Exploring Push-Pull Drivers of Migration Flows from South Korean Small and Medium-Sized Cities

Sri Utami Purwaningati[a]
[a]Ulsan National Institute of Science and Technology (South Korea)

1 Introduction

Small and medium-sized cities (SMCs) play a crucial yet frequently overlooked role in regional economic systems (Mayer & Lazzeroni 2022). Traditional regional planning and economic development theories have long emphasized large metropolitan areas or export-oriented industries, leaving SMCs' contributions underexplored (Bell & Jayne 2009). In South Korea, SMCs are experiencing profound demographic shifts: continuing depopulation and net out-migration, particularly among young people who disproportionately leave smaller regions for the capital area (OECD 2022). One of the primary ways to understand city relations and city networks is through population migration (Gao et al. 2025). Understanding flows of migrants and the relationships between cities of origin and destination, as well as their driving factors, is essential for developing policies that promote balanced regional development, equitable access to opportunity, and sustainable inter-city relationships.

This study addresses two core research questions. First, what are the primary migration flows from SMCs in South Korea, in terms of destination city size and interprovincial movement? Second, how do city characteristics including economic opportunities, service accessibility, industrial specialization and diversity function as push or pull factors influencing migration? The objectives are to

map and rank migration flows using an origin-destination (OD) migration matrix, quantify the relative influence of multiple city attributes on migration decisions, and synthesize findings within urban network theory.

2 Methods

This study examines migration flows between forty-five SMCs in South Korea—defined here as cities outside the Seoul Capital Region with population under 500,000—and their thirty primary destination cities based on migrant inflows. The destination destinations span the full urban hierarchy: small cities (less than 200,000 people), medium-sized cities (200,000-500,000 population), large cities (500,000-1.5 million people), metropolitan areas such as Busan, Incheon, and Daegu (1.5-5 million people), and Seoul (around nine million people). The [$picture_1$] illustrates the study area: light green denotes the SMC origins, dark green highlights the major large and metropolitan destinations including Seoul, Busan, Incheon, Daegu, Daejeon, Gwangju, and Ulsan, while the gray represents other large cities and rural areas within each province.

To analyze migration flows, this study applies the Multiplicative Competitive Interaction (MCI) model, originally developed by Nakanishi and Cooper (1974). The MCI model, widely used in market-share and spatial-interaction analysis, is well-suited for migration study because it estimates the probability that migrants leaving a given origin select among multiple competing destinations, accounting for relative attractiveness.

Attractiveness is operationalized as a multiplicative composite of city attributes, such as economic opportunities, service accessibility, and industrial specialization and diversity, each raised to a parameter that reflects its importance in migration decisions. The basic form of the MCI model is nonlinear but can be estimated using ordinary least squares after a log-centering transformation of the data. This allows the derivation of elasticity-like parameters that indicate how sensitive migration flows are to changes in specific city attributes. By modeling destination competition, the MCI approach captures how economic, service, and industrial factors jointly structure migration patterns.

3 Results

This section first summarizes cross-tabulation results of industry characteristics and service accessibility to describe the patterns of industry characteristics and service accessibility patterns, then explains the results of spatial analysis related

to migration patterns from SMCs to their primary destination cities and finally presents the results of the MCI model.

Cross-tabulation of industry characteristics (table 1) reveals distinctive profiles by city size. Manufacturing is more specialized in large, metropolitan, and medium-sized cities, whereas its presence is notably lower in Seoul. By contrast, wholesale and retail activities are most concentrated in Seoul, reflecting the dominance of central retail function. Accommodation and food services are more specialized in small and medium-sized cities, likely linked to tourism and the provision of local services. Seoul stands out for its concentration of higher-order service industries, including finance, insurance, real estate, and information and communication. Industrial diversity, as measured by the Herfindahl-Hirschman Index (HHI), is higher in larger cities, with Seoul demonstrating the most diverse industrial base, while the medium-sized cities tend to have a more concentrated industrial base.

	Total	Seoul	Large and Metropol. Cities	Medium-sized Cities	Small Cities
	Mean (Std. Dev) $N = 85$	Mean (Std. Dev) $N = 1$	Mean (Std. Dev) $N = 22$	Mean (Std. Dev) $N = 29$	Mean (Std. Dev) $N = 33$
Manufacturing	1.1702 (0.6923)	0.2553	1.2640 (0.6876)	1.2885 (0.7274)	1.0316 (0.6261)
Wholesale and Retail	0.9467 (0.2202)	1.1662	0.9977 (0.1917)	0.9424 (0.2725)	0.9100 (0.1749)
Accommodation and Food Service	1.0860 (0.3386)	0.8833	0.9777 (0.1193)	1.1034 (0.2578)	1.1491 (0.4627)
Information and Communication	0.4713 (0.6597)	2.5481	0.6844 (1.0089)	0.3636 (0.2185)	0.3610 (0.4661)
Finance and Insurance	0.7475 (0.3501)	1.7565	0.8013 (0.3466)	0.7167 (0.3815)	0.7081 (0.2696)
Real Estate	0.8551 (0.2962)	1.2589	1.0478 (0.1912)	0.9251 (0.2618)	0.6531 (0.2580)
HHI index	0.1182 (0.0349)	0.0866	0.1203 (0.0376)	0.1245 (0.0388)	0.1123 (0.0279)

