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STRATEGIC HIGH-SKILLED IMMIGRATION POLICIES IN SMALL STATES: A COMPARATIVE STUDY OF SINGAPORE AND ESTONIA

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Abstract
High-skilled immigration is crucial for small, developed countries to remain competitive and overcome demographic challenges. This paper uses a mixed-methods study that combines policy analysis and permit data to compare Estonia and Singapore. Employer-driven systems supported by wage thresholds based on national priorities are common to both nations. Through the Employment Pass, Singapore attracts significant inflows that support its high-paying occupations, innovation rankings, and dominance in the venture capital sector. To boost the performance of its ICT sector and innovation, Estonia, which attracts a relatively small number of migrants, utilizes targeted programmes such as the EU Blue Card and startup visas. The study shows that high-skilled migration indirectly contributes to economic development through supporting innovation and addressing labour shortages.

1 Introduction

In many countries, highly skilled immigrants play a crucial role in their host countries' economies and labour markets [1]. Highly skilled immigrants are generally defined as individuals who have a tertiary education, specialized skills, or work experience, which lets them to be highly specialized in a particular sector [2]. On the other hand, small and developed countries have limited size and population, but they are wealthy countries with high income [3].

The main reason behind high-skilled immigration is economic factors, as the acquisition and utilization of human skills are becoming increasingly essential for investment and production. This view aligns with Human Capital Theory [4], which suggests that investment in education and skills leads to increased productivity and long-term economic benefit. It has been confirmed by empirical studies that high-skilled immigration indeed has a positive effect on innovation, entrepreneurship, and the flexibility of national economies in Europe [5]. Other industry-level analyses have also confirmed that highly educated migrants have a positive and significant impact on innovation through patent activity [5]. However, economic explanations remain insufficient. Academic studies of comparative migration tell us that high-skilled immigration policy is shaped by historical and political factors, as well as labour market demand [6]. For instance, Canada has a points-based system that was partly developed to move away from biased and racial immigration. At the same time, the USA first prioritized family reunification before creating visas and permits for skilled employees [6]. Governments now compete for talent globally in what has been called the 'race for talent' by using

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fast-tracked visas, a points-based system for choosing skilled immigrants, and specific paths for professionals in sectors that need a critical workforce, such as technology and science [7].

While many researchers have focused on high-skilled immigration in larger countries and economies, such as the USA, Germany, or the United Kingdom, this paper examines how small states implement high-skilled immigration as a strategic tool to contribute to economic development and address labour shortages. It compares the strategies of small, developed countries, such as Singapore and Estonia, in attracting highly skilled immigrants. As a research question, this research aims to find how small, developed states design and manage high-skilled immigration policies, and what effects these strategies have on labour market integration and innovation performance.

2 Conceptual Framework

The government creates the category and controls it through labour market demands, talent promotion programmes, and visa procedures [6]. Importantly, "high-skilled" does not necessarily mean an advantage, as many high-skilled migrants face cultural barriers, a lack of acknowledgement of their qualifications, and difficulty finding employment, particularly due to their gender or place of origin [8].

In this analysis, high-skilled immigration is a policy response to labour market shortages, rising innovation rates, and longer-term growth needs, rather than just a demographic outcome. High-skilled migrants bring new experiences to host countries' economies and help fill labour shortages in important fields such as technology, finance, and healthcare. Immigration policy is an economic tool that allows states to compete and grow in the global talent market, increase productivity, and promote innovation in small industrialized countries [8].

This analysis is based on Human Capital Theory, which explains that individuals with higher levels of education and skills contribute to economic growth by increasing productivity and introducing new ideas. In this theory, Schultz argues that human skills and knowledge are a form of capital, which has been a significant driver of economic growth in Western countries and societies. He mentions that this human capital has grown faster than conventional capital, like land, working hours, or machines, and it is the main reason why countries have seen significant increases in their economic output [4].

Furthermore, the study also uses some ideas from Strategic Migration Policy Theory [7] [9]. This theory explains the active management of migrant waves to achieve broader national objectives. It also emphasizes the importance of using integrated, whole-of-government strategies that connect labour, education, and innovation policies with migration to optimize the contributions of migrants.

