

Road Infrastructure Investment and Internal Migration in Albania: A District-Level Analysis of Spatial Heterogeneity (2014-2024)

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ABSTRACT: Albania's population declined 15.3% between 2014 and 2024 – from 2,822,902 to approximately 2,390,942 inhabitants – driven by international emigration and intense internal redistribution toward Tirana. Over the same period, Albania invested approximately 1,547 million euros in road infrastructure through the Albanian Road Authority (ARRSH), applying Bank of Albania annual exchange rates and retaining only physically realized construction works. This investment generated pronounced spatial heterogeneity across 12 districts: from 427.6 million euros in Gjirokastër (580 €/inhabitant/year) to just 17.0 million euros in Shkodër (9 €/inhabitant/year). Using an original dataset constructed from ARRS administrative budget records and INSTAT civil registry statistics (2014-2024), this paper provides the first district-level descriptive analysis of the relationship between road investment and internal migration in Albania. The findings reveal a paradox consistent with the siphon-effect hypothesis: the districts receiving the highest investment record persistent net out-migration. At the same time, Tirana – with only 37 €/inhabitant/year – maintains a chronic positive balance of +9,090 persons per year. Temporal analysis across three sub-periods (2014-2016, 2017-2020, 2021-2024) confirms that this paradox deepens with increasing investment intensity. A four-channel transmission mechanism is proposed to explain how road corridors amplify rather than reduce demographic polarisation in contexts of extreme urban primacy.

KEYWORDS: road infrastructure, internal migration, siphon effect, demographic polarisation, regional disparity, Albania, Western Balkans.

How to cite: Bilaj, V., & Liko, E. (2026). Road Infrastructure Investment and Internal Migration in Albania: A District-Level Analysis of Spatial Heterogeneity (2014-2024). *World Conference on Science, Innovation and Human Progress*. Futurity Research Publishing. <https://doi.org/10.5281/zenodo.21453234>

Introduction

Albania presents one of the most pronounced demographic contractions in post-communist Europe. Between 2014 and 2024, the country's population declined from 2,822,902 to approximately 2,390,942 inhabitants – a fall of 15.3% – shaped by international emigration and a persistent concentration of internal migrants in Tirana (INSTAT, 2024). The capital recorded an average annual net migration gain of 9,090 persons over 2014–2024, while the other eleven districts recorded net losses. The sharpest depopulation occurred in Shkodër (–26.7%), Kukës (–24.7%), and Lezhë (–24.5%), while Tirana remained nearly stable at –2.6%.

Simultaneously, Albania channeled approximately 1,547 million euros in road investment through ARRS (2014–2024), covering only physically realized construction, asphaltting, reconstruction, resurfacing, and expropriation works – excluding VAT, supervision, technical assistance, PPP/concession contracts and judicial settlements. Annual Bank of Albania exchange rates were applied: 139 ALL/€ (2014–2015), declining to 107 ALL/€ (2024). The spatial distribution was deeply unequal: Gjirokastër received 427.6 million euros (580 €/inhabitant/year), Elbasan 341.6 million euros (119 €/inhabitant/year) and Tirana 312.0 million euros (37 €/inhabitant/year). At the other extreme, Shkodër received only 17.0 million euros (9 €/inhabitant/year). Together, Gjirokastër, Elbasan and Tirana account for approximately 70% of the 2014–2024 national total.

The theoretical debate on the demographic effects of transport investment centers on two mechanisms. The retention hypothesis – grounded in Aschauer (1989) and Barro (1990) – holds that improved connectivity raises local productivity and reduces emigration pressure. The siphon-effect hypothesis (Xu & Sun, 2021; Wang, Guo & Zhang, 2024; Yu, Cui & Lv, 2023) predicts that new infrastructure lowers the cost of moving toward dominant urban centers, accelerating demographic concentration. For Albania specifically, Lerch (2016) documented a structural "primate city" migration pattern – migrants move directly to Tirana, bypassing secondary cities – that predates and contextualizes the investment cycle studied here. Newsham & Rowe (2023) confirm that Eastern European sub-national regions exhibit the sharpest population decline trajectories in Europe.

Research Aim and Research Questions

This paper aims to document and analyze the spatial and temporal relationship between road infrastructure investment and internal migration patterns across Albania's 12 districts from 2014 to 2024. Two research questions guide the analysis:

RQ1: Is higher road investment per capita associated with lower net out-migration from peripheral districts, or does the spatial pattern suggest a siphon mechanism?

