

Migrant Adolescents in Urbanizing China: Nonlinear Adaptation, Family Support, and Macro–Micro Dynamics

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Abstract: *With the rapid advancement of urbanization in China, the number of migrant populations has continued to grow, and the educational and social adaptation issues of migrant adolescents have become increasingly prominent. This study integrates macro-level demographic data with empirical evidence from questionnaires and interviews to systematically examine the distribution, socio-psychological adaptation, and influencing mechanisms of migrant adolescents. The results indicate that migrant adolescents are mainly concentrated in eastern coastal regions, while central and western areas face the challenge of left-behind children due to the outflow of educational resources. No significant gender differences were found in school integration, psychological adjustment, or family support. However, the relationship between length of residence and psychological adaptation showed a nonlinear pattern—those who had lived in the city for longer periods tended to have lower levels of psychological adaptation. Although the number of school transfers did not significantly affect adaptation, family support played a notable buffering role. The findings suggest that the development of migrant adolescents is shaped by the interaction of institutional environments, regional policies, family capital, and individual resilience. Based on these insights, this paper recommends further reform of the household registration (hukou) system, promoting equitable access to education and public services, improving mental health support systems, and reinforcing family and community support networks. Despite limitations related to the cross-sectional data and sample representativeness, the study's multidimensional analytical framework offers a new perspective on understanding the developmental challenges faced by migrant adolescents and provides guidance for future policy and research.*

Keywords: *migrant adolescents; socio-psychological adaptation; family support; length of residence; educational equity*

1. Introduction

China's accelerated urbanization has reshaped childhood and adolescence on an unprecedented scale. The Seventh National Population Census reports 376 million migrants in 2020—nearly 70% more than in 2010—with 298 million children aged 0–17 nationwide, including roughly 71 million migrant children and 67 million left-behind children; together these groups affect nearly half of all children^[1-3]. Migrant and left-behind children are twin outcomes of mobility: the former move to cities with parents yet face institutional barriers to schooling and social integration, while the latter remain in hometowns and endure prolonged parental absence. For migrant families, constraints emerge both from the supply of public services—especially education and healthcare—and from household conditions such as limited parental companionship, lower parental education, and financial stress^[4]. Despite legal guarantees of compulsory education, hukou-linked admission rules, limited public-school capacity, and competition for seats often divert migrant adolescents from well-resourced public schools; many later return to their hometowns to continue study, effectively moving from “migrant” back to “left-behind” status^[5, 6].

Existing research provides a rich but uneven picture of these dynamics. Official statistics and policy bulletins document both scale and evolving policy responses. The Ministry of Education notes rising enrollment of school-age migrant children in compulsory education, and cities such as Beijing, Shanghai, and Shenzhen have experimented with points-based household registration and more flexible admissions^[3, 7, 8]. At the national level, the 2021 Action Plan on Strengthening the Care and Protection of Migrant Children established a broad protection framework^[9]. Even so, large regional disparities persist, especially where resources are scarce. Domestic scholarship centers on educational inequality, showing how hukou and enrollment practices channel many migrant children into under-resourced private

“migrant schools,” with consequences for attainment and opportunity^[10, 11]. Research on psychological wellbeing links migration experiences, family social capital, and parental support to mental health and behavioral adaptation, and shows that unequal school access depresses belonging and heightens stress^[12, 13]. Media and NGO reports amplify these findings, documenting policy thresholds—residence permits, social insurance qualifications—that prompt families to send children back home, and noting that the expansion of public education has lagged behind the growth of school-age migrant children^[4](Xinhua News Agency, 2020). Theoretical perspectives commonly invoked include segmented assimilation, which anticipates divergent developmental pathways depending on institutional and community contexts^[14-16]; theories of educational equity and distributive justice^[17]; the urban–rural dual structure that allocates public resources through hukou^[18]; social capital’s buffering effects^[19]; and developmental-psychological accounts of adaptation in adolescence^[13]. Internationally, migration scholarship employs population forecasting and scenario modeling to anticipate flows and service demand, methods that can inform forward-looking education and social policy^[20, 21].

