in the destination country. Although data on migrants' financial literacy are scarce, some evidence suggests that migrants often lack knowledge about assessing remittance methods (Doi, McKenzie, and Zia 2014; Seshan and Yang 2014). Additionally, a lack of financial literacy makes migrants vulnerable to fraud, money laundering, and other types of financial crimes.

Systematic data and evidence on migrants are scarce because migrants have rarely been studied despite their growing population. This is partly related to their highly mobile nature; tracking them is both difficult and expensive. At the same time, there is a growing interest from policymakers to improve the financial literacy of migrants to help them integrate into the financial system in the destination country and to encourage remittance receivers to use the money they receive in a more sustainable and productive way. Some countries, including the Philippines and Indonesia, have started providing financial literacy training to migrants before their departure. However, to date, there is almost no evidence of the impact of financial literacy on migrants' remittance behavior. The exceptions are Gibson et al. (2014), Karunarathne and Gibson (2014), and Seshan and Yang (2014), who conducted randomized experiments designed to measure the impact of

providing financial literacy training to migrants. They found that financial literacy training improved the financial knowledge of low-educated and low-experience immigrants, but there were no changes in the frequency or amount of remittances.

The objective of this study is to contribute to the scarce evidence on the financial literacy of migrants by examining Mongolian migrants in Japan, a small but actively remitting migrant population. Using primary surveys conducted by the author, this study aims to (1) determine the factors affecting the financial literacy of migrants and (2) analyze the effects of financial literacy on the decision to send remittances and the amount remitted.

This study focuses on Mongolian migrants in Japan for three reasons. First, there is a growing interest among young Mongolians to migrate abroad to work because of low real wages and high living costs in Mongolia. With enormous amounts of unexploited mineral resources, Mongolia has experienced a series of commodity booms and busts, mainly caused by fluctuations in international commodity prices. For many Mongolians, international labor migration has become a way of diversifying their income to cope with the negative shocks in the domestic economy. Although no concrete statistics are available, the Ministry of Foreign Affairs estimates that approximately 5% of the total population works and lives abroad. Japan is the fourth largest destination for Mongolian migrants. Second, despite its growing importance, there are no tangible data or evidence of migration and remittances in Mongolia. The National Statistical Office of Mongolia has conducted several household surveys; however, none of their questionnaires contains modules on migration and remittances. Third, a World Bank survey conducted in 2012 revealed that Mongolians have poor financial literacy, which contributes to the country's financial sector instability (Heidelk, Perotti, and Zottel 2013). In particular, the survey results highlight the lack of financial knowledge among Mongolians who do not understand simple financial concepts.

This study contributes to the growing literature on determinants of financial literacy and remittances by expanding it to the context of the rarely studied migrant population in Japan. By conducting primary surveys targeting Mongolian migrants in Japan and their family members who stayed in Mongolia, I have constructed financial literacy scores for migrants and their families. The definition and measurement of financial literacy used in this study were adopted from the OECD/International Network for Financial Education (2018) methodology, designed to produce internationally comparable statistics on financial literacy. According to this methodology, financial literacy is defined as a combination of the financial knowledge, behavior, and attitudes necessary to make sound

financial decisions and achieve financial well-being. Consequently, overall financial literacy is measured as the sum of financial knowledge, behavior, and attitude scores. Although my survey results are not representative of the total Mongolian migrant population in Japan, a simple comparison with other countries suggests that Mongolian migrants and their family members who stayed have relatively high levels of financial literacy, averaging around 17 out of 21 points. Consistent with the World Bank's survey results, financial knowledge appears to be the weakest point for migrants, as it is for the total population. The estimation results show that migrants' financial literacy increases with their monthly income, level of Japanese proficiency, and education level.

Another contribution of this study is that it shows whether financial literacy affects remittance behavior. Although the determinants of remittances have been studied extensively, the effect of financial literacy on remittances has not been addressed. An exception is Gibson et al.(2014), who show that financial literacy does not affect the frequency and amount remitted among Pacific Island and East Asian immigrants in New Zealand, and Sri Lankan immigrants in Australia. The results are consistent with their findings and show that overall financial literacy appears to have an insignificant effect on the decision to send remittances and the amount remitted. In terms of the financial literacy components, a higher financial attitude score was associated with a lower probability of sending remittances and a lower remitted amount. This could indicate that remittances are sent for immediate consumption rather than long-term financial aspirations.

The remainder of this paper is organized as follows. Section 2 describes the primary data collection, construction of the financial literacy scores and presents descriptive results of the surveys. Section 3 presents the empirical strategies used to determine the factors affecting financial literacy and the effects of financial literacy on remittances. Section 4 presents the results and Section 5 discusses the results and concludes.

2.Data

2.1 Data collection

The author conducted two separate online surveys targeting Mongolian migrants in Japan and their families in Mongolia. First, an online survey of migrants was conducted between May and June 2020. As migrants form a hard-to-reach population, there is no official sampling frame to draw probability sampling. Therefore, the survey opted for non-probability sampling, in which survey participants were selected based on their accessibility and proximity to the research. First, migrants in Japan were recruited through Social Networking Systems (SNS). To ensure privacy and data security, data collection

was implemented using an online survey provider, QuestionPro. An online survey form via QuestionPro was uploaded to several Facebook groups for Mongolians in Japan. Although these groups are dedicated to Mongolians in Japan, they are not exclusive and may include members who are not currently residing in Japan. Therefore, a screening test was included in the online questionnaire to ensure that the respondent was currently living in Japan and was above 18 years of age. To confirm that the survey respondents had accessed the survey from Japan, IP addresses were checked if they were within Japan. Moreover, the survey was allowed to be taken only once by each participant to avoid duplicate participation. Each IP address, email address, and device accessing the survey were registered to ensure that each response was unique. The survey reached 260 Mongolian migrants in Japan via SNS.

Second, an online survey targeting family members who stayed in Mongolia was conducted between August and December 2020. Family members were contacted through email addresses provided by migrants. The survey targeted the household heads and family members responsible for family financing. Although the migrants consented to participate in the survey, their family members in Mongolia sometimes declined. Therefore, the final matched migrant family sample comprised 112 migrants and their families. This study uses the final matched migrant family sample.

The recruitment of participants and the surveys for both migrants and their families were implemented in Mongolian, the native language of the target population, in order to prevent from any effects of a language used. Further details on the survey design and results can be found in Murakami (2021).

2.2 Measurement of financial literacy

The online surveys adopted the OECD/International Network for Financial Education (OECD/INFE) questionnaire for adult financial literacy with modifications suitable to the financial systems in Mongolia and Japan. The OECD/INFE questionnaire is a harmonized questionnaire designed to construct internationally comparable statistics[1] on the financial literacy of adults aged between 18 and 79 years with different educational and cultural backgrounds. Accordingly, the definition of financial literacy used in this study corresponds to that of the OECD (2018) methodology, which defines financial literacy as a combination of knowledge, attitudes, and behaviors necessary to make sound financial decisions and ultimately achieve individual financial wellbeing. Hence, financial literacy

[1] For cross-country comparisons, OECD/INFE recommends having a nationally representative sample of at least 1000 individuals.

