

Environmental Migration and Labor Market

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I. Why Environmental Migration?

Migration has long been recognized as a major consequence of climate and environmental change. While natural disasters such as earthquakes, tsunamis, volcanic eruptions, and landslides have traditionally led to temporary and permanent population displacement, the effects of slow-onset changes induced by climate change are becoming increasingly apparent. These changes include rising sea levels, droughts, floods, reduced agricultural yields, conflicts, and the spread of infectious diseases, all of which contribute to both intra- and inter-continental migration patterns.

Environmental migration,¹ triggered by diverse factors, brings about large shifts in the social, labor, and industrial structures of sending and receiving countries. Particularly, labor

migration has multiple impacts on host countries, affecting wages, employment rates, production costs, commodity prices, and business cycle fluctuations. Additionally, changes in migrant labor supply and wages have a direct bearing on the process of industrial restructuring. Notably, climate change leads to migration flows predominantly from industries like agriculture, amplifying the impact on these specific sectors.

The purpose of this report is to present the findings of Jang et al. (2022), who conducted a comprehensive study of the regional patterns of environmental migration and the potential labor market implications of these migration behaviors. Although Korea presently remains unaffected by environmental migration, it is

¹ Environmental migration refers to “the movement of persons or groups of persons who, predominantly for reasons of sudden or progressive changes in the environment that adversely affect their lives or living condi-

tions, are forced to leave their places of habitual residence, or choose to do so, either temporarily or permanently, and who move within or outside their country of origin or habitual residence.” (IOM, 2019)

expected to experience an influx of climate migrants in the near future. This projection is based on the fact that migrants from Southeast Asian and South Asian countries, which are increasingly grappling with the consequences of climate and environmental changes, currently make up a substantial portion of Korea's total migrant population.

Therefore, it is crucial to investigate which countries are likely to contribute migrants and the socio-economic characteristics of these potential migrants as climate change intensifies. Such an investigation will enable the development of appropriate policies to mitigate the socio-economic impacts associated with the anticipated influx of immigrants. By proactively addressing these challenges, Korea can better prepare itself for the future dynamics of climate-induced migration and its impact on society, labor markets, and industrial sectors.

II. Previous Research

The existing literature on environmental migration can be broadly categorized into three main areas: 1) the impact of climate change on migration, 2) the impact of migration on the labor market, and 3) the impact of climate change on the labor market through the migration channel.

The relationship between environmental change, such as rising temperatures, and migration is well documented. However, the impact of environmental migration varies de-

pending on factors such as the type of environmental change, the agricultural dependence of the countries concerned, their income levels, and political stability. For instance, changes in temperature or precipitation variability can reduce agricultural productivity and trigger migration. It is challenging to distinguish these environmental migrations from migrations caused by other factors, which limits our ability to isolate the independent impact of environmental migration on labor market outcomes. Additionally, even if there is an intention to migrate due to environmental changes in the sending country, actual migration may be hindered by budgetary constraints. Climate change may also affect migration by lowering the income expectations of potential migrants, making it more difficult for them to afford the costs associated with migration and thus discouraging actual migration.

Regarding the impact of migration on the labor market in the host country, it is often observed that sectors and types of employment in which migration is concentrated experience a decline in wages and the displacement of domestic workers by foreign workers. However, positive economic effects can be enhanced if migrants possess socio-economic characteristics that align with the host country's economic structure. Studies have shown that the influx of migrants into certain occupations can reduce wages and employment rates in cities that are heavily dependent on those occupations. Nevertheless, the general consensus is that the overall negative impact of migration on the host country's labor market is likely to

be limited. If migrants are placed in industries or occupations that complement the domestic workforce, they can improve labor market conditions by increasing productivity and stimulating business expansion. Moreover, migrant inflows can address labor shortages and have a positive impact on stabilizing production costs, commodity prices, and increasing consumer welfare.

Research on the specific impact of climate change on labor markets through migration is limited. While some studies have examined the shift of labor from agriculture to non-agricultural sectors in response to climate change, less attention has been paid to the reorganization of the labor force through international migration. The difficulty lies in isolating the exclusive impact of environmental migration, as migration resulting from environmental change is not entirely separate from migration driven by changing economic and social conditions. Additionally, some migration may not take place due to financial constraints.

In sum, the existing literature provides valuable insights into the multifaceted relationship between environmental migration, climate change, and labor markets. However, further research is needed to fully understand the distinct impact of climate change on labor markets through the migration channel, taking into account the complexities involved in distinguishing environmental migration from other forms of migration and the constraints that influence migration decisions.

III. Econometric Analysis

The main objective of Jang et al. (2022) is to estimate the impact of climate and environmental change on cross-border migration through empirical analysis, taking into account the budget constraints faced by potential migrants. As discussed above, existing literature suggests that the socioeconomic characteristics of potential migrants play a crucial role in determining migration decisions and patterns. If individuals cannot afford the costs associated with migration, they are unlikely to migrate even in the presence of climate change-induced push factors, this paper examines whether budgetary constraints have differential impact on climate change migration. It also analyzes bilateral migration data to provide insights from both the receiving and sending countries, shedding light on the conditions under which outward migration is less likely to occur. In addition, the report discusses the potential variations in labor market impacts resulting from environmental migration based on these conditions.

