



Endogenous migration restrictions and population aging in China[☆]

Zhu Chen^{a,1}, Jipeng Zhang^{b,*}, Kang Zhou^{c,*}

^a Southwest University of Political Science and Law, People's Republic of China

^b Shandong University, People's Republic of China

^c Zhejiang University, People's Republic of China

ARTICLE INFO

JEL classification:

J61
R23
R28

Keywords:

Population aging
Migration
Hukou reform
Urban development

ABSTRACT

This paper investigates how local governments in China respond to demographic shifts by reducing migration restrictions through Hukou reform. We construct a novel measure of reform intensity by combining a data-driven approach with textual analysis of official policy documents. By quantifying the share of pre-reform migrants who would qualify for local urban Hukou under the most recent settlement criteria, our measure captures the endogenous constraints embedded in local settlement policies. Using this measure, we estimate the impact of local population aging on Hukou policy changes. We find that cities with higher aging levels are more likely to lower thresholds for migrant settlement, with stronger effects in prefectures facing lower fertility rates. Mechanism analysis further highlights the role of population aging as a driver of labor market deregulation and urban development.

1. Introduction

Population aging is among the most pressing demographic challenges of this century. According to UN projections, the global population aged 65 and older will more than double, from 761 million in 2021 to 1.6 billion by 2050, with the population aged 80 and above growing even more rapidly. A growing literature has documented the adverse economic consequences of population aging, including reduced savings, reduced innovation, a shrinking labor force, and weaker aggregate demand (e.g., Baldwin and Teulings, 2014; Lee, 2014; Jones, 2022; Ge et al., 2023). These findings highlight the importance of identifying and evaluating margins of adjustment that can mitigate the disruptive effects of demographic change.

Labor-saving technologies, such as robotics and automation, have been widely documented as responses to population aging and are considered important drivers of future growth (e.g., Acemoglu and Restrepo, 2022; Zhang et al., 2022; Ge et al., 2023). Other studies emphasize measures to address the root causes of aging, such as policies to raise fertility rates or extend retirement ages. In contrast, relatively little is known about how reducing labor market frictions, through policies like removing migration restrictions, might alleviate the economic pressures associated with aging. Yet, such reductions may be quietly reshaping labor allocation across sectors and regions within a country.

In this paper, we examine how local governments adapt to shifts in demographic structures by endogenously reducing barriers to internal migration under China's Hukou system. The Hukou system has long functioned as a fundamental institution regulating population movement across regions and sectors in China. Its regulatory power is reflected in the high value individuals place on urban Hukou status, as estimated by Chen et al. (2019), highlighting the substantial benefits tied to local residency. Since the 1990s, China has gradually introduced Hukou reforms, with the pace of reform accelerating markedly over the past decade (Meng, 2012; Zhang et al., 2019). These reforms, implemented unevenly across regions, represent a substantial relaxation of migration controls and have significant impacts on local economic development, public finance and educational mobility (Sieg et al., 2023).

China provides a compelling context for studying migration restrictions that are endogenously determined by local governments. First, internal migration within China is tightly regulated by the Hukou system, which imposes institutional barriers that limit migrants' access to essential public services, including public education for their children (Chen and Feng, 2013; Zhang et al., 2020; Sun et al., 2025). Second, China is undergoing a sharp demographic transition marked by population aging, driven by historically controversial fertility control

[☆] We thank Shiyu Bo, Shu Cai, Yuanyuan Chen, Zhan Gao, Ming Lu, Marlon Seror, Kailing Shen, Yuta Suzuki, Guiying Laura Wu, Le Xu, Sen Xue, Youzhi Yang, Yi Zhang, and participants at many seminars and conferences for helpful comments. Zhang acknowledges financial support from the National Social Science Fund of China (24ZDA049) and the National Science Fund of China (72173098); Zhou acknowledges financial support from the National Social Science Fund of China (24BJY179).

* Corresponding authors.

E-mail addresses: jipengzhang@sdu.edu.cn (J. Zhang), kang.zhou@zju.edu.cn (K. Zhou).

<https://doi.org/10.1016/j.jdevec.2025.103674>

Received 25 July 2025; Received in revised form 7 October 2025; Accepted 18 October 2025

Available online 7 November 2025

0304-3878/© 2025 Elsevier B.V. All rights reserved, including those for text and data mining, AI training, and similar technologies.

policies and rising life expectancy (e.g., [Ge et al., 2023](#)). As the supply of middle-aged workers continues to shrink, the economic costs of maintaining a rigid Hukou regime have grown. Importantly, under China's political system, local officials compete for promotion in a tournament based on relative performance, historically measured by GDP growth ([Li and Zhou, 2005](#)). This competition provides strong incentives for local policymakers to address pressures from population aging that may hinder economic growth.