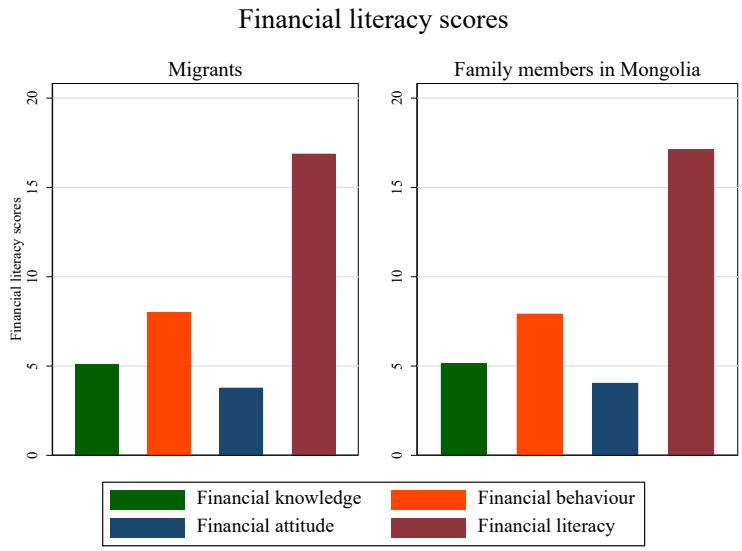
is measured by a combination of three competencies: financial knowledge, financial behavior, and financial attitudes.

The survey questionnaire included a set of questions designed to measure each of the three core competencies. The financial knowledge competency incorporates financial awareness, knowledge, and skills, and measures whether an individual understands financial concepts including inflation, interest rates, and risks, and applies simple numeracy in the financial context. There were seven financial knowledge questions in the questionnaire. Each correct response received a score of 1, resulting in a total financial knowledge score of 7. Financial behavioral competency measures whether an individual is prudent in saving, long-term planning, keeping track of cash flow, and making considered purchases. The financial behavior score was constructed based on the positive behaviors exhibited in the above financial aspects. The financial behavior score ranged from 0 to 9, with 9 being the maximum. Finally, financial attitude competency assesses whether an individual demonstrates a long-term attitude toward money and an affinity towards saving. The survey adopts two questions from the OECD/INFE to construct the financial attitude score. The financial attitude score is defined by averaging the response scales (minimum 1 to maximum 5) and measuring the degree to which respondents disagree with their short-term monetary preferences. Therefore, the highest score for financial attitude was 5 and the lowest was 1.

2.3 Descriptive statistics

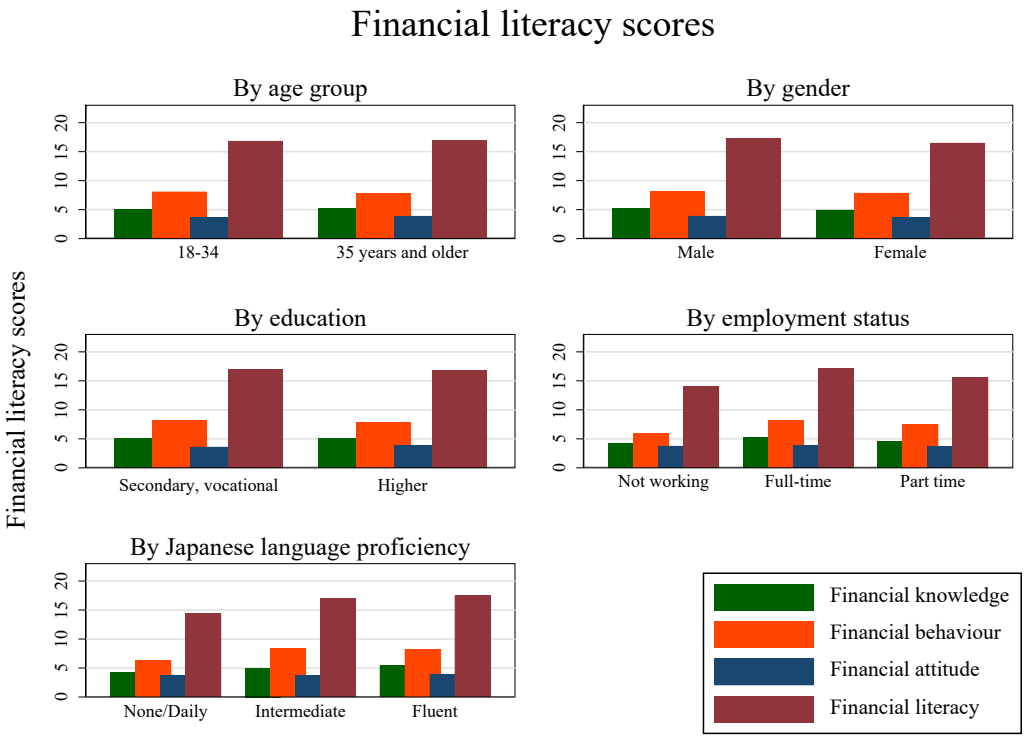
Financial literacy scores were calculated for each participant using three core components based on the OECD/INFE methodology. The mean financial literacy score for migrants in Japan was 16.9, and that for their family members in Mongolia was 17.1 out of the total score of 21 (Figure 1). Although the difference between the financial literacy scores of migrants and their families was negligible, family members consistently outperformed migrants, except for their financial behavior scores. Although the survey is not representative of the target population and the sample size is relatively smaller than the OECD/INFE recommendation, the average financial literacy scores for migrants and their family members are substantially higher than those in developing countries where data are available. For example, OECD (2020) survey results report that the mean financial literacy score is 13.3 for Indonesia, 12.5 for Malaysia, and 14.8 for Hong Kong, China.

Figure 1: Overall financial literacy scores



Source: Author's calculations

Figure 2: Financial literacy scores of migrants



Source: Author's calculations

Figure 2 shows the financial literacy of migrants in Japan according to their age, gender, education, employment, and Japanese language proficiency. Because migrants comprise a relatively young population[2], there is no significant difference in financial literacy by age. By gender, men were found to be slightly more financially literate than women. The migrants have a relatively high level of education. Secondary education is the lowest educational achievement among migrants. Migrants with tertiary education tended to be more financially literate than those with secondary and vocational education. Migrants who work full time have a higher level of financial literacy than those who work part-time or do not work. Moreover, Japanese-language proficiency seems to improve the financial literacy of migrants. Migrants fluent in Japanese have the highest levels of financial literacy.

Table 1 presents summary statistics of the variables used. To compare financial literacy levels across its components and measure an individual's financial literacy as a percentage of the total score, financial literacy scores were converted into proportions. Therefore, the financial literacy variables show how well an individual scores as a percentage and are bounded between zero and one. The average financial literacy score is 80 percent. The contribution of the financial behavior score to the overall financial literacy score was the highest at 89 percent, while that of financial knowledge was the lowest at 73 percent. In other words, Mongolian migrants in Japan are good at managing their money in a financially literate manner by budgeting, paying bills on time, saving purposefully, making responsible purchases, and avoiding debts. However, they seem to lack knowledge of basic financial concepts and the application of simple numeracy skills in the financial context. The average financial attitude score of the migrants was 76 percent. Therefore, migrants' overall financial literacy can be improved by gaining more financial knowledge and changing their financial attitudes towards long-term financial goals.

Table 1: Summary statistics of variables

Variables	N	Mean	Std. Dev.	Min	Max
Financial knowledge, proportion	112	0.73	0.17	0.14	1.00
Financial behavior, proportion	112	0.89	0.14	0.33	1.00
Financial attitude, proportion	112	0.76	0.08	0.50	1.00
Financial literacy, proportion	112	0.80	0.09	0.40	0.90
18-34 years old	112	0.67	0.47	0.00	1.00
35+ years old	112	0.33	0.47	0.00	1.00
Male	112	0.45	0.50	0.00	1.00
Female	112	0.55	0.50	0.00	1.00
Not married	112	0.54	0.50	0.00	1.00
Married	112	0.46	0.50	0.00	1.00

[2] Over 90 percent of the survey participants are younger than 45 years old (Murakami, 2021).