Notwithstanding this progress, several limitations constrain explanation and policy relevance. First is data lag. Censuses and large-scale surveys are infrequent and slow to release, making it difficult to track short-term changes in the number, location, and schooling trajectories of migrant adolescents amid shifting labor markets and policy adjustments. Second is limited scope and comparability. Many studies are regional or case-based, often using distinct measures and sampling frames; this hampers cross-regional generalization and masks heterogeneity in access, school quality, and psychological outcomes. Third is methodological separation. Work on education and mental health typically proceeds apart from demographic modeling, leaving weak linkages between projected population movements and likely pressures on schools, counseling services, and family support systems. Fourth, estimation approaches remain coarse when direct statistics are unavailable. Simple proxies—such as total migrants multiplied by the adolescent share—offer only baseline counts and cannot capture dynamics like return migration, cohort progression, or policy shocks^[22]. Recent advances—age-specific migration rates, return-migration parameters, and Shared Socioeconomic Pathways (SSP)-based scenarios—show promise for forecasting the future scale of migrant adolescents, but uncertainty in inputs and policy regimes remains high^[23]. These gaps collectively limit predictive analysis, cross-level integration, and the translation of evidence into resource planning.

The present study responds by integrating macro-demographic perspectives with micro-level evidence on schooling, belonging, and household economy. We pair basic projections with original survey data from 411 migrant adolescents and targeted interviews to illuminate mechanisms—how family support, school environments, and community networks interact with institutional constraints to shape adaptation and aspirations. Methodologically, we emphasize multi-scenario simulations and sensitivity analyses to make uncertainty explicit and to test the robustness of inferences to plausible parameter ranges; empirically, we quantify the prevalence of key frictions (school transfers, belonging deficits, financial strain) and identify patterns of resilience that inform policy. Substantively, our analysis aims to link policy design—admission criteria, capacity expansion, psychological support—to measurable changes in adolescent outcomes across jurisdictions with different resource endowments. In doing so, we seek to move beyond descriptive portraits toward a forward-looking framework that can guide equitable allocation of public education and social services as China’s mobility landscape continues to evolve.

2. Methodology and Preparation

We conducted a cross-sectional study combining an online survey of migrant adolescents with follow-up interviews to assess social adaptation. The survey measured six dimensions—school belonging, peer relations, self-expression, access to educational resources, family support, and future outlook—using 22 Likert items (1–5). To contextualize micro-level findings, we also compiled provincial migration indicators from the National Bureau of Statistics (2016–2024), estimating migrant adolescents by multiplying each province’s total migrants by the 0–19 population share.

Participants were 411 adolescents aged 12–18 from 28 regions (including Guangdong, Beijing, Shanghai, and Sichuan). The sample was 56% female and 42% male (2% undisclosed). Mobility was common: 64.5% reported one school transfer and 18% reported two or more. To enrich interpretation, we conducted three semi-structured interviews (20–30 minutes each) with survey participants.

Analytically, we used descriptive statistics to profile demographics and overall adaptation, independent-samples t-tests and one-way ANOVA to examine differences by gender, age, residence

length, and transfer history, and correlation analysis to explore associations among dimensions. Interview transcripts were coded with content analysis to identify themes that converged with or explained quantitative patterns.

Measurement quality was acceptable to strong. Cronbach's alpha for all dimensions met the 0.70 benchmark (range ≈ 0.78 – 0.81). Sampling adequacy was high (KMO = 0.910), and Bartlett's test indicated factorability ($\chi^2 = 2896.713$, $df = 231$, $p < 0.001$). Overall, this mixed-methods design links macro demographic context with micro experiences to illuminate how institutional and family factors shape migrant adolescents' schooling, belonging, and aspirations, as shown in tables 1-2.

Table 1. Reliability Analysis

Dimension	Cronbach's Alpha	Number of Items
School Belonging	0.791	5
Psychological Adaptation	0.812	6
Family Support	0.784	6
Future Outlook	0.809	2

Table 2. Validity Analysis (KMO and Bartlett's Test)

Indicator	Value
KMO	0.910
Bartlett's χ^2	2896.713
df	231
p-value	0.000

3. Results and Analysis

3.1 Quantitative results

From 2015 to 2023, internal migration consistently concentrated along the eastern seaboard. Guangdong remained the largest destination, rising from about 18.57 to 25.6 million migrants ($\approx +37.8\%$), while Zhejiang more than doubled from 6.52 to 15.07 million ($\approx +131\%$), underscoring the persistent pull of the Pearl and Yangtze River Deltas. Central provinces exhibited a “two-way” pattern. Henan oscillated around 10–13 million migrants, reflecting its dual status as both labor sender and partial receiver; Hubei shifted from a net inflow of roughly +2.87 million in 2015 to a net outflow by 2023 (≈ -2.74 million), with the pandemic year intensifying losses to about -3.84 million before partial recovery. Western provinces improved from a lower base as Sichuan's net outflow narrowed from about -8.58 to -6.96 million, hinting at the growing influence of the Chengdu–Chongqing economic circle. The Northeast continued to contract, with Heilongjiang's net outflow expanding from -1.61 to -3.69 million, signaling persistent pressure on traditional industrial regions, as shown in figures 1-2.