A central feature of China's Hukou reform has been the adjustment of settlement thresholds, which define the conditions under which migrants can convert their Hukou status from migrant to local resident. In practice, these thresholds have been shaped by a decentralized, gradual, and strategic process, authorized by the central government but implemented by local authorities. Consequently, local governments may have endogenously relaxed Hukou restrictions to allow migrants from rural areas and other cities to obtain local urban Hukou, based on local development priorities. Although settlement thresholds critically determine tens of millions of migrants' access to basic public services, accurately measuring these thresholds has remained a persistent challenge in the study of labor market liberalization. We address this gap by developing a novel measure of migration restrictions, captured through changes in local Hukou reform policies.

We develop the measure of reform intensity by combining a data-driven approach to quantify migrant eligibility with textual analysis of official policy documents. By quantifying the share of pre-reform migrants who would qualify for local urban Hukou under the most recent settlement criteria, our measure captures the endogenous constraints embedded in local migration policies. Specifically, we compile the most comprehensive dataset to date of official Hukou policy documents issued at the prefectural level between 1998 and 2024. Using a predefined set of criteria, as detailed below, we systematically review these documents and calculate the share of migrants (based on a reference year) who are eligible for local Hukou. This share serves as our key outcome variable, capturing the extent of local Hukou registration barriers over time and across prefectures.

Next, we combine this measure with data from four waves of population censuses to estimate the impact of local demographic changes on settlement thresholds endogenously determined by local governments. The population censuses provide the most comprehensive demographic data available in China, including detailed information on age structure, Hukou status, and residential location. These rich datasets, especially the newly released microdata from the 2020 census, allow us to construct fine-grained measures of local demographic shifts during a period marked by accelerated Hukou reform and substantial policy-induced migration flows.

We find that demographic changes, which increase the proportion of elderly individuals in the population, lead local governments to lower Hukou eligibility thresholds. Specifically, prefectures moving from the median to the 90th percentile in aging ratios experience a statistically significant 7.52% reduction in the qualification barrier for obtaining local Hukou. This decline suggests that local governments are making notable adjustments in response to the pressures of population aging. Moreover, we find that the effect is more pronounced in prefectures with lower fertility rates (below the median of all prefectures) over the same period. Then, in what follows, we explore the underlying mechanism and show that the results are driven mainly by the downward pressures of aging on labor supply, housing markets, pension burdens, and economic growth.

These results highlight the importance of local demographic shifts in accelerating the integration of rural migrants into urban areas. Over the past few decades, China has experienced substantial rural-to-urban migration. The influx of migrants from rural areas and smaller towns has significantly expanded the urban labor force, making it both larger and younger. This migration has facilitated a rapid reallocation of labor from agriculture to manufacturing and services and has contributed to agricultural modernization, productivity growth, and the rise of

mega-cities in developing countries, including China (e.g., [Foster and Rosenzweig, 2007](#); [Ngai and Pissarides, 2007](#); [Ngai et al., 2019](#); [Imbert et al., 2023](#)). Understanding this migration process is crucial, as internal migration not only mitigates local economic shocks through sectoral labor reallocation but also raises important questions about the endogenous drivers of economic growth. Our findings suggest that population aging is playing an increasingly important role in motivating local governments to lower migration barriers and accelerate the urban integration of rural migrants under China's Hukou system.

Our paper contributes to three strands of literature. First, we add to the growing literature quantifying China's Hukou reform (e.g., [Zhang and Tao, 2012](#); [Kinnan et al., 2018](#); [Zi, 2025](#); [Zhang et al., 2019](#)). Recent studies, such as [Fan \(2019\)](#) and [Tian \(2024\)](#), have developed Hukou reform indices based on textual analysis of local government laws and regulations. These indices only track the frequency of reform-related documents or the presence of reform-specific keywords. Our measure provides a more accurate index by quantifying the share of pre-reform migrants who would qualify for local urban Hukou under the most recent settlement criteria, thereby capturing the endogenous constraints embedded in local settlement policies. Thus, we also contribute to the broader literature quantifying China's reform and policy changes and their impact on economic development, such as [Chen et al. \(2024\)](#) and [Wang and Yang \(2025\)](#). The panel data of our Hukou reform indices are valuable for a deeper understanding of China's policy learning and diffusion across governments.