Monthly income less than 200,000 yen[1]	112	0.17	0.38	0.00	1.00
Monthly income of 200,000-250,000 yen	112	0.35	0.48	0.00	1.00
Monthly income of 250,000-350,000 yen	112	0.44	0.50	0.00	1.00
Monthly income of 350,000+ yen	112	0.04	0.21	0.00	1.00
Secondary and vocational education	112	0.37	0.48	0.00	1.00
Tertiary education	112	0.63	0.48	0.00	1.00
Not working	112	0.06	0.24	0.00	1.00
Working full-time	112	0.87	0.34	0.00	1.00
Working part-time	112	0.07	0.26	0.00	1.00
None/elementary Japanese	112	0.15	0.36	0.00	1.00
Intermediate Japanese	112	0.34	0.48	0.00	1.00
Fluent Japanese	112	0.51	0.50	0.00	1.00
Arrived in 2010 and earlier	112	0.29	0.45	0.00	1.00
2011-2013	112	0.29	0.46	0.00	1.00
2014-2016	112	0.25	0.43	0.00	1.00
2017 and later	112	0.17	0.38	0.00	1.00
Kanto	112	0.64	0.48	0.00	1.00
Outside Kanto	112	0.36	0.48	0.00	1.00
Does not send remittances	112	0.11	0.31	0.00	1.00
Sends remittances	112	0.89	0.31	0.00	1.00
Remittances sent, annual, in 1000 yen	100	1,340.5	612.8	50.0	3,120.0
Recipient of remittances: Spouse	112	0.31	0.47	0.00	1.00
Recipient of remittances: Parent	112	0.53	0.50	0.00	1.00
Recipient of remittances: Other	112	0.16	0.37	0.00	1.00

Source: Author's calculations
Note: 1 – The average JPY-USD exchange rate for 2020 was 106.8 (https://data.imf.org/regular.aspx?key=61545850 accessed on 05/15/2023).
JPY: Japanese Yen, USD: United States Dollar

The summary statistics show that the majority of the survey respondents were women (55 percent) aged 18-34 years (67 percent), unmarried (54 percent), fluent in Japanese (51 percent), holding tertiary education (63 percent), working full-time (87 percent), earning a monthly income of 250-350,000 yen (44 percent), and living in the Kanto[3] region (87 percent). Almost 90 percent of the migrants send monetary remittances to their family members in Mongolia. As most migrants are not married, the recipients of remittances in Mongolia are often their parents. On average, migrants send 1.3 million yen to their families per year.

3.Empirical strategy

The empirical analysis in this study consists of two parts. First, I analyze the determinants of Mongolian migrants' financial literacy in Japan based on the financial literacy scores constructed. Second, I analyze how financial literacy affects migrants' remittance behavior, which is measured by two aspects of the remittance decision process: (1)

[3] Kanto region is the most urban and developed region in Japan and includes Gunma, Tochigi, Ibaraki, Saitama, Tokyo, Chiba, and Kanagawa prefectures. However, there were no survey participants from Gunma prefecture in this study.

whether to send money and (2) how much money to send.

3.1 Determinant of financial literacy

The baseline model used to estimate the determinants of financial literacy and its components is as follows:

$$y_i = \beta_0 + \sum_{j=1}^{9} \beta_j x_{ij} + \varepsilon_i \quad (1)$$

where the dependent variable, y_i is a financial literacy score (alternatively takes financial knowledge, behavior, attitude, and overall scores) measured in proportion (i.e $0 \leq y_i \leq 1$) for an individual *i*, and is to be explained by *j* number of independent variables x_i. There are nine independent variables: age, gender, marital status, monthly income, educational level, employment status, Japanese-language proficiency level, time of arrival in Japan, and residence in the Kanto region. These variables have been selected based on previous research, highlighting the significance of individual attributes and life experiences in shaping an individual's financial literacy. Proficiency in the host country's language and familiarity with its financial system are essential for migrants to comprehend financial concepts, access financial services, and manage their finances effectively. Moreover, the place of residence may be associated with exposure to a variety of financial products and services, as well as opportunities for education and employment, which can influence an individual's level of financial literacy. All independent variables are categorical because the online survey included only multiple-selection-type questions to reduce data entry mistakes and respondent "fatigue." Lastly, β_j are parameters to be estimated and ε_i is an idiosyncratic error term.

Baseline model (1) is estimated using a simple ordinary least squares (OLS) regression method. However, the bounded nature of the dependent variable and the possibility of observing values at the boundaries make the estimation results of OLS regressions questionable. One primary reason for this is that the effect of any independent variable cannot be constant throughout its range when the dependent variable is bounded by zero and one. The literature suggests that this problem can be addressed to some extent by augmenting the OLS regression with nonlinear functions of the independent variables. However, in the present case, all independent variables are categorical. Another major problem is that the values predicted from the OLS regression cannot be guaranteed to fall between 0 and 1. This problem is analogous to the drawbacks of linear probability models with binary dependent variables.

Therefore, I apply a quasi-maximum likelihood estimator (QMLE) or a generalized linear model in which the dependent variable is Bernoulli distributed. This method was introduced by Papke and Wooldridge (1996). QMLE estimation is attractive because it appropriately considers the boundary values of the dependent variable without additional adjustments, and the conditional expectations of the dependent variables can be estimated directly. The QMLE model used in this study has the following form:

$$E(y_i|x_i) = f\left(\beta_0 + \sum_{j=1}^{9} \beta_j x_{ij}\right) \quad (2)$$

where $f(\cdot)$ is a logistic function, $\frac{e^{x_i\beta}}{1+e^{x_i\beta}}$. All other variables are measured as previously described.

3.2 Effects of financial literacy on remittances

Remittance behaviors of Mongolian migrants in Japan are measured by two types of variables in this study: a binary variable that indicates whether the migrant sends remittances and a continuous variable for the value of remittances. Financial literacy could be endogenous in remittance behavior and reverse causality may be at work. For example, migrants who want to remit money back home are more likely to search for information on possible low-cost and safe remittance modes. There may be unobserved factors that affect both remittances and financial literacy. Therefore, I first test the endogeneity of the financial literacy variables using the Durbin-Wu-Hausman (DWH) test. Details of the test results are provided in the Appendix. The DWH test fails to reject the null hypothesis of exogeneity or that the OLS estimates are consistent. Hence, I apply the following OLS model to the continuous remittance variable or the monetary value of remittances sent:

$$\ln(remit_i) = \alpha_0 + \alpha_1 FL_i + \sum_{k=2}^{12} \alpha_k z_{ik} + \epsilon_i \quad (3)$$

where $remit_i$ is the monetary value of remittances sent by migrant *i*, and FL_i is the financial literacy score, which is alternatively the financial knowledge, behavior, attitude, and overall score. There are nine other explanatory variables: z_{ik}: age, sex, marital status, household size in Japan, monthly income, education, employment status, Japanese language proficiency, date of arrival in Japan, residence in Japan, recipient in Mongolia, and household income in Mongolia. ϵ_i the idiosyncratic error term.

For the remittance decision or the binary remittance variable, the following probit model

is estimated:

$$P(rem_i|x) = \Phi\left(\gamma_0 + \gamma_1 FL_i + \sum_{k=2}^{8} \gamma_k z_{ik}\right) \quad (4)$$

where $\Phi(\cdot)$ is the standard normal cumulative distribution function and rem_i is a binary variable for sending remittances, and x is a vector of independent variables including FL_i and z_{ik}. Here z_{ik} include age, sex, recipient, employment status, Japanese proficiency, date of arrival in Japan, and whether living in the Kanto region.

4.Results

This section presents the estimation results obtained using the data and methods described in Sections 2 and 3.