Based on these theoretical considerations, the study compares Singapore and Estonia along five central issues. Firstly, Policy Design & Objectives discusses the purpose and content of visa programmes. Selection Mechanisms analyse whether government agencies or private employers drive admissions, and the main criteria required for specific types of permits are identified. Sectoral Focus examines those industries where high-skilled immigrants are in the highest demand. Integration and Retention Supports evaluate language training, labour market integration, and pathways to permanent residence permits. Ultimately, economic and innovative outcomes evaluate the impact of migration policies on productivity, economic growth, and national competitiveness. This approach lets us analyse the (comparative) study of how small states manage high-skilled migration in the context of their economic development strategies.

3 Methodology

This study is a mixed-methods comparative case study that utilizes quantitative permit data and qualitative policy analysis. The statistics on permit types are sourced from government agencies (Singapore's Ministry of Manpower and the Estonian Police and Border Guard Board/EMN) and associates them with various macroeconomic indicators, such as innovation rankings, venture capital flows, and ICT job rates. These datasets are cross-validated with OECD, Eurostat, and World Bank data to enhance their reliability and comparability. A key limitation is that Singaporean data

cover total stocks (including renewals). In contrast, Estonian data report first-time flows, which limits direct comparability but provides meaningful comparisons in terms of scale and policy design. Qualitatively, the study employs a document analysis approach to analyse government policy papers, legal texts, and secondary literature, examining the goals, institutional arrangements, and types of integration. The mixed-methods approach is therefore the appropriate design, as it connects quantifiable achievements with contextual understanding. Crucially, while the results indicate associations between high-skilled migration and measures of economic performance, the analysis does not suggest a cause-and-effect relationship, as other variables, such as research investments and global market conditions, can also influence innovation outcomes.

3.1 Case Selection Strategy

This paper uses the most similar systems design (MSSD) for case selection. This is a comparative research method, derived from John Stuart Mill's work, and it involves examining cases that are similar in main aspects but differ in certain key variables, allowing us to analyze causal factors by minimizing the influence of other potential variables [10]. These countries, Singapore and Estonia, were chosen as cases that share some fundamental similarities and also meaningful differences in their approaches to the high-skilled immigration policy. Both are small, developed, and open states with populations of less than 10 million. Additionally, they have implemented a strategy of high-skilled immigration as a deliberate plan to foster their economic development. Both countries limit low-skilled migrants to temporary labour contracts, and they provide very limited or no access to granting refugee status [11] [12]. Moreover, both countries face similar demographic and financial challenges, such as labour and skill shortages.

In terms of differences, they come from different regional contexts. Singapore in the Asia-Pacific and Estonia in Northern Europe have different institutional contexts, as Estonia operates within the legal and policy framework of the European Union. In contrast, Singapore is fully autonomous in terms of policymaking, having a non-membership status.

This model is suitable as it allows for a systematic comparison, holding constant the factors that might create bias, such as economic development level, democratic governance, and demographic pressures. Holding them constant allows us to analyse how different regional contexts, institutional frameworks, and policy innovations affect immigration outcomes, and it limits generalizability, but it also provides valuable comparative analysis.

4 Singapore case study

4.1 Policy Design and Objectives

Singapore is a small city-state with limited national resources, and its history and development have a strong connection with migration [13]. As the country has limited national and human resources, immigration policy serves as the main policy goal in this country. Singapore has a diversified migration policy aimed at attracting the brightest talent from around the world. The main criteria here are their skills and knowledge, but not their nationalities, genders, ethnicities, or social backgrounds. By bringing highly qualified migrants, the country makes strategic investments in its local talent pool. The primary goal is to establish a global hub for high-tech and knowledge-intensive businesses [14].

To attract high-skilled immigrants, Singapore offers different types of visa options. The most common visa schemes are the Employment Pass (EP) for highly skilled immigrants, the S Pass for mid-level skilled workers, and the EntrePass, which is for entrepreneurs [15]. There are also requirements, such as minimum salary thresholds for EP, which have been regularly updated, rising to SGD 5,000 per month in 2023. This aims to ensure that only highly qualified migrants can obtain this permit to stay in Singapore [16]. This study analyses only the data for EP, as it focuses only on high-skilled immigrants, and this approach ensures conceptual consistency with Human Capital Theory. Therefore, other residence permit types, such as the S Pass and Work Permit, are not used in this study.