Table 1

Service opportunities demonstrate sharp disparities (table 2). On a per capita basis, medium-sized cities have relatively more universities, small cities perform

strongly in basic healthcare provision, while specialized physicians (such as obstetrics and gynecology) are concentrated in Seoul. Nationwide, the availability of ob-gyn specialists averages 8 per 100,000 people, but Seoul nearly doubles this (15 per 100,000), whereas small cities provide only 6. A similar gradient holds for pediatric services, where Seoul's supply is highest and small cities lag with just 6 specialists per 100,000, well below the national average of 9. Cultural and welfare facilities per capita, however, are relatively stronger in small cities.

Measuring facilities per square kilometer captures spatial density patterns. Seoul exhibits the highest density in all categories (e.g., 2.049 pediatric specialists per km² compared to a national average of 0.222) while small cities have extremely low densities (0.058 per km²). This underscores how spatial inequality compounds access disadvantages. In short, small cities provide better per capita access in some services but suffer from sparse spatial coverage, while Seoul combines extreme density with weaker per capita ratios given its population scale.

Ranking the top 30 destination cities for each SMC, the primary destination was identified to illustrate where migration from SMCs was concentrated (table 3). The analysis reveals that Seoul is the most frequent first-choice destination, attracting migrants from 13 SMCs, notably in Gangwon, North Chungcheong, South Chungcheong, North Gyeongsang, and Jeju provinces [$picture_2$]. Gangwon and Jeju provinces lack large cities within their provincial boundaries, which are likely to contribute to the prominence of Seoul as their main destination. The second most common destination is Daegu, selected mainly by SMCs in North Gyeongsang Province [$picture_3$], followed by Busan for SMCs in South Gyeongsang [$picture_4$]. Daejeon also attracts migrants from South Chungcheong and Sejong, underscoring the power of proximity [$picture_5$]. Ulsan and Gwangju function as major destinations for Gyeongju (North Gyeongsang) and Naju (South Jeolla), respectively [$picture_6$].

	Total Mean (Std. Dev) $N = 85$	Seoul Mean (Std. Dev)	Metro Mean (Std. Dev) $N = 3$	Large Mean (Std. Dev) $N = 20$	Medium Mean (Std. Dev) $N = 28$	Small Mean (Std. Dev) $N = 33$
University*	0.7962 (0.6997)	0.4915	0.4410 (0.2012)	0.6099 (0.3082)	0.9436 (0.7925)	0.8257 (0.7999)
Healthcare*	1459.598 (770.7539)	886.1288	1546.498 (437.1453)	1344.087 (585.8134)	1300.885 (627.4985)	1673.749 (960.6337)
Cultural*	7.1561 (5.3461)	4.0858	3.2929 (0.2087)	3.9928 (1.3077)	5.6381 (2.8325)	10.8054 (6.5985)
Welfare*	116.1403 (110.7754)	53.7088	82.8906 (1.6477)	80.7057 (35.6487)	103.9278 (75.8799)	152.8924 (155.1303)
Sports*	184.4723 (79.3337)	145.2135	134.9678 (8.8395)	145.0950 (21.6737)	177.7431 (63.7111)	219.7369 (101.2105)
University**	0.0102 (0.0164)	0.0792	0.0156 (0.0112)	0.0202 (0.0205)	0.0093 (0.0135)	0.0022 (0.0037)
Healthcare**	24.0571 (38.2675)	142.8567	53.4299 (30.4425)	47.8052 (52.3767)	19.2882 (29.8850)	7.4404 (14.9891)
Cultural**	0.0798 (0.1101)	0.6587	0.1072 (0.0254)	0.1264 (0.1191)	0.0671 (0.0847)	0.0423 (0.0616)
Welfare**	1.4821 (1.9386)	8.6586	2.7339 (0.8449)	2.5330 (2.4052)	1.3258 (1.6079)	0.6466 (1.0083)
Sports**	2.7706 (4.1988)	23.4105	4.4082 (1.1429)	5.1706 (5.2367)	2.3397 (2.9135)	0.9074 (1.3583)
Obgyn specialist*	8.6610 (3.3360)	15.6260	11.5090 (2.0310)	10.7540 (3.2750)	8.8870 (2.7860)	6.7310 (2.6730)
Obgyn specialist**	0.2080 (0.4070)	2.5190	0.3860 (0.1620)	0.4390 (0.4950)	0.1390 (0.2070)	0.0410 (0.1200)
Pediatrics specialist*	9.4460 (3.3150)	12.7080	11.9300 (1.8040)	11.4310 (2.2090)	10.6440 (2.8720)	6.9020 (2.7360)
Pediatrics specialist**	0.2220 (0.3770)	2.0490	0.3940 (0.1310)	0.4290 (0.4450)	0.1830 (0.2650)	0.0580 (0.1810)