4.1 Determinants of financial literacy

Table 2 shows the OLS regression results for the financial literacy components. The results show that income, education level, and Japanese language proficiency are likely to increase financial literacy and its component scores, whereas living in the Kanto region tends to decrease them. Monthly income level is an important determinant of financial knowledge. Compared to migrants who earn less than 200,000 yen per month, those who earn 200-250,000 yen have financial knowledge scores 0.261 percentage points higher, and those who earn more than 350,000 yen have 0.333 percentage points higher. Japanese language proficiency is an important determinant of financial behavior. Migrants with intermediate and fluent Japanese have about 0.11 percentage points higher financial behavior scores. Financial attitudes tend to improve with higher educational levels. Compared with migrants with secondary or vocational training education, those with tertiary education have a 0.049 percentage point higher financial attitude score. Monthly income and Japanese language proficiency are positively correlated with overall financial literacy, whereas living in the Kanto region is negatively associated with it. Migrants who earn 350,000 yen per month have 0.097 percentage points higher overall financial literacy scores than those who earn less than 200,000 yen per month. Migrants who speak fluent Japanese have financial literacy scores 0.073 percentage points higher than those with elementary or lower proficiency.

While the results that higher income and educational attainment are associated with higher levels of financial literacy is in line with the existing literature including Lusardi and Mitchell (2011) and Mouna and Anis (2017), the effect of living in Kanto region is not clear as a priori. As an urban region, living in Kanto region may provide more

exposure to financial institutions, educational resources, and diverse financial products and services. At the same time, urban areas tend to have a higher cost of living, which can lead to financial pressures and potentially impact financial decision-making. Ultimately, the impact of living in an urban area on financial literacy will depend on the specific circumstances, opportunities, and resources available in that urban setting.

As for the effect of proficiency in the host country language on financial literacy, the literature does not provide much evidence as it has not been studied extensively. Some evidence (Carlsson, Eriksson, and Rooth 2023) suggests that immigrants who are proficient in the host country's language are more likely to have better and higher paying job prospects in the host country. Similarly, it could be predicted that proficiency in the host country's language is crucial for understanding financial concepts, accessing financial services, and effectively managing financial matters.

Table 2: OLS results for determinants of financial literacy and its components

	(1) Financial knowledge	(2) Financial behavior	(3) Financial attitude	(4) Financial literacy
35 years and older	0.056	-0.024	-0.000	0.008
	(0.047)	(0.039)	(0.027)	(0.024)
Female	0.004	-0.002	-0.034	-0.007
	(0.049)	(0.030)	(0.024)	(0.024)
Married	-0.056	-0.016	0.030	-0.019
	(0.045)	(0.033)	(0.021)	(0.023)
Monthly income 200,000–250,000 yen[1]	0.261*	-0.030	0.014	0.078
	(0.144)	(0.078)	(0.063)	(0.051)
Monthly income 250,000–350,000 yen	0.284	0.008	-0.033	0.090
	(0.179)	(0.080)	(0.060)	(0.056)
Monthly income 350,000+ yen	0.333**	-0.028	-0.009	0.097*
	(0.167)	(0.091)	(0.093)	(0.056)
With tertiary education	-0.033	-0.027	0.049*	-0.011
	(0.051)	(0.049)	(0.026)	(0.033)
Employed full-time	-0.112	0.038	-0.003	-0.022
	(0.132)	(0.082)	(0.058)	(0.065)
Employed part-time	-0.116	0.018	-0.027	-0.037
	(0.163)	(0.085)	(0.079)	(0.082)
With intermediate Japanese	0.002	0.114*	-0.005	0.048
	(0.044)	(0.066)	(0.040)	(0.032)
With fluent Japanese	0.075	0.108*	0.004	0.073**
	(0.066)	(0.058)	(0.050)	(0.032)
Arrived between 2011 and 2013	0.024	0.018	-0.000	0.016
	(0.021)	(0.026)	(0.015)	(0.013)
Arrived between 2014 and 2016	0.006	-0.006	-0.012	-0.003
	(0.032)	(0.027)	(0.017)	(0.018)
Arrived in 2017 or after	0.063	-0.107	-0.018	-0.029
	(0.150)	(0.077)	(0.075)	(0.055)
Lives in Kanto	-0.015	-0.055**	-0.008	-0.030*
	(0.033)	(0.023)	(0.018)	(0.016)
Constant	0.577***	0.836***	0.754***	0.730***
	(0.199)	(0.127)	(0.093)	(0.091)
Observations	112	112	112	112
R-squared	0.333	0.457	0.191	0.479
RESET	0.51	6.29	3.44	1.55
p-value	0.6757	0.0006	0.0201	0.207

Notes: Robust standard errors are shown in parentheses. *** p<0.01, ** p<0.05, * p<0.1
Note: 1 – The average JPY-USD exchange rate for 2020 was 106.8 (https://data.imf.org/regular.aspx?key=61545850 accessed on 05/15/2023).
JPY: Japanese Yen, USD: United States Dollar
Source: Author's estimations

The fit of the linear model can be checked by computing Ramsey's RESET test (Ramsey, 1969). The null hypothesis is that Model (1) is correctly specified, and the significant

RESET test implies that Model (1) misses potential nonlinearities. The RESET test rejects model (1) for financial behavior and attitude but fails to reject it for financial knowledge and overall financial literacy.

Next, Model (2) is estimated, and the estimated results are presented in Table 3.

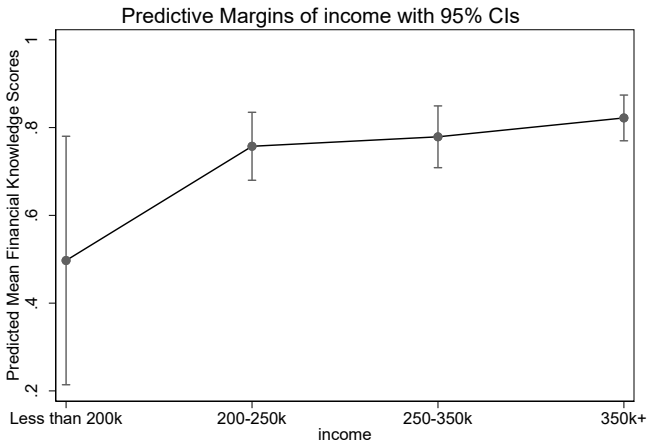
Table 3: QMLE estimation results for determinants of financial literacy

	(1) Financial knowledge	(2) Financial behavior	(3) Financia l attitude	(4) Financial literacy
35 years and older	0.300	-0.145	0.003	0.065
	(0.215)	(0.326)	(0.145)	(0.137)
Female	0.020	0.058	-0.182	-0.047
	(0.214)	(0.257)	(0.124)	(0.128)
Married	-0.294	-0.210	0.159	-0.115
	(0.210)	(0.342)	(0.108)	(0.135)
Monthly income 200,000–250,000 yen[1]	1.163*	-0.134	0.075	0.407
	(0.633)	(0.466)	(0.319)	(0.251)
Monthly income 250,000–350,000 yen	1.286*	0.387	-0.184	0.513*
	(0.762)	(0.560)	(0.307)	(0.274)
Monthly income 350,000+ yen	1.558**	-0.162	-0.036	0.529*
	(0.712)	(0.666)	(0.510)	(0.278)
With tertiary education	-0.157	-0.248	0.260**	-0.061
	(0.239)	(0.464)	(0.129)	(0.191)
Employed full-time	-0.467	0.047	-0.020	-0.134
	(0.513)	(0.403)	(0.292)	(0.281)
Employed part-time	-0.456	0.124	-0.147	-0.175
	(0.652)	(0.424)	(0.390)	(0.357)
With intermediate Japanese	-0.010	0.830*	-0.030	0.242
	(0.198)	(0.453)	(0.199)	(0.156)
With fluent Japanese	0.372	0.706*	0.031	0.392**
	(0.292)	(0.370)	(0.253)	(0.158)
Arrived between 2011 and 2013	0.125	0.194	-0.004	0.106
	(0.104)	(0.352)	(0.078)	(0.084)
Arrived between 2014 and 2016	0.042	-0.059	-0.066	-0.016
	(0.158)	(0.327)	(0.089)	(0.110)
Arrived in 2017 or after	0.292	-0.741	-0.099	-0.173
	(0.680)	(0.553)	(0.380)	(0.278)
Lives in Kanto	-0.072	-0.528**	-0.044	-0.187**
	(0.160)	(0.208)	(0.089)	(0.087)
Constant	0.294	2.038***	1.135**	1.074**
	(0.868)	(0.765)	(0.474)	(0.427)
Observations	112	112	112	112
RESET	0.74	1.77	1.19	0.76
p-value	0.3898	0.1835	0.2756	0.3848