4.2 Selection Mechanism

Singapore has an employer-driven immigration system that places companies at the center of identifying and recruiting skilled foreign talent to address sectoral skills shortages [17]. The Ministry of Manpower evaluates all work pass applications and determines whether the approvals align with economic requirements and labour objectives. This hybrid model, in contrast to entirely state-controlled systems, places businesses at the forefront of international talent acquisition while maintaining state oversight through frameworks like COMPASS and salary thresholds, which create a balance between openness and national workforce goals.

4.3 Integration and Retention Supports

Singapore also actively supports immigrants in integrating them into society by organizing onboarding schemes. They conduct mandatory seminars and ongoing education opportunities through various initiatives, such as SkillsFuture, which promotes professional development for each resident, including foreign citizens [18]. However, there are some limitations as well, such as limited residence permit pathways and difficulty in getting family reunification visas [19].

4.4 Sectoral Focus

The high-skilled migration program supports Singapore's strategic priority sectors, including biomedical sciences, financial services, and information technology. These sectors align with national priorities, such as the RIE2025 programmes and the Smart Nation initiative [20].

4.5 Outcomes: Quantitative and Qualitative evidence

According to Table 1 by the Ministry of Manpower, Singapore's annual wave of high-skilled immigrants between 2019 and 2024 demonstrated both vulnerability to unforeseen shocks and remarkable policy adaptability. According to statistics from the Ministry of Manpower Singapore, the number of Employment Pass Holders was 183,700 in 2019. During the COVID-19 pandemic, the number declined, reaching 177,100 in 2020 and further to 161,700 in 2021. However, when the recovery began in 2022, the numbers started to rise, reaching 187,300 in 2022, followed by a strong rebound to 205,400 in 2023. 2023 was the highest level registered in recent years. In 2024, the number of high-skilled immigrants was 202,100. As a result, Singapore was able to bounce back quickly after the pandemic, with a V-shaped decrease in numbers followed by a recovery.

Table 1[*]. Employment Pass stock in Singapore, 2019–2024. Source: Ministry of Manpower (MOM), Employment Pass Statistics

Pass type	Dec 2019	Dec 2020	Dec 2021	Dec 2022	Dec 2023	Dec 2024
Employment Pass (EP)	183,700	177,100	161,700	187,300	205,400	202,100

The economic impact of high-skilled immigration is reflected in several measures. As demonstrated by venture capital transactions, it ranked first in 14 of 78 variables, including business ethics, politics, and ICT infrastructure, and fourth in the 2024 Global Innovation Index, its highest ranking since 2010 [21].

[*] The Table 1 presents Employment Pass stock data, including both first-time granted and renewals, as reported by the Ministry of Manpower (MOM).

Year	GII Position	Innovation Inputs	Innovation Outputs
2020	8th	1st	15th
2021	8th	1st	13th
2022	7th	1st	14th
2023	5th	1st	12th
2024	4th	1st	11th

Figure 1. Singapore Global Innovation Index Ranking, 2020-2024. Source: WIPO, Global Innovation Index Reports [21].

In the same year, the country secured 67% of venture capital funding in Southeast Asia, amounting to US$4.8 billion, and strengthened its position as the innovation hub of the region [22]. According to the Singapore Government's Factually portal, foreign professionals serve a strategic function in the Singaporean labour market, as well as in the country's broader economy. Although they represent a minority of firms, foreign-owned companies employ approximately one-third of the resident workforce and more than 60 percent of residents who earn more than S$13,000 per month, placing them in the top 10 percent of income brackets. It is a reminder of how talent is the foundation of global investment and high-paying jobs for Singaporeans. In other areas, over the past ten years, the number of high-skilled PMET (Professional, Managerial, Executive, Technician) employment held by residents has far exceeded the number of new EP and S Pass holders; 382,000 new residents are taking up PMET jobs, while 38,000 new EP and S Pass holders have done so. This pattern suggests that high-skilled migration and the growth of the local workforce in knowledge-intensive industries are complementary, rather than identical, and local people also benefit from the expansion of the labour market in Singapore [23]. According to the Ministry of Trade and Industry in Singapore, the productivity impact of highly skilled individuals is also supported by firm-level evidence in addition to aggregate innovation indices. Singapore's labour productivity increased by 3.6% in 2024, with the most significant increases in ICT manufacturing (+10.5%) and manufacturing (+5.1%) [24]. Let's compare participating firms in A*STAR's T-Up with non-participants. We find that participating firms have significantly higher R&D investment, revenues, and employee numbers, which highlights the essential role that talent supply plays in improving company performance and innovation capabilities. However, this does not directly demonstrate causality.