These flows intersect with widening disparities in adolescent opportunities. In 2020, China had approximately 71.09 million migrant children (23.9% of all children) and about 66.93 million left-behind children. Destination provinces face steep service pressures: interprovincial migrant children accounted for 51.2% of all children in Zhejiang, over 40% in Guangdong, and 35.3% in Jiangsu. Meanwhile, central and western origins show modest declines in left-behind counts but ongoing shortages in schooling quality and psychological support. Structural shifts in youth cohorts accentuate these patterns. The 0–4 population peaked at 72.98 million in 2021 and fell to 57.54 million by 2023 (-21.2%), while the 10–14 group remained elevated (≈ 92.30 million in 2021; ≈ 94.78 million in 2023), reflecting a small birth swell entering adolescence. In major destinations, pressures are concrete: Guangdong hosts over four million migrant children aged 0–14—about one-third of local peers—straining classrooms, clinics, and integration services. Origin provinces such as Henan display a “left-behind plus returning” pattern as the 15–19 share rose from 5.32% (2018) to 5.79% (2023), indicating return for schooling or early work pathways, as shown in figure 3.

Cyclical dynamics track policy and macroeconomic shocks. The 2015–2017 period was broadly stable under ongoing urbanization and hukou reform. Between 2018 and 2020, macro headwinds and COVID-19 disrupted interregional flows, with Hubei's net outflow deepening around 2020. Recovery from 2021 to 2023 was uneven: inflows to coastal provinces rebounded quickly—Zhejiang alone grew by about 12.4% in two years—while several central and western provinces, including Hunan and Anhui,

remained below pre-pandemic migration levels.

Group comparisons from the survey align with these macro trends but reveal limited compositional effects. There were no significant gender differences in school integration, psychological well-being, or family support (all $p > .05$). Length of residence mattered more: perceived family support strengthened with time; school integration peaked among those living in the city for one to three years and then leveled or dipped slightly; psychological adjustment trended downward among longer-term residents, consistent with accumulating academic and social pressures. Transfer frequency showed no statistically significant associations with family support, school integration, or psychological adjustment; although multiple transfers were linked to marginally lower means, the differences did not reach significance.