To estimate the impact of climate and environmental change on migration, this paper employs a gravity model analysis using bilateral migration data. The dependent variable used is the bilateral migration database constructed by Abel and Cohen (2019). By examining migration behavior across income levels in sending countries, we aim to identify budget constraints, making bilateral migration data most appropriate for this analysis. Specifically, the Abel and Cohen (2019) database provides

five-yearly estimates of two-way migration flows for 200 countries from 1990 to 2020.

Key independent variables include global warming-induced increases in temperature and decreases in precipitation, which directly and indirectly affect migration. Data on annual mean temperature and mean precipitation for each country between 1901 and 2010 from the World Bank's Climate Change Knowledge Portal are used to calculate the most recent 10-year average, the temperature change over the past 100, 50, and 20 years, and the magnitude of change, measured by standard deviation, over the past 20 years. Due to the nature of analyzing incremental changes in temperature or precipitation and their impact on migration, panel analysis is considered inappropriate. Therefore, a gravity model is employed to analyze cross-sectional data, as illustrated in the equation below:

$$M_{ij} = a_0 + a_1 CC_i + a_2 CC_j + a_3 \log(GDP)_i + a_4 \log(GDP)_j + a_5 \log(POP)_i + a_6 \log(POP)_j + a_7 \log(DIST)_{ij} + X'\beta + \phi_i + v_i + \epsilon_i$$

M_{ij} is the number of migrants moving from sending country i to receiving country j between 2015 and 2020. CC , GDP , POP , and $DIST$ denote climate change-related variables, national income, population, and geographical distance, respectively. These variables are separately included to distinguish the impact of each independent variable on migration in sending and receiving countries. Control variables, denoted as X , are added to account for

economic disparity, openness, administrative differences, cultural differences, unemployment rate, economic losses due to natural disasters, and agricultural dependence.

The analysis of environmental migration by the income level of the sending countries reveals that in low-income countries, a decline in income discourages migration. Furthermore, environmental change leads to migration outflows only in low- and middle-income countries. Column (1) of Table 1 shows how the impact of temperature change on migration varies across lower-middle, upper-middle, and high-income countries, using low-income countries as a baseline for comparison. For low-income migrant-sending countries, temperature change has a negative impact on migration, suggesting that budget constraints may affect migration decisions. The magnitude and significance of the regression coefficients are larger in lower and upper middle-income countries compared to low-income countries, suggesting that temperature change influences migration more strongly in these countries. The regression coefficient for the interaction term in high-income countries shows a significant decrease in significance, suggesting that individuals in these countries are less affected by budget constraints, but have less incentives to migrate due to their higher income levels at home. This pattern remains consistent even after including mean temperature and temperature anomaly in sending and receiving countries in columns (2) and (3). Notably, higher mean temperature, temperature change, and temperature anomaly in

the receiving country exhibit a negative effect on migration, indicating the influence of climate change on migration decisions. This suggests that when potential migrants consider

migrating and subsequently select a destination, they are more likely to move to countries with more favorable climatic and environmental conditions.

Table 1. Regression Results

Dependent Variable: Bilateral migrants	(1)	(2)	(3)
Δ TEMP_Home	-0.940** (0.393)	-0.901*** (0.344)	-0.435*** (0.123)
(Δ TEMP \times LMIC)_Host	0.404* (0.244)	0.299* (0.179)	0.074 (0.188)
(Δ TEMP \times UMIC)_Host	0.716** (0.354)	0.601*** (0.208)	0.371* (0.200)
(TEMP \times HIC)_Host	0.246 (0.525)	0.152 (0.570)	0.061 (0.570)
Δ TEMP_Host	-0.402 (0.353)	-0.652* (0.345)	-0.167 (0.272)
TEMP_Home		0.013 (0.009)	0.001 (0.014)
TEMP_Host		-0.033** (0.014)	-0.058*** (0.013)
SD_TEMP_Home			-1.634 (1.331)
SD_TEMP_Host			-2.551*** (0.385)
Constant	12.912*** (4.335)	13.947*** (5.099)	15.928*** (5.537)
No. Observations	23,780	23,780	23,780

Notes: Δ TEMP denotes changes in average temperature over 50 years, TEMP denotes average temperature, and SD_TEMP denotes standard deviation of temperature over 20 years; LMIC, UMIC, HIC denote Lower Middle-Income Countries, Upper Middle-Income Countries, and High-Income Countries, respectively; All regressions include control variables, income fixed effects, and continent fixed effects; parentheses indicate clustered standard errors by income level; * $p < 0.10$. ** $p < 0.05$. *** $p < 0.01$

Source: Jang et al. (2022). p.212

IV. Policy Implications

Based on our analysis, we derived three areas of policy implications: 1) the need to scale up humanitarian assistance; 2) the need to strengthen development cooperation and 3) the

need to prepare for the influx of environmental migrants.