Notes: Robust standard errors are shown in parentheses. *** p<0.01, ** p<0.05, * p<0.1
Note: 1 – The average JPY-USD exchange rate for 2020 was 106.8 (https://data.imf.org/regular.aspx?key=61545850 accessed on 05/15/2023).
JPY: Japanese Yen, USD: United States Dollar
Source: Author's estimation

The directions of the effects are the same as those in the linear models. Higher monthly income, Japanese proficiency, and tertiary education increase financial literacy scores, whereas living in the Kanto region is negatively related to financial literacy. The RESET test results do not show any misspecifications in any of the four equations listed in Table 3. As the result of the RESET test is more consistent, my preferred model is therefore, QMLE estimation. To interpret the estimated results in Table 3, I compute the marginal effects of the predicted mean financial literacy scores and plot them for the independent variables found to be significant in the QMLE estimations.

Figure 3: Predicted mean financial knowledge scores by income level



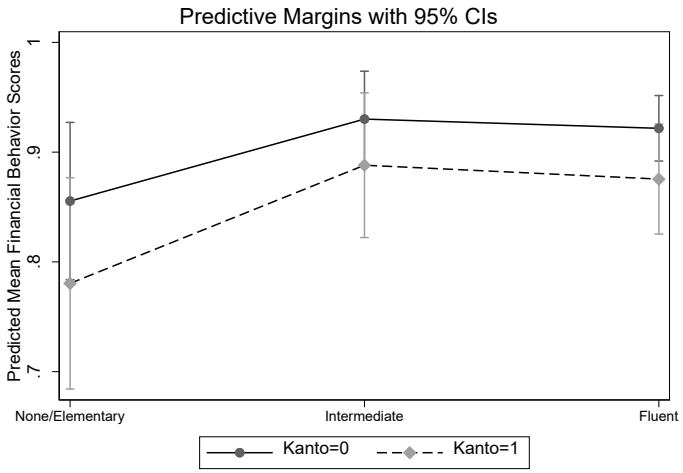
Source: Author's estimations

Figure 3 shows the marginal effects of the predicted mean financial knowledge score on the income level. The results show that the predicted mean financial knowledge score for migrants with a monthly income of less than 200,000 yen is approximately 50 percent. Increasing monthly income to 250,000 yen increases the financial knowledge score by 26 percentage points, which is a substantial increase. Once migrants reach a monthly income of at least 200,000 yen, the effect of income on their financial knowledge score becomes more gradual. Migrants who earn a monthly income between 250,000 and 350,000 yen account for 78%, and those earning more than 350,000 yen per month have a financial knowledge score of 82%. All predicted mean values of financial knowledge are highly statistically significant.

The predicted mean values for the financial behavior scores by Japanese language proficiency are plotted based on whether they live in the Kanto region in Figure 4. Moving from elementary to intermediate Japanese markedly improves migrants' financial

behavior. If living in the Kanto region, improving one's Japanese language proficiency from elementary to intermediate increases their financial behavior score by 11 percentage points (from 78% to 89%). Living outside Kanto increases the financial behavior score by approximately 8 percent. However, improving one's Japanese proficiency from intermediate to fluent is not associated with a further increase in financial behavior scores.

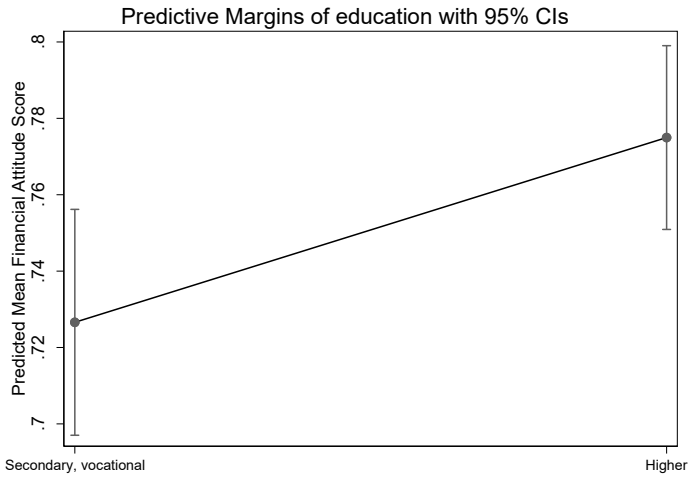
Figure 4: Predicted mean financial behavior scores by Japanese language proficiency



Source: Author's estimations

Figure 5 shows the predicted mean financial attitude scores based on the migrants' educational achievements. Holding a tertiary education increases migrants' financial attitude scores by approximately five percentage points.

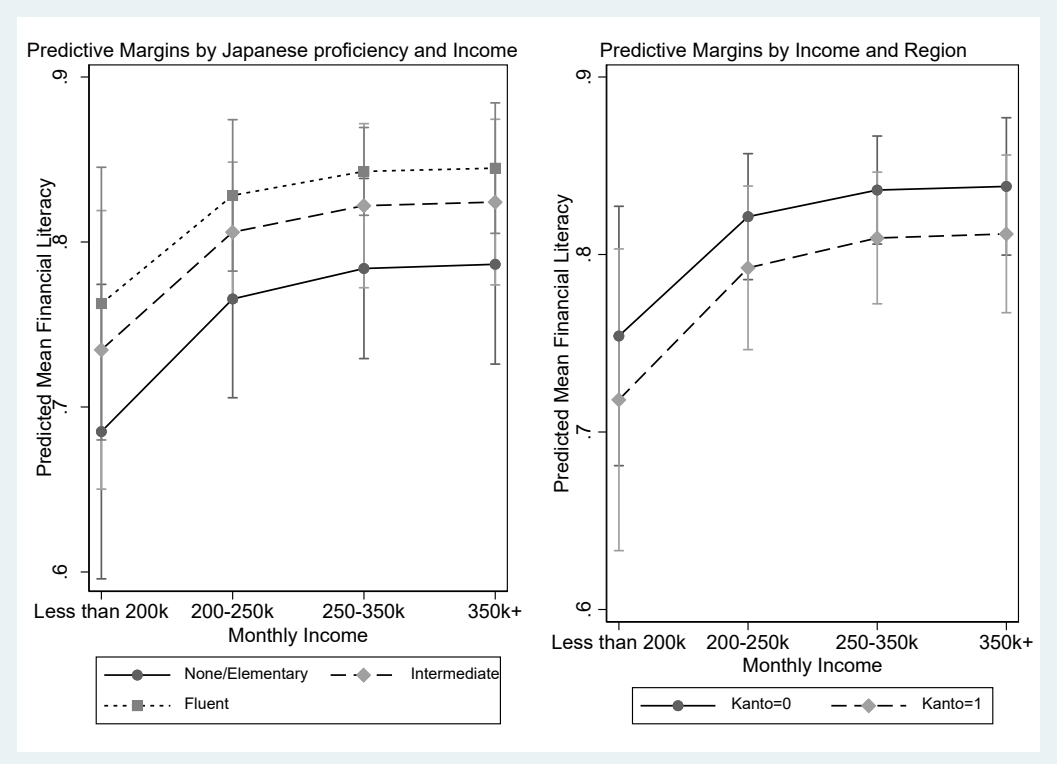
Figure 5: Predicted mean financial attitude score by education



Source: Author's estimations

In Figure 6, the mean predicted financial literacy scores are plotted by income, Japanese proficiency, and whether they live in the Kanto region. The predicted mean scores are all highly statistically significant, indicating that higher Japanese language proficiency and income are associated with higher overall financial literacy scores, whereas living in the Kanto region is negatively correlated. The effect on financial literacy is larger for moving from elementary to intermediate Japanese and from a monthly income of less than 200,000 yen to up to 250,000 yen. The gap between the financial literacy scores of migrants who have elementary Japanese education and earn less than 200,000 yen monthly and those who speak fluent Japanese and earn more than 350,000 yen monthly is 16 percentage points. Advancing from elementary to intermediate Japanese and earning less than 200,000 yen to 250,000 yen monthly increases migrants' financial literacy scores by approximately 12 percentage points. Once migrants reach intermediate Japanese and earn more than 200,000 yen, the improvement in financial literacy is moderate, indicating at least intermediate Japanese is necessary for migrants to integrate into the Japanese financial markets and act in a financially literate way.