* (per 100,000 people), ** (per square km)

Table 2

Table 3

Destination			Origin		
Province Name	**City Name**	**City Size**	**Province Name**	**City Name**	**City Size**
Seoul Metropolitan City	Seoul Metropolitan City	Seoul	Gangwon	Gangneung	Medium
			Gangwon	Wonju	Medium
			Gangwon	Chuncheon	Medium
			Gangwon	Donghae	Small
			Gangwon	Samcheok	Small
			Gangwon	Sokcho	Small
			North Chungcheong	Chungju	Medium
			South Chungcheong	Dangjin	Small
			South Chungcheong	Boryeong	Small
			South Chungcheong	Seosan	Small
			South Chungcheong	Jecheon	Small
			North Gyeongsang	Yeongju	Small
			Jeju	Jeju City	Medium
Daegu Metropolitan City	Daegu Metropolitan City	Metropolitan	North Gyeongsang	Mungyeong	Small
			North Gyeongsang	Sangju	Small
			North Gyeongsang	Andong	Small
			North Gyeongsang	Yeongcheon	Small
			North Gyeongsang	Gyeongsan	Medium
			North Gyeongsang	Gumi	Medium
			North Gyeongsang	Pohang	Medium
Busan Metropolitan City	Busan Metropolitan City	Metropolitan	South Gyeongsang	Miryang	Small
			South Gyeongsang	Tongyeong	Small
			South Gyeongsang	Geoje	Medium
			South Gyeongsang	Yangsan	Medium
			South Gyeongsang	Jinju	Medium
Daejeon Metropolitan City	Daejeon Metropolitan City	Large	North Chungcheong	Gyeryong	Small
			North Chungcheong	Gongju	Small
			North Chungcheong	Nonsan	Small

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Destination			Origin		
Province Name	**City Name**	**City Size**	**Province Name**	**City Name**	**City Size**
			Sejong City	Sejong City	Medium
Ulsan Metropolitan City	Ulsan Metropolitan City	Large	North Gyeongsang	Gyeongju	Medium
Gwangju Metropolitan City	Gwangju Metropolitan City	Large	South Jeolla	Naju	Small
North Jeolla	Jeonju	Large	North Jeolla North Jeolla North Jeolla North Jeolla North Jeolla	Iksan Gunsan Gimje Jeong-eub Namwon	Medium Medium Small Small Small
South Chungcheong	Cheonan	Large	South Chungcheong	Asan	Medium
South Jeolla	Suncheon	Medium	South Jeolla South Jeolla	Gwangyang Yeosu	Small Medium
North Gyeongsang	Gumi	Medium	North Gyeongsang	Gimcheon	Small
South Gyeongsang	Jinju	Medium	South Gyeongsang	Sacheon	Small
Gangwon	Wonju	Medium	Gangwon	Taebaek	Small
Jeju	Jeju City	Medium	Jeju	Seogwipo	Small
South Jeolla	Muan City	Small	South Jeolla	Mokpo	Medium
South Jeolla	Gwangyang	Small	South Jeolla	Suncheon	Medium

Beyond inter-provincial migration toward metropolitan centers, some SMCs exhibited a preference for larger intra-provincial cities [$picture_7$]. For instance, Iksan, Gunsan, Gimje, Jeongeup, and Namwon showed migration flows toward Jeonju in North Jeolla Province, while Asan exhibited migration toward Cheonan in South Chungcheong Province. Overall, the findings suggest that the dominant migration pattern from SMCs is oriented toward nearby or adjacent large or metropolitan cities. Where such cities are absent from the provinces, as in the cases of Jeju and Gangwon, Seoul tends to become the main destination. A secondary pattern of intra-provincial migration between small and medium-sized cities was also observed, typically involving geographically proximate pairs. For example, residents of Seogwipo (a small city) predominantly migrated to Jeju City (a medium-sized city) within Jeju Province, while Suncheon (a medium-sized city) demonstrated a migration preference for Gwangyang (a small city) within the South Jeolla Province.