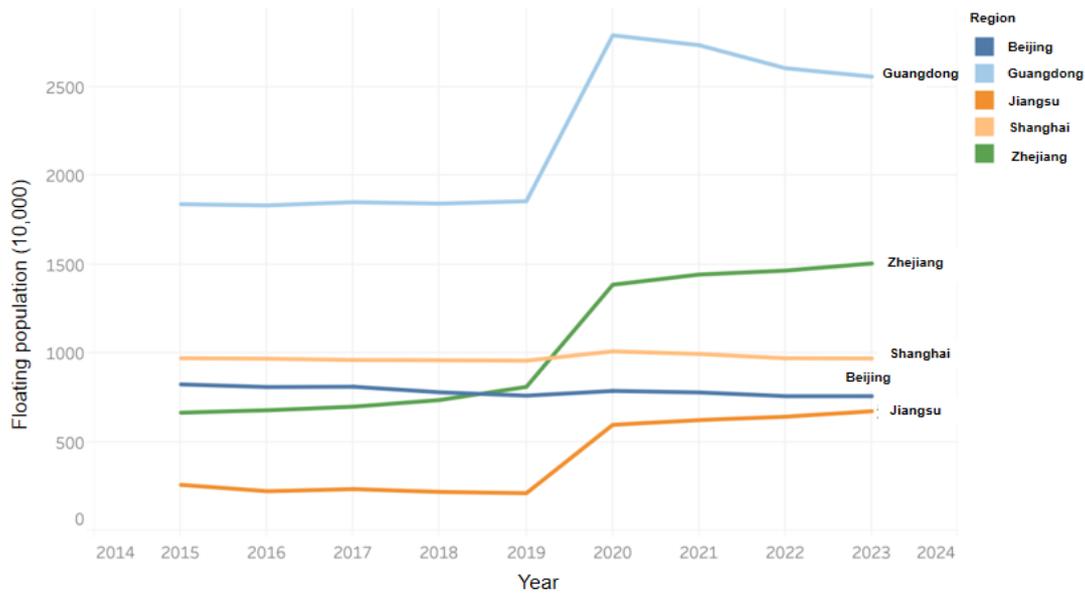


Figure 1. Total Migrant Population by Major Regions in China

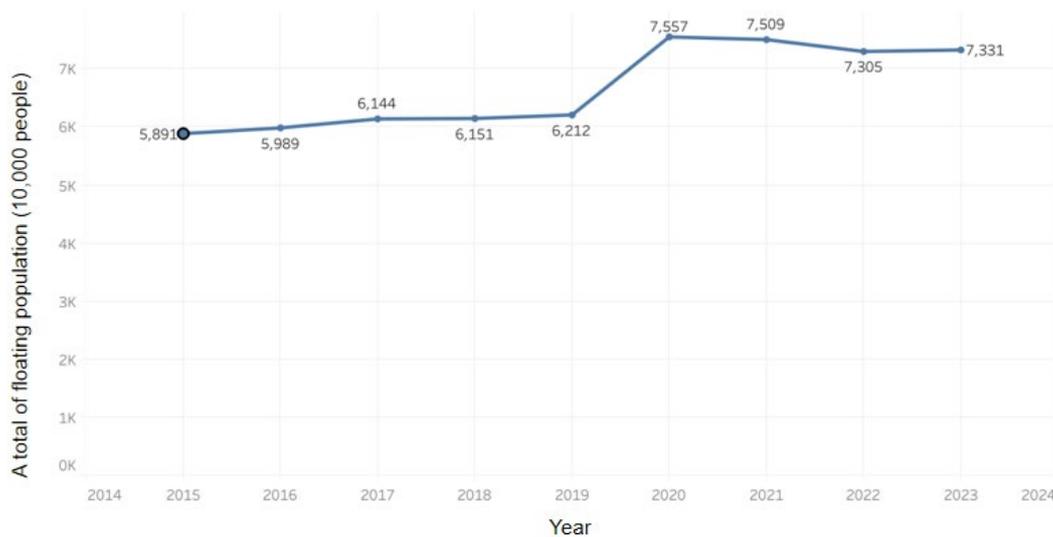


Figure 2. Total Migrant Population in China (2015-2023)

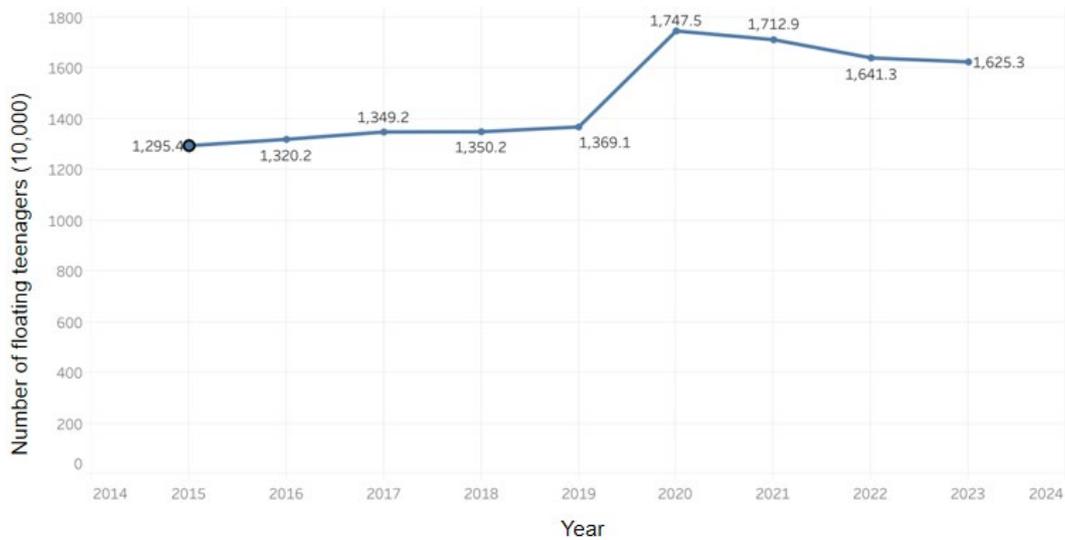


Figure 3. Total Migrant Adolescent Population in China (2015–2023)

3.2 Structured-interview insights

Interviews corroborate the statistical picture while clarifying mechanisms. Boys and girls described comparable experiences of belonging, peer trust, teacher support, and family warmth, reinforcing the absence of gender gaps in the survey. School transfers were framed as manageable transitions: initial strain was offset by parental encouragement and teacher scaffolding, and most students adapted within a short period. Residence duration shaped trajectories in expected ways. Newcomers reported strong motivation to integrate and optimism about opportunities, whereas longer stays brought cumulative pressures from academic competition, resource thresholds, and social expectations—an arc that helps explain the mild decline in psychological adjustment over time. Narratives from destination cities such as those in Zhejiang and Guangdong captured a dual reality of crowded classes and competitive placements alongside access to richer extracurriculars and counseling, producing a “high-pressure yet high-opportunity” environment. Across contexts, adolescents voiced strong urban aspirations and self-efficacy, aligning with the survey’s finding that a large majority intend to study or work in cities despite constraints, as shown in tables 3-4.