Policy support for the safe resettlement of migrants displaced by environmental factors is of paramount importance. Migrants are often so-

cio-economically disadvantaged due to their insecure status, making external assistance crucial to ensure their basic rights. Their inherent instability makes it difficult for them to find stable employment, and lack of information and financial resources hinders their access to adequate health care. The threat of deportation, both internally and externally, leads to physical and mental exhaustion. Tragic incidents such as the border crossing tragedy between Morocco and the Spanish city of Melilla in June 2022 highlight the urgent need for comprehensive support.

To improve the situation, it is essential to establish systematic support mechanisms through cooperation between government authorities and non-governmental organizations. These actors should work together to assist migrants with paperwork related to their stay and movement, facilitate childbirth and care, provide access to education and health care, offer food and shelter to vulnerable groups such as women and children, and actively prevent deportations. Furthermore, it is important to recognize migrants as active agents in shaping their own lives in the face of internal and external challenges, rather than portraying them solely as passive recipients of assistance. Drawing upon the experience of migrant support organizations, many of which are made up of migrants themselves, can help identify effective ways of supporting migrants to solve their own problems.

Recognizing that it is not feasible to support all those who wish to migrate, it is essential to

address the underlying negative factors that drive migration. Reducing income disparities between countries and enhancing overall quality of life can help reduce the motivation to cross borders. Our fieldwork has revealed that a significant number of migrants express a desire to return if conditions in their place of origin were to improve, suggesting that they may not have left in the first place if conditions had been more favorable. However, it is important to note that only a small proportion of migrants and refugees, around 10%, benefit from assistance projects sponsored by international and governmental organizations in places such as Tangier, Morocco, including the UNHCR, the International Organization for Migration, and the European Commission.

To tackle the root causes of migration in migrant-sending countries, such as income inequality, conflict, disasters, and climate change, development cooperation support is crucial. Specifically, climate change, as a major driver of migration highlighted in this report, requires investment in both adaptation to the existing climate change and mitigation policies to reduce the intensity and extent of climate change. The UNFCCC's 27th Conference of the Parties in Egypt in 2022 prioritized climate change adaptation, resulting in an agreement to provide adaptation support to 4 billion climate-vulnerable people by 2030. This comprehensive approach includes scaling up resilient and sustainable agriculture, preventing food loss, increasing access to water, improving irrigation practices, and promoting climate-resilient livelihoods.

It is also worth considering specific policy options to support these objectives. These may include investments in the agricultural sector to increase productivity and promote sustainable practices. At the same time, supporting employment in non-agricultural sectors can provide alternative opportunities for individuals and reduce their dependence on agricultural activities. Additionally, programs to support sector transformation through improved access to formal and informal finance, food aid, and credit provision can contribute to sustainable economic development.

While Korea is not currently facing a direct increase in migration due to climate and environmental change, it is crucial to anticipate that Korea could become a significant migration destination if climate change accelerates in the future. Consequently, it is imperative to proactively forecast the demand and supply of foreign labor and develop strategies to accommodate the potential influx. Korea's relatively high-income level and favorable climate conditions make it an attractive destination for migrants. Notably, the empirical analysis in this report reveals that many of the main countries sending migrants to Korea are middle-income countries, where environmental migration is more likely to occur. Furthermore, as Korea undergoes demographic changes, including a declining birth rate and an aging population, it is expected to become increasingly dependent on migrants in the future. Comprehensive measures must be taken to minimize potential socio-economic disruptions resulting from a

rapid influx of migrants without institutional and social preparedness.

It is also important to recognize that while the influx of migrants is likely to have a positive impact on the host economy, it may temporarily depress native wages and increase unemployment rates in industries and employment sectors where migrants are concentrated. As seen in the case of African migrants, a surge in immigration without adequate institutional and social preparation can prevent migrants from enjoying a decent quality of life and may lead to social conflict. To address these challenges, it is necessary to identify the demand and supply of foreign labor, establish administrative procedures, and prepare policies aimed at minimizing potential socio-economic effects.

Developing acceptance strategies in preparation for increased migrant inflows is vital. The positive effects of immigration can be maximized through comprehensive administrative, institutional, economic, and social preparation for increased migration. This includes anticipating which countries will send migrants with specific socioeconomic characteristics as climate change accelerates. Moreover, overhauling immigrant screening and placement processes to enhance complementarities between foreign and domestic workers through occupational switching can help mitigate the negative effects of immigration.

By adopting these proactive measures, Korea can better prepare for potential future migra-

tion flows, ensure a smoother integration process for migrants, minimize socio-economically negative impacts of immigration, and maximize its positive impacts. **KIEP**

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