Figure 6: Predicted mean financial literacy scores



Source: Author's estimations

4.2 Effects of financial literacy on remittances

Table 4 shows the estimation results of Equation (3) for the relationship between financial literacy and remittance amount sent.

Table 4: Financial literacy and remittance amount sent

	(1)	(2)	(3)	(4)
Financial knowledge	0.623			
	(0.610)			
Financial behavior		-0.548		
		(0.603)		
Financial attitude			-3.728*	
			(2.117)	
Financial literacy				-0.865
				(1.141)
35 years and older	-0.162	-0.197	-0.006	-0.183
	(0.187)	(0.190)	(0.147)	(0.194)
Female	-0.415	-0.405	-0.404*	-0.406
	(0.251)	(0.255)	(0.227)	(0.253)
Household size in Japan	0.097	0.079	0.143*	0.073
	(0.076)	(0.071)	(0.077)	(0.072)
Monthly income 200,000–250,000 yen[1]	0.164	0.347	0.719	0.510
	(0.609)	(0.827)	(0.596)	(0.738)
Monthly income 250,000–350,000 yen	0.267	0.496	0.849	0.680
	(0.588)	(0.821)	(0.590)	(0.722)
Monthly income 350,000+ yen	-0.104	0.116	0.571	0.323
	(0.745)	(0.973)	(0.873)	(0.858)
Tertiary education	-0.215	-0.263	-0.215	-0.277*
	(0.154)	(0.163)	(0.149)	(0.163)
Employed full-time	1.030	1.097**	1.331**	1.080**
	(0.648)	(0.529)	(0.531)	(0.531)
Employed part-time	1.103*	1.193**	1.402**	1.186**
	(0.646)	(0.533)	(0.553)	(0.539)
Intermediate Japanese	-0.538*	-0.475*	-0.473**	-0.478*
	(0.299)	(0.284)	(0.218)	(0.281)
Fluent Japanese	-0.337	-0.257	-0.186	-0.258
	(0.371)	(0.367)	(0.285)	(0.360)
Arrived between 2011 and 2013	0.134	0.161	0.111	0.170
	(0.117)	(0.121)	(0.125)	(0.121)
Arrived between 2014 and 2016	0.300**	0.319**	0.221	0.327**
	(0.148)	(0.147)	(0.154)	(0.147)
Arrived in 2017 or after	-0.139	-0.096	0.263	0.034
	(0.743)	(0.939)	(0.630)	(0.866)
Kanto	0.146	0.111	0.066	0.109
	(0.123)	(0.123)	(0.102)	(0.116)
Recipient: Parent	-0.285**	-0.321**	-0.286**	-0.318**
	(0.129)	(0.142)	(0.128)	(0.139)
Recipient: Other	-0.229	-0.284	-0.306	-0.248
	(0.613)	(0.614)	(0.463)	(0.612)
Household income in MN: 4-5 million MNT[2]	0.716***	0.718***	0.567***	0.726***
	(0.164)	(0.170)	(0.158)	(0.164)
Household income in MN: 5 million + MNT	0.487***	0.528***	0.525***	0.551***
	(0.165)	(0.159)	(0.195)	(0.167)
Constant	5.634***	6.335***	7.900***	6.381***
	(1.162)	(1.279)	(1.522)	(1.499)
Observations	100	100	100	100
R-squared	0.586	0.586	0.647	0.585

Notes: Robust standard errors are shown in parentheses. *** p<0.01, ** p<0.05, * p<0.1.
1 – The average JPY-USD exchange rate for 2020 was 106.8 (https://data.imf.org/regular.aspx?key=61545850 accessed on 05/15/2023).
2 – The average MNT/USD exchange rate for 2020 was 2813.29 (https://data.imf.org/regular.aspx?key=61545850 accessed 05/15/2023)
JPY: Japanese Yen, USD: United States Dollar, MNT: Mongolian Tugrik, MN: Mongolia
Source: Author's estimations

The results show that overall financial literacy does not significantly affect the decision to remit, or the amount remitted. By its components, financial attitude appears to have a negative effect on remitted amounts. Because the financial attitude score is measured as the fraction bound between zero and one, a 1% increase in the financial attitude score decreases the monetary value of the remittances sent by 3.7%. This result could indicate that remittances are likely to be spent on short-term consumption rather than longer-term savings and investment, because migrants who have long-term attitudes towards finance remit less.

The other components of financial literacy are found to be insignificant determinants of the amounts sent. Rather, other characteristics of migrants and their family members in Mongolia—including gender, household size in Japan, education, employment, Japanese proficiency, relationship with the recipient of remittances, and household income in Mongolia—are important determinants of the amount of remittances sent.

On average, women send 33% less[4] than men do. If the household size in Japan increased by one person, the amount sent increased by 14.3%. As the majority of Mongolian migrants in Japan are young and single, household members in Japan often consist of siblings and relatives rather than married couples. This implies that remittances increase as the number of migrants from the same household increases. The migrants with tertiary education send 24% less than those with secondary and vocational training education. This may indicate that those with tertiary education are more likely to study rather than work. Employment has a significantly positive effect on remittances. If a migrant is employed full-time or part-time, it increases the amount sent by 1.1-3.0 times to that sent by those who are not working. The length of stay in Japan appears to have an inverse U-shaped relationship with remittances sent. Migrants who arrived in Japan between 2014 and 2016 send up to 38% more remittances than those who arrived before 2011. As migrants stay in Japan for a longer period, their relationships with their original households are likely to be looser than those of newly arrived migrants, who, on the other hand, are not yet accustomed to the financial systems and remitting process at the destination.

The relationship with the remittance receiver in Mongolia appears to be an important determinant of the remittances sent. If a migrant is married and sends remittances to his/her spouse, the amount is, on average, larger than the amount sent to any other person in Mongolia. For example, the parents of migrants receive about 24-27% lower

[4] Partial effects are calculated as $g = (e^{\alpha} - 1)$ for binary and categorical explanatory variables.

remittances than the amount sent to their spouses. Monthly household income in Mongolia is likely to have a nonlinear effect on the amount of remittances sent. Migrants whose Mongolian household monthly income is less than 4 million MNT send the lowest amount, whereas those with a household income of 4-5 million MNT send the largest amount. As the household income increases to more than 5 million MNT per month, the amount sent drops again.

Table 5 presents the estimation results of the probit model for the decision to remit. Consistent with the results in Table 4, overall financial literacy does not appear to have a statistically significant effect on the decision to send remittances. Through its components, the financial attitude score reduces the probability of sending remittances. This is consistent with the results on the remittance amount sent and could indicate that the remittances are sent for immediate consumption rather than for long-term savings or investment. All other financial literacy components have statistically insignificant effects.