4.6 Limitations and Conclusion

However, Singapore's model has some limitations as well. Firstly, the analysis uses the Employment Pass (EP) stock data, but not the flows, as in Estonia. It means that the total number of valid permits includes both renewals and new arrivals simultaneously. Thus, it can limit the ability to capture short-term dynamics of high-skilled migration. Second, the lack of micro-level data linking individual EP holders to productivity or job creation outcomes limits the ability to establish causality, even as macro-level data, such as innovation rankings and venture capital, can show a larger economic impact. Third, the system is vulnerable to business cycles due to its reliance on an employer-driven selection process, and the lack of permanent residency paths limits long-term retention. Finally, Singapore's competitiveness in the global "race for talent" may be weakened by

higher income limits and stricter rules, highlighting the fundamental trade-offs small nations must make between social cohesiveness and openness.

Overall, the Singaporean case shows the potential and limitations of high-skilled labour mobility in small states. Singapore provides an example of how highly qualified immigrants can strengthen innovation capability, but it also requires a careful balancing act between retention and integration regulations.

5 Estonia case study

5.1 Policy Design and Objectives

In Estonia, high-skilled immigration is part of a long-term policy action plan aimed at improving and innovating the country as a high-performing and economically advanced small state in Europe [25]. Additionally, Estonia is facing demographic issues as its population has declined to 1.3 million [26]. Estonia has established the Temporary Residence Permit (TRP) for highly skilled country nationals, including the EU Blue Card, temporary residence permits for start-up employment, and permits for researchers and lecturers [27].

5.2 Selection Mechanisms

The high-skilled immigration system in Estonia primarily focuses on employers, who play a crucial role in attracting and recruiting global talent to address specific skill gaps [11]. Furthermore, the Police and Border Guard Board takes over the applications for residence permits [28] , while the integration activities include the “Settle in Estonia” program, which offers orientation services, language training courses, and also some other kinds of cultural activities to the immigrants to help them integrate into society [29].

Firstly, the EU Blue Card is one of the permit types for highly skilled immigrants, and it requires a minimum wage that is at least 1.5 times the national average gross salary. A valid, one-year job contract is also required to apply for it [30]. Moreover, to be considered a startup in Estonia, a technology-based, creative, and sustainable business with a minimum viable product (MVP) and early market share is a must. Which companies can meet these criteria, which are confirmed by the Estonian Startup Committee, and can apply for the Startup Visa or Startup TRP, which allows them to reside and work in Estonia [31]. There is also a short-term visa for academic research, available to researchers, lecturers, doctoral, or postdoctoral students, which lets them enter Estonia for a period of up to 90 days within 180 days to conduct research or teach at educational institutions in Estonia. The main criteria for this are having an invitation from a host institution, research or teaching experience, financial proof, and health insurance [32].

5.3 Sectoral Focus

Estonia's high-skill migration policy has reflected its structural labour market requirements and strategic economic priorities. Although the ICT sector remains the largest sector for foreign specialists, shortages are also present in the health, engineering, and education sectors. Employers have regularly cited four occupations as experiencing critical shortages: software developers, health care workers in hospitals, welders and flame cutters, and audiologists/speech therapists [11].

5.4 Integration and Retention Supports

Estonia recognizes that high-skilled migrants need to be encouraged to become productive members of society for extended periods. Therefore, the government offers the Settle in Estonia programme, the first state-funded adaptation programme aimed at all foreigners in the country who have received a residence permit over the past five years, free of charge. The programme consists of work/study/research/ entrepreneurship/family life, and civic orientation training modules, as well as tuition courses in the Estonian language at levels A1 and A2, helping newcomers to enhance their integration possibilities [33]. However, the programme also has some limitations, including limited access for temporary migrants, irregular recognition of foreign qualifications, a short-term

focus that does not address long-term retention, and the availability of only beginner-level language classes (A1–A2).