RQ2: Does the investment-migration relationship evolve across sub-periods, and does the paradox deepen as investment intensity increases?

The primary contribution is an original dataset constructed from ARRSH administrative budget records – filtering only physically realized road works with BSH annual exchange rates – combined with America, the Northcote – Trevelyan report, Great Britain and M. Weber in Germany. It is considered the best way to organize work in the public sector. It is used in a wide range of countries, according to INSTAT civil registry data, providing the first comprehensive district-level picture of this relationship in Albania.

Research Results

Data and methodology

The road investment variable is derived from ARRSH annual budget execution files (domestic financing + foreign financing, 2014-2024), retaining only physically realized construction works. Annual Bank of Albania exchange rates are applied: 139 ALL/€ (2014-2015), declining to 107 ALL/€ (2024). The internal migration variable – annual net balance of arrivals minus departures – is sourced from INSTAT's civil registry (2014-2024). Table 1 presents the cross-sectional findings; Table 2 reveals the temporal dynamics.

Table 1

Road investment and internal migration by district, 2014-2024

District	Cum. (M€) 2024	Inv. 2014- 2024	Avg. €/capita/yr	Avg. Migr./yr	Net	Pop. Change 2014-2024
Berat	57.5		36€	-1,557		-6.4%
Dibër	42.8		32€	-2,264		-21.2%
Durrës	80.5		30€	+2,072		-13.8%
Elbasan	341.6		119€	-1,463		-20.7%
Fier	85.7		29€	-1,216		-22.5%
Gjirokastrë	427.6		580€	-998		-20.2%
Korçë	63.1		29€	-1,342		-22.1%
Kukës	38.8		49€	-1,066		-24.7%
Lezhë	41.3		33€	-463		-24.5%
Shkodër	17.0		9€	-732		-26.7%
Tiranë	312.0		37€	+9,090		-2.6%
Vlorë	39.7		22€	-61		-19.8%

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As shown in [Table 1], the data reveal a striking paradox. Gjirokaštër, with the highest absolute (427.6 M€) and per-capita investment (580 €/inhabitant/year – 16 times the national unweighted average of ~37 €/inhabitant/year), records an average net loss of 998 persons per year and a population decline of 20.2%. Elbasan, the second-highest per-capita recipient (119 €/inhabitant/year), loses 1,463 persons annually. Conversely, Tirana – with only 37 €/inhabitant/year – absorbs +9,090 persons per year and remains near-demographically stable (–2.6%). Shkodër, with just 9 €/inhabitant/year, loses only 732 persons annually – fewer than heavily invested Elbasan. This non-monotonic pattern indicates that investment intensity alone does not determine demographic outcomes.

Table 2

Temporal evolution of road investment (M€) and average net migration (persons/yr) – three sub-periods

District	P1: 2014-2016		P2: 2017-2020		P3: 2021-2024	
	Inv. M€	Mig./yr	Inv. M€	Mig./yr	Inv. M€	Mig./yr
Berat	31.1	–1,943	11.5	–1,605	15.0	–1,219
Dibër	29.5	–2,334	3.8	–2,517	9.6	–1,958
Durrës	41.3	+2,685	6.1	+2,403	33.1	+1,280
Elbasan	65.2	–1,314	140.9	–1,776	135.5	–1,261
Fier	8.7	–1,220	42.6	–1,278	34.5	–1,152
Gjirokaštër	17.9	–1,028	96.7	–1,164	313.1	–810
Korçë	26.6	–1,581	21.8	–1,371	14.7	–1,135
Kukës	20.6	–1,287	10.4	–1,150	7.7	–816
Lezhë	6.6	–317	13.4	–592	21.3	–443
Shkodër	6.8	–922	5.5	–776	4.7	–546
Tiranë	29.5	+9,572	65.3	+9,901	217.2	+7,916
Vlorë	0.8	–312	8.8	–76	30.1	+143

Source: ARRSH and INSTAT. P1=2014-2016; P2=2017-2020; P3=2021-2024. Migration: annual average per period. Green = positive balance; yellow = negative balance.