Table 3. Results of ANOVA on Length of Residence

* $p < 0.05$ ** $p < 0.01$	Question: How long have you lived in your current city? (Mean ± SD)					F	p
	Less than 1 year (n=16)	1-3 years (n=39)	3-5 years (n=154)	More than 5 years (n=202)	5		
Family support	16.25±3.09	18.46±4.13	18.25±4.44	19.28±4.31		3.551	0.015*
School Integration	18.19±4.13	21.44±3.89	19.06±5.31	19.82±5.21		2.773	0.041*
Psychological	15.56±2.85	17.15±4.13	14.75±4.47	14.63±4.02		4.266	0.006**

Table 4. Results of ANOVA on School Transfer Frequency

* $p < 0.05$ ** $p < 0.01$	Question: Have you ever transferred schools due to family migration? (Mean ± SD)			F	p
	no (n=72)	once (n=265)	Two or more (n=74)		
Family support	19.00±4.41	18.84±4.24	17.91±4.62	1.553	0.213
School Integration	20.35±4.48	19.42±5.28	19.68±5.22	0.936	0.393
Psychological Adaptation	15.74±3.67	14.85±4.33	14.54±4.26	1.676	0.188

4. Discussion and Conclusion

China's eastward-concentrated migration continues to intensify pressure on education and social services in destination cities, while central and western regions confront resource drain and persistent left-behind populations. At the individual level, gender differences in school integration, psychological adjustment, and family support were negligible, suggesting a convergence of adolescent experiences under urbanization. More salient is the nonlinearity between residence duration and adjustment: newcomers display strong adaptation enthusiasm, whereas longer-term residents report mild declines—counter to the assumption that adaptation improves monotonically with time. Transfer frequency did not yield significant differences, indicating that mobility per se is less determinative than the social and institutional context surrounding it.

These patterns align with and extend existing theory. Interview evidence shows that parental encouragement and teacher scaffolding buffer relocation stress, consistent with social capital theory^[19]. Heterogeneous trajectories resonate with segmented assimilation (Portes & Rumbaut, 2001), in which outcomes hinge on institutional gateways and community environments. Beyond documenting hukou-driven inequalities^[10], our findings add three contributions: (1) residence duration exhibits a curvilinear relation with psychosocial outcomes, echoing “adaptive load” perspectives whereby everyday frictions cumulate into chronic stress without institutional support; (2) gender effects are minimal, implying challenges that are structural and widely shared; and (3) family support operates as a protective factor, buffering the adverse effects of mobility and school transfers.

Policy should therefore pursue equalization of public services in parallel with hukou reform, with priority to high-inflow cities. Education policy must shift from mere access to sustained quality—smaller classes, qualified teachers, and embedded mental-health services—while adopting duration-sensitive supports (e.g., onboarding programs for newcomers and burnout prevention for longer-term residents). Family-centric measures—parenting programs, community resource hubs, and accessible counseling—can strengthen resilience and indirectly improve engagement and wellbeing. Linking demographic forecasts to school seat planning, counseling capacity, and neighborhood services would make these interventions anticipatory rather than reactive.

Several limitations qualify the evidence. As a cross-sectional, online sample, the study cannot establish causality and may underrepresent the most disadvantaged adolescents. Forecasting components rely on available statistics and policy assumptions, reducing sensitivity to shocks. Future research should adopt longitudinal, multi-site designs; integrate administrative and education records with surveys and interviews; and connect demographic forecasting to service-capacity modeling to test how institutional reforms translate into improved outcomes.

In sum, integrating macro demographic trends with micro social surveys reveals a large, internally diverse population of migrant adolescents whose development hinges on the interaction of institutional environment, regional inequality, family capital, and individual resilience. Advancing equal access to services, elevating educational quality and mental-health provision, and investing in family resilience are not only effective strategies but also a moral and social imperative. Ensuring migrant adolescents' successful integration and realization of potential is central to social equity and sustainable national development.

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