5.5 Outcomes: Quantitative and Qualitative analysis

Table 2 represents the number of first-time granted permits between 2019 and 2024. Based on this, after the COVID-19 pandemic, the grants increased during the recovery period. However, between 2023 and 2024, they sharply declined, resulting in 2,463 first-time TRP permits in 2022 and 1,235 in 2024. As a result of the general decline, startup employee permits decreased from 345 in 2022 to 116 in 2023 and to only 18 in 2024, while Top Specialist TRPs dropped from 645 in 2022 to 320 in 2023 and to 170 in 2024. The latter-described EU Blue Card also experienced low acceptance rates, falling from 23 authorizations in 2021 to 10 in 2024. However, as of 2024, there were 34 permits for lecturers and researchers, which remained essentially unchanged.

Table 2[*]. First-time employment-related temporary residence permits issued to third-country nationals in Estonia, by channel (EU Blue Card, Top Specialist TRP, Start-up TRP, Researchers/Lecturers), 2019–2024. Source: PBGB/EMN migration statistics reports [34] [35] [36].

Year	EU Blue Card	Top Specialist TRP	Start-up TRP	Researchers/Lecturers
2019	19	390	315	42
2020	9	384	232	36
2021	23	566	190	52
2022	18	645	345	40
2023	10	320	116	34
2024	13	170	18	34

These results were affected by macroeconomic push factors, sanctions on Russian and Belarusian citizens, and the effect of Ukrainian refugees' inflows that formed Estonia's migration profile post-2022 [27]. Despite being the smallest, high-skilled migration to Estonia is more knowledge-driven, with a focus on knowledge-intensive industries such as ICT and startups. The Estonian startup sector still received €326.6 million of investment in 2024, despite global downturns, and continues to employ more than 10,000 people across over 1,500 active companies [37]. Moreover, Estonia's steady economic growth over the past 20 years, combined with structural labour shortages resulting from migration and demographic aging, is the primary driver of the increase in immigration [11]. Additionally, Bolt, Wise, Veriff, and other unicorns show how an open approach to entrepreneurial migration fosters the creation of globally competitive businesses [38].

Macroeconomically, Estonia's ICT sector employs approximately 7.3% of the workforce, which is among the highest percentages in the EU. Foreign experts are also essential in addressing the ongoing shortages in cybersecurity and software development [39]. In the Global Innovation Index, Estonia achieved good results, moving up from 25th in 2020 to 16th in both 2023 and 2024, ranking 14th in innovation inputs and 16th in innovation outputs [40]. These rankings demonstrate how Estonia's status as a competitive, innovation-driven economy within the EU has been strengthened by high-skilled migration and knowledge-intensive growth.

[*] Notes: The Table 2 shows first-time residence permits for employment granted to third-country nationals. Renewals and stocks are excluded based on PBGB/EMN statistical sources for 2019-2024.

Year	GII Position	Innovation Inputs	Innovation Outputs
2020	25th	25th	20th
2021	21st	24th	20th
2022	18th	15th	22nd
2023	16th	14th	16th
2024	16th	14th	16th

Figure 2. Global Innovation Index (GII) scores for Singapore and Estonia, 2020–2024. Source: WIPO, Global Innovation Index Reports [40].

Estonian migration law ensures that migrants are paid at least 1.24 times and 1.5 times the national average wage, thereby avoiding competition with local workers. These mechanisms consolidate Estonia as an advanced digital country, where migration contributes to productivity and competitiveness in the knowledge-based sector, and even positively affects economic development. Despite Estonia's relatively low GNI per capita limiting absolute improvements, a recent cross-country analysis found that the immigration of highly skilled workers is positively correlated with global competitiveness and innovation indices. This result highlights that, even if it is small in scale, high-skilled migration makes a significant contribution to boosting Estonia's capacity for innovation and international competitiveness [41]. Moreover, in Estonia, beyond aggregate indicators, OECD evidence suggests that a few large and global companies significantly contribute to the economy, and these larger companies have a substantial influence on many smaller firms. Additionally, innovation is spread by the large companies [42]. In our case, high-skilled immigrants, when they work in these large companies, contribute their skills to the country's economy as well. Even if there is no direct causality, these are the types of companies that hire high-skilled migrants, which supports an association between their contribution and positive productivity results.