The results of the MCI model [$table_4$] underscore the three consistent determinants of migration from SMCs, including proximity, economic opportunity, and industrial diversity. First, distance is negative and highly significant, confirming that closer destinations dominate flows. In both the general model and the youth-specific model, distance exerts a strong negative and highly significant effect, proving that proximity remains a fundamental determinant of destination choice. Economic opportunities, as reflected in job opportunities ($\beta = 0.366$, $p < 0.05$ for all migrants; $\beta = 0.436$, $p < 0.05$ for youth) and GDP per capita ($\beta = 0.173$; $\beta = 0.212$), strongly drive migration, with youth showing higher responsiveness.

In terms of service accessibility, high school availability ($\beta \approx 0.5$) and cultural facilities ($\beta \approx 0.5$) emerge as the two most influential service factors, especially among youth, highlighting the centrality of education and culture in migration decisions. By contrast, the presence of higher education institutions in origin cities has a negative effect, indicating that local universities mitigate out-migration.

As for industry specialization, wholesale and retail concentration is strongly positive, while accommodation and food specialization is negative, suggesting low-wage service economies deter migrants. Real estate specialization positively contributes, especially for youth, likely as a proxy for urban development and perceived dynamism. Regarding industry diversity, the HHI index is consistently negative, confirming that diverse and resilient economies attract migrants, with particular appeal for younger cohorts.

In terms of urban scale, migrants overwhelmingly prefer larger cities shown by the city-size dummy which is strongly negative for SMC destinations relative to larger urban areas. Interestingly, the Seoul Capital Region dummy variable

	Model 1		Model 2	
	all migration	P>t	year_20s_-30s	P>t
Economic opportunity				
Job opportunity	0.366	**	0.4355715	**
GRDP per capita	0.173	**	0.2121445	**
Locational characteristics				
Distance	-0.581	***	-0.5219077	***
Dummy – Seoul capital region	0.093		0.0139865	
Dummy – city size (ref: large cities)	-0.970	***	-1.03022	***
Service Accessibility (Facilities per 100,000 people)				
Healthcare	0.065		0.0701052	
Higher education	-0.261	***	-0.2370905	***
High school	0.511	***	0.4468282	***
Welfare facilities	-0.022		-0.0222572	
Cultural facilities	0.503	***	0.5392811	***
Sports facilities	0.020		0.0458783	
Industry specialization and diversity				
Manufacturing	-0.054		-0.0645953	
Wholesale and retail	0.694	***	0.7728467	***
Accommodation and food	-0.874	***	-0.9094014	***
Information and communication	-0.085		-0.0938864	
Finance and insurance	0.079		0.0960554	
Real estate	0.243	***	0.3419036	***
HHI index	-0.428	***	-0.4063967	***
constant	11.381	***	10.28851	***
Adj R-Squared	0.3045		0.2752	
Root MSE	0.89213		0.94964	
N	1,362		1,362	

**: $P < 0.05$, ***: $P < 0.01$

Table 4

is statistically insignificant, implying Seoul's draw is more structural (jobs, education, culture) than simply geographic. Comparing models, youth migration is more strongly influenced by economic prospects and cultural amenities, while the broader population balances a wider set of considerations.

4 Conclusion

Migration flows from South Korea's SMCs are decisively shaped by proximity, economic diversity, and city scale. A consistent two-tiered pattern emerges: inter-provincial migration oriented toward metropolitan centers, and intra-provincial flows directed at nearby large or medium-sized cities. Seoul dominates as a destination primarily where provinces lack comparable urban centers. The MCI model further reveals that job opportunities, GRDP per capita, educational and cultural facilities, and industrial diversity are key pull factors, especially for young people.

These findings underscore the challenges of regional imbalance. While young people are drawn to cities offering strong labor markets and vibrant cultural environments, SMCs often struggle with out-migration due to limited diversity and specialist services. Policy interventions could thus focus on strengthening educational and cultural infrastructure, diversifying local economies, and building intra-provincial urban networks so that SMCs can retain youth and sustain balanced regional development.

References

Bell, David & Mark Jayne. 2009. Small cities? towards a research agenda. *International Journal of Urban and Regional Research* 33(3). 683–699. DOI: 10.1111/j.1468-2427.2009.00886.x.

Gao, Peng, Wei Qi, Shenghe Liu, Xiao Wang & Zehan Pan. 2025. Understanding the city networks: an analysis from china's inter-city population migration. *Applied Spatial Analysis and Policy* 18(1). DOI: 10.1007/s12061-024-09621-7.

Mayer, Heike & Michela Lazzeroni. 2022. *A research agenda for small and medium-sized towns*. Edward Elgar Publishing Limited.

Nakanishi, Masao & Lee G. Cooper. 1974. Parameter estimation for a multiplicative competitive interaction model: least squares approach. *Journal of Marketing Research* 11(3). 303–311. DOI: 10.2307/3151146.

OECD. 2022. *Adapting regional policy in korea: preparing regions for demographic change* (OECD Rural Studies). Paris: OECD Publishing. DOI: 10.1787/6108b2a1-en.