The temporal analysis in [Table 2] deepens the paradox. Gjirokaštër's investment surged 17-fold from P1 (17.9 M€) to P3 (313.1 M€), yet net out-migration improved only marginally (from –1,028 to –810 persons/year). Elbasan recorded its worst migration balance (–1,776/year) precisely during its investment peak in P2 (140.9 M€, 2017–2020) – consistent with a contemporaneous siphon effect. Tirana's investment surged to 217.2 M€ in P3 (Unaza e Re ring road, boulevard reconstruction), reinforcing its absorptive dominance. Vlorë is the only peripheral district showing sustained improvement, moving from –312/year (P1) to +143/year (P3), likely driven by tourism-related economic growth rather than road investment alone.

Transmission mechanism: how roads amplify polarisation

Four sequential channels explain why road investment amplifies rather than reduces demographic polarisation in Albania. First, reduced travel costs to Tirana: when Tirana's labor market offers wages 2–3 times higher than local alternatives, improved road connectivity tips decisions toward permanent migration rather than retention. Second, social network effects: better roads increase the frequency of contact between peripheral residents and Tirana-based migrants, thereby accelerating network-driven migration chains documented by Caro, Bailey and Van Wissen (2014). Third, temporary construction employment: large road projects create temporary jobs during the build phase – explaining Gjirokaštër's marginal improvement during peak investment – but workers ultimately move to Tirana when construction ends. Fourth, urban investment asymmetry: Tirana's P3 investment in urban ring roads and boulevard reconstruction directly raises economic productivity and living standards in the capital, attracting businesses and workers from peripheral cities – a dynamic documented by Baum-Snow et al. (2017) for Chinese radial highway infrastructure. Together, these channels produce the "passageway effect" identified by Yu, Cui and Lv (2023): infrastructure creates asymmetric flows that systematically benefit the dominant endpoint.

Discussion

The cross-sectional paradox (Table 1), temporal dynamics (Table 2) and transmission mechanism together provide coherent evidence supporting the siphon hypothesis over the retention hypothesis for Albania. The evidence is difficult to reconcile with the retention effects found by Aggarwal (2018) for India and Stringer, García Clavel & Burelo (2025) for Mexico – contexts where the economic gap between origin and destination is smaller, or where road investment is paired with local agricultural market development. Albania's structural configuration – extreme urban primacy concentrated in a single capital with no viable secondary centers – means that the conditions for retention effects are absent. Ouni & Mraihi (2025), across 49 developing countries, confirm that the welfare effects of transport infrastructure are conditional on socioeconomic context: Albania's configuration places it in the adverse category. These findings have direct relevance to the Economic and Investment Plan for the Western Balkans (European Commission, 2020) and the OECD's convergence scoreboard (OECD, 2025), both of which treat transport connectivity as a primary instrument of convergence.

Conclusions

This paper presents the first district-level analysis of the relationship between road investment and internal migration in Albania over 2014–2024, using original ARRS administrative data and INSTAT civil registry statistics. Four conclusions emerge. First, Albania invested 1,547 million euros in roads (2014–2024), concentrated in Gjirokastër (427.6 M€), Elbasan (341.6 M€) and Tirana (312.0 M€), which together account for ~70% of the national total. Second, investment intensity does not predict migration retention: Gjirokastër (580 €/capita/yr) and Elbasan (119 €/capita/yr) record chronic net out-migration, while Tirana (37 €/capita/yr) absorbs +9,090 persons annually. Third, temporal analysis across three sub-periods confirms that the paradox deepens: Gjirokastër's 17-fold increase in investment produced only a marginal improvement in migration; Elbasan's worst balance coincided with its investment peak. Fourth, a four-channel transmission mechanism – reduced travel costs, social network effects, temporary construction employment and urban investment asymmetry – explains structurally why road investment amplifies polarisation in contexts of extreme urban primacy.

These findings carry direct policy relevance for IPA III transport investment design in Albania and analogous Western Balkans countries facing similar demographic trajectories (Mickovic et al., 2020). Road corridors connecting peripheral districts to the capital function as migration facilitators rather than retention mechanisms. Complementary policies – local economic development, employment incentives, digital infrastructure and quality peripheral services – are necessary to create economic anchors that road investment alone cannot provide. Future work will apply fixed-effects panel models and Arellano-Bond GMM estimation to formally identify causal relationships, incorporate district-level inequality measures (pending the provision of INSTAT microdata), and test for spatial spillover effects using Moran's I and Spatial Durbin Models.

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