5.6 Limitations and Conclusion

Several limitations can be applied to the Estonia case. Firstly, the data presented for Estonia are for first-time permits only and do not include renewals. Second, there is no micro-level evidence that individually connects high-skilled immigrants to productivity or innovation outcomes, as seen in the Singapore case. Third, migration data from 2022 are primarily determined by Ukrainian temporary protection arrivals, thus making it difficult to find patterns in high-skilled migration. Last but not least, Estonia's open economy and small size make it highly susceptible to any unexpected external cause. As a result, we see significant variations in yearly migration.

To conclude, Estonia demonstrates that a small EU member state can develop targeted migration policies to meet the needs of its digital economy and foster innovation-led growth. Top Specialist TRP, including Startup Visa and Blue Card, are instruments that align well with the country's development orientation. However, the number of inflows remains small, fluctuating, and challenging to sustain both demographically and geopolitically. Overall, Estonia demonstrates that high-skilled migration can boost innovation and competitiveness in small nations. However, policies addressing integration, retention, and the complementarity of foreign talent are necessary for long-term economic benefits.

6 Comparative discussion

Both Singapore and Estonia, although in different regional settings, demonstrate how small countries effectively utilize migration and policy to deal with demographic challenges and remain competitive in innovation-based economies. Both countries employ an employer-driven model, where companies identify labour shortages and manage applications based on their specific needs. The government establishes regulatory parameters, including salary thresholds and eligibility criteria. Additionally, both states align their migration channels with national development priorities in knowledge-intensive fields. For example, Singapore focuses on ICT, finance, and healthcare, while Estonia focuses on ICT, startups, and is increasingly investing in healthcare and the green transition. In both scenarios, salary thresholds (the EP thresholds in Singapore and the 1.24-1.5x rules in Estonia) act as quality filters.

At the same time, the cases differ significantly in terms of size, results, and world position. Singapore has a large stock and naturally is also a regional centre for multinational investment, meaning that turnover is high (over 200,000 EP holders in 2024), while Estonia's first inflows are low (just 1,235 permits in 2024). This difference is also reflected in the scope of the data. The other difference is the economic impact. The 2024 Global Innovation Index ranked Singapore in 4th position globally and secured 67 percent of Southeast Asia's venture capital funding, which is closely tied to its deep bench of global talent. Estonia, in contrast, ranked 16th in the 2023-2024 GII and received € 326.6 million in startup investment in 2024. Furthermore, both countries face integration and retention issues, but both have similar problems and limitations. Singapore offers ongoing training via SkillsFuture but caps permanent-resident status, thereby limiting long-term retention. In Estonia, support is provided through the Settle in Estonia program, but there is a lack of language instruction, uneven recognition of qualifications, and narrow PR pathways.

This confirms the Human Capital Theory, as the results of innovation are positively correlated with the productivity of skilled labour. However, it also supports the Strategic Movement Policy Theory, which explains how national institutions and policy contexts regulate the contribution. The examples together demonstrate that high-skill migration is essential for long-term competitiveness in small states; however, it is not sufficient on its own, as integration, retention, and institutional resilience measures are also crucial.

7 Findings and Conclusion

To conclude, comparing Singapore and Estonia, high-skilled immigration is not only a demographic strategy for small states, but also a strategy for them to foster innovation and economic growth. The extensive EP stock in Singapore is supported by high innovation rankings, as well as significant venture capital flows, while Estonia's channels, such as the Startup Visa, EU Blue Card, and the Top Specialist TRP, support its ICT sector and niche competitiveness. These patterns are consistent with the Human Capital Theory, insofar as selective forms of skilled migration are associated with positive innovation outcomes, and the Strategic Migration Policy Theory, which emphasizes the role of individual states in shaping their migration regimes to meet their economic goals. However, as outcomes are also influenced by local research and development, educational systems, and global market forces, the view is one of association rather than direct causation. This study finds that high-skilled immigration has a positive impact on the competitiveness and economic growth of Estonia and Singapore, regardless of whether they attract a large number of workers or focus on specific sectors. To maintain long-term competitiveness, this immigration must be supported by effective integration and retention policies. The study has been analyzed using innovation indicators, venture capital flows, and firm-level perspectives as partial measures. Further research should be conducted using micro-level evidence to identify more direct contributions from migrants.

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