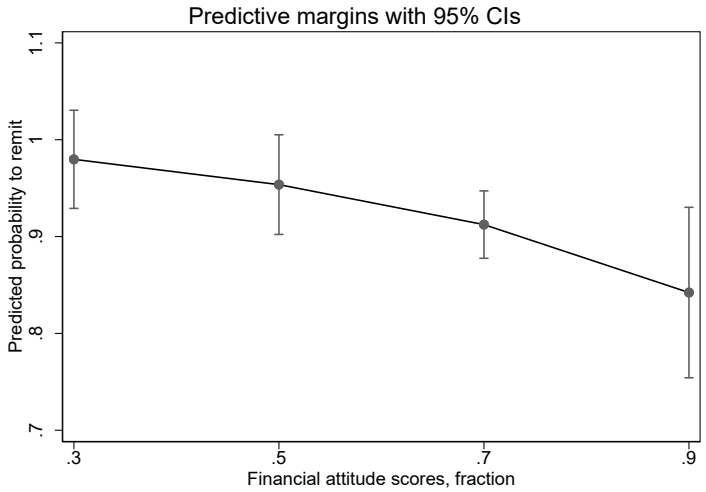
Table 5: Financial literacy and decision to remit

	(1)	(2)	(3)	(4)
Financial knowledge	-0.316			
	(0.999)			
Financial behavior		-0.216		
		(1.890)		
Financial attitude			-3.770*	
			(2.118)	
Financial literacy				-1.938
				(2.226)
35 years and older	-0.416	-0.486	-0.579	-0.437
	(0.457)	(0.437)	(0.444)	(0.479)
Female	-0.293	-0.299	-0.168	-0.233
	(0.632)	(0.578)	(0.651)	(0.599)
Recipient: Spouse	0.824	0.874	0.908	0.911
	(0.710)	(0.714)	(0.744)	(0.757)
Recipient: Parent	1.365**	1.350**	1.206*	1.423**
	(0.638)	(0.686)	(0.702)	(0.672)
Employed full-time	1.452***	1.429***	1.609***	1.520***
	(0.512)	(0.504)	(0.470)	(0.500)
Intermediate Japanese	0.063	0.115	0.066	0.256
	(0.774)	(0.765)	(0.701)	(0.750)
Fluent Japanese	-0.718	-0.709	-0.704	-0.556
	(0.620)	(0.658)	(0.681)	(0.629)
Arrived in 2017 or after	-0.675	-0.662	-0.789*	-0.740
	(0.543)	(0.528)	(0.466)	(0.565)
Kanto	-0.722*	-0.736*	-0.796*	-0.821*
	(0.406)	(0.429)	(0.423)	(0.448)
Constant	0.885	0.863	3.574**	1.990
	(0.892)	(1.766)	(1.756)	(1.832)
Observations	112	112	112	112

Note: Robust standard errors are shown in parentheses. *** p<0.01, ** p<0.05, * p<0.1.
Source: Author's estimations

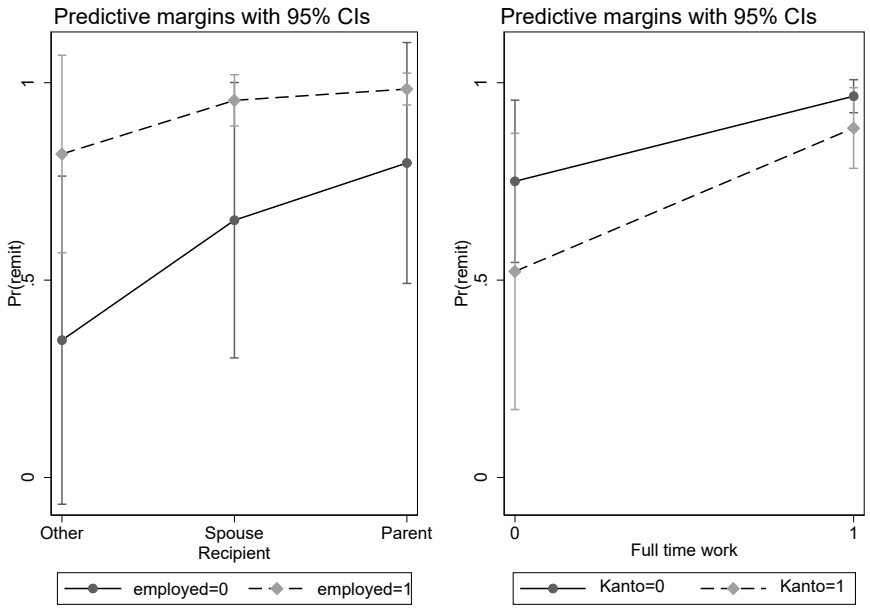
To interpret the estimation results of the probit model, I computed the marginal effects and plotted them in Figures 7 and 8 for the statistically significant explanatory variables in Table 5. Figure 7 plots the predicted probability of sending remittances based on the financial attitude scores. The results show that the predicted probability of sending remittances is 95% if a migrant's financial attitude score is 50%. As the financial attitude score increased to 90%, the predicted probability of sending remittances decreased to 84%.

Figure 7: Predicted probability to remit by financial attitude scores



Source: Author's estimations

Figure 8: Predicted probability to remit by some indicators



Source: Author's estimations

Other indicators relevant to the decision to remit are the relationship with the recipient, employment, and place of residence in Japan. Figure 8 shows the probability of sending remittances predicted using these indicators. Employment appears to be an important determinant of the decision to send remittances. Depending on their relationship with the

recipient, migrants are 19-47% more likely to send remittances if they are employed. Mongolian parents are the most likely to receive remittances. This may be related to the characteristics of the migrant population in Japan, as the majority are young and unmarried. If employed, there is almost no difference in the probability of sending remittances to a spouse or parents. Living in the Kanto region reduces the predicted probability of sending remittances by 8-23% points, depending on whether the migrant is employed. As discussed before, the place of residence may be associated with various aspects of individual's financial literacy, including exposure to financial products and services, and educational and job opportunities. Literature shows that the level of financial literacy tends to be higher because of higher opportunities for formal education, and access to higher paying jobs. At the same time, living in urban area may present challenges that can affect financial literacy. For example, urban areas might have higher living costs and greater exposure to consumerism, which can lead to financial pressures and potentially impact financial decision-making. Moreover, urban areas may also have more complex financial systems and a wider range of financial products and services, which can require individuals to have a higher level of financial knowledge and understanding. There are no apparent reasons why living in the Kanto region reduces the probability of remittances and the amounts sent. One could think that this may be related to the higher cost of living in the region or more entertainment and amusement available for migrants.

5.Discussion and Conclusion

This study relates to two strands of the literature: determinants of financial literacy and determinants of remittances. In terms of financial literacy, the current study is the first to adapt the OECD/INFE financial literacy survey in the context of migrants at a destination country. Although my results are not representative of the entire Mongolian immigrant population in Japan, they reveal that migrants are highly financially literate. The overall financial literacy score for migrants is 16 and that for families staying behind is 17, which is higher than the average for OECD countries and developing countries that have data in OECD/INFE (2020). This indicates that migrants and their families are generally financially savvy.

The results show that income and Japanese language proficiency are the two most important factors determining migrants' overall financial literacy. Different factors play important roles in financial literacy. Income is an important determinant of financial knowledge, whereas Japanese language proficiency is important for financial behavior. Education is a key determinant of financial attitude. These results are consistent with

those of Lusardi and Mitchel (2014) and Morgan and Trinh (2019; 2020). However, some differences from the existing literature include the fact that age, gender, and marital status were not significant factors in determining financial literacy. This could be because migrants are young and unmarried and there are not much variations in the data for these variables. Existing studies generally find that women are less financially literate than men. The survey results are consistent with the existing findings. However, when formally testing whether gender is a determinant of financial literacy, the analysis yields insignificant results, which may indicate that there are no gender differences in migrants' financial literacy.

The second strand of the literature relates to the determinants and motives for sending international remittances. Existing studies suggest several motives for migrants to send remittances, including pure altruism, insurance, bequest motives, loan repayments, and exchange motives (Hagen-Zanker and Siegel 2007). Sometimes, these motives are difficult to dismantle from one another. This analysis can be used to test some of these motivations. For example, in the literature, the altruism motive is measured by examining the effect of higher migrant income on the remittance decision or amount remitted. My results do not suggest altruism motives among Mongolian migrants, as a higher migrant income is not associated with larger remittances or a higher probability of remittances. Although the results do not show that higher migrant income increases remittances, employment – an indicator closely related to the migrant income is one of the key determinants of the decision to remit and the amount remitted. This could imply that migrants remit for predetermined agreement with their families staying behind, including loan repayment, repaying the cost of migration, and child care (Rapoport and Docquier 2006; Cox, Eser, and Jimenez 1998; Poirine 1997). In contrast, I find that household income in Mongolia increases both the amount remitted and the probability of remitting, suggesting a strategic behavior or bequest motive. The strategic motive of remittances were extensively covered in Holst and Schrooten (2006) and Stark and Wang (2002)

The effect of financial literacy on remittances has not been studied extensively. The only exception is Gibson et al. (2014), who find that financial literacy has no significant effect on remittances. My results are consistent with their results and show that overall financial literacy does not significantly affect remittance decisions or the amount remitted. However, financial attitudes are found to be negatively related to remittances. This result may indicate that remittances are often sent or used for short-term consumption, and not for long-term financial aspirations.

While this study makes a valuable contribution to the existing literature on the financial literacy of international migrants abroad, it is not without limitations. Firstly, it should be noted that this study focuses on a specific minority migrant group in Japan, and therefore, the findings may not be fully representative of the entire target population. Due to the absence of a sampling frame for this highly mobile population, conducting repeated non-representative studies may provide some insights. Secondly, it is important to highlight that the results of this study do not establish causal relationships or causal impacts. However, it is worth noting that endogeneity is not likely to be a cause for concern in this study. The identification and endogeneity tests suggest that endogeneity and misidentification are not a significant issue in the analysis.

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Appendix

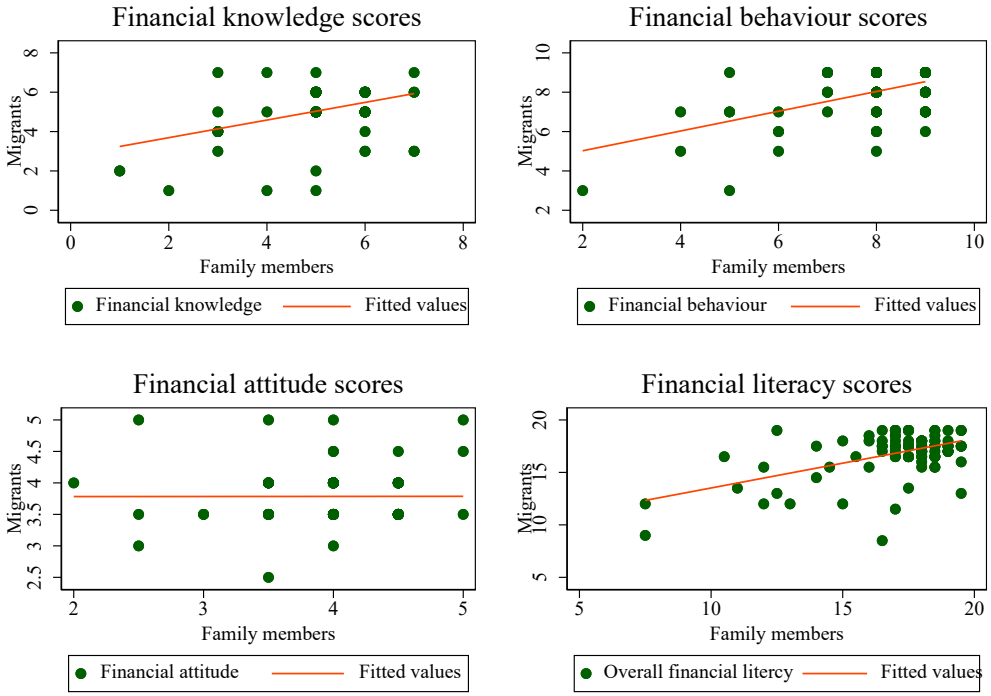
This appendix explains the Durbin-Wu-Hausman test procedure used to test the endogeneity of the financial literacy variables. Let us assume that financial literacy is endogenous, and the following simultaneous equation model is appropriate for correctly addressing endogeneity.

$$remit_i = \alpha_0 + \alpha_1 FL_i + \sum_{k=2}^{9} \alpha_k z_{ik} + \epsilon_i \quad \text{(A1)}$$

$$FL_i = \delta_0 + \sum_{k=2}^{9} \delta_k z_{ik} + \delta_{10} FL\_mon_i + \varepsilon_i \quad \text{(A2)}$$

where FL_mon_i is the financial literacy score of the migrant household members staying in Mongolia (alternatively, taking the overall knowledge, behavior, and attitude scores). All other variables are described in Equation (3). By including FL_mon_i in equation (A2), I use it as an instrument for the migrant's financial literacy score and assume that it affects remittances only through its effect on the financial literacy of the migrants.

Figure A.1: The relationship between financial literacy scores of migrants and their family members



Source: Author's estimations

Figure A.1 shows the relationship between the financial literacy scores of migrants and their families, indicating that household members' financial literacy can be a good instrument. The relationships are generally positive, except for the financial attitude scores, where migrants' financial attitudes do not change much as family members' scores increase. Therefore, the financial knowledge, financial behavior, and overall financial literacy scores of family members can be instrumental variables for migrant scores.

In order to test the endogeneity of the financial literacy scores, I estimated equation (A2) using the OLS estimates and obtain the residuals $\widehat{\varepsilon_i}$. Next, I estimated the following augmented regression of type:

$$remit_i = \alpha_0 + \alpha_1 FL_i + \sum_{k=2}^{9} \alpha_k z_{ik} + \alpha_{10}\widehat{\varepsilon_i} + \epsilon_i \qquad \text{(A3)}$$

Then, the null hypothesis of exogeneity or $H_0: \alpha_{10} = 0$ is tested against $H_1: \alpha_{10} \neq 0$. If the null hypothesis is rejected, the ordinary least squares (OLS) is not consistent, and the endogeneity of the FL_i should be addressed.

Table A. 1: Durbin-Wu-Hausman test results for endogeneity of financial literacy

	Knowledge	Behavior	Attitude	Overall
α_{10}	1.609	-10.762	-3.180	-27.626
$\chi^2(1)$	0.06	2.52	0.11	0.81
$Prob > \chi^2$	0.805	0.112	0.738	0.366

Source: Author's estimations

The results in Table A.1 show that, for all financial literacy variables, the test fails to reject the null hypothesis. Therefore, it can be concluded that the OLS estimates are consistent.

Abstract (in Japanese)

要　約

本論文では、在日モンゴル人移民における金融リテラシーの決定要因とその送金への影響について考察した。在日モンゴル人移民とその出身家族を対象とした調査により、移民の金融リテラシーを 3 つの能力（金融知識、金融行動、金融態度）の組み合わせで測定した。金融リテラシーの主な決定要因は、収入、日本語能力、教育レベルであることがわかった。しかし、全体的な金融リテラシーは、送金の意思決定および送金額には影響しないようである。むしろ、金融態度のスコアが高い移民ほど、送金をする可能性が低い。この結果は、送金が短期的な消費のために送られたり使われたりすることが多く、長期的な家計目標のために使用されているわけではないことを示唆しているのかもしれない。

キーワード：金融リテラシー、移民、送金