The second contribution of this paper is its identification of a new force driving labor market liberalization in China. While the deregulation of migration restrictions and its substantial economic benefits have been well-documented, with recent studies quantifying large gains (e.g., [Tombe and Zhu, 2019](#); [Sieg et al., 2023](#); [Li et al., 2024](#); [Fang and Zhou, 2024](#)), the underlying causes of such policy shifts remain less understood. [Tian \(2024\)](#) emphasizes the role of export market liberalization, showing that China's accession to the WTO led to a rise in pro-migrant regulations in the early 2000s. We provide a new perspective by highlighting population aging as an additional and important force behind labor market deregulation, especially for the recent decade. Although the literature often treats China's Hukou reform as an exogenous policy shock from the central government, our findings suggest that local governments adjust the implementation of Hukou reform endogenously in response to local incentives and constraints, with population aging playing a key role.

Third, we contribute to the growing body of research on the mechanisms through which demographics influence economic growth. Although recent studies have emphasized the role of population aging in accelerating the adoption of automation technologies as a response to labor shortages (e.g., [Acemoglu and Restrepo, 2022](#); [Ge et al., 2023](#)), we extend this literature by examining how demographic shifts shape institutional adaptations in the context of China's Hukou system. Our findings indicate that these adjustments, specifically the enactment of more migrant-friendly regulations, have played a crucial role in reducing labor market frictions and therefore supporting productivity growth and urban development (e.g., [Hsu and Ma, 2021](#); [Suzuki, 2023](#)). This has general implications for other aging regions and countries to adopt more friendly migration and immigration policies.

The remainder of the paper is organized as follows. Section 2 provides background on China's Hukou system, recent reforms, and demographic trends. Section 3 describes our methodology for measuring the intensity of the Hukou reform. Section 4 outlines the empirical strategy. Section 5 presents the main results and explores heterogeneity in prefectures. Section 6 discusses the underlying mechanisms driving these results. Section 7 concludes.

2. Context: Hukou reform and aging

2.1. The Hukou system and its reform

The Hukou system in China is a household registration system that categorizes individuals as either local or non-local residents. This

system has been a fundamental part of China's social and economic structure since its establishment in the late 1950s. The Hukou system is typically used as a tool for social control in China, as it helps the government monitor and regulate population movement and distribution. In doing so, each Chinese citizen is registered at birth in a local Hukou, which determines their access to social services, education, healthcare, and other benefits. Specifically, under the Hukou system, local Hukou holders typically have access to better job opportunities, social welfare, and public services, while migrants, who refer to those without local Hukou, lack these benefits. Hence, the Hukou system historically restricted internal migration, and obtaining permission to change their Hukou status is particularly important for migrants in terms of access to public services and social welfare.

Because access to public services and social welfare is closely linked to local Hukou status, a central feature of China's Hukou reform has been the adjustment of settlement thresholds. These thresholds define the conditions under which migrants can convert their Hukou status—such as from rural to urban or across cities. Criteria such as education level, housing ownership, and years of social insurance contributions serve as filters to grant full local rights primarily to migrants deemed economically and socially desirable. Consequently, local governments' choices of settlement thresholds may reflect underlying local economic, demographic, and administrative conditions.

In practice, the choice of settlement thresholds has followed a decentralized approach, authorized by the central government but executed by local governments. Prior to 1993, local governments had limited autonomy in Hukou reform and issued few policy documents. A key turning point came in June 1993, when the State Council's "Decision on Deepening Reform of the Household Registration System" formally proposed delegating authority over migration regulation to local governments. A more significant shift occurred in 1997, with the launch of a pilot program targeting small towns. This allowed selected cities to experiment with their own Hukou policy measures. After 2000, as the central government placed growing emphasis on urbanization, labor mobility, and the modernization of the Hukou system, national-level policies increasingly served as strategic frameworks, while local governments took on the primary role of policy design and implementation.

Additionally, Hukou reforms implemented by local governments have proceeded gradually rather than through abrupt policy shifts. For instance, the reform initiated in 2001 by allowing counties and towns to adjust Hukou entry conditions. Since 2014, reforms have been increasingly differentiated by city tier and local public service capacity, and have been explicitly shaped by demographic pressures, particularly population aging.

2.2. Rapid aging in China

Population aging has accelerated markedly in China over the past decades. By the end of 2020, the share of the population aged 60 years old and above accounted for 18.7% of the country's total population, making China the country with the largest elderly population in the world. This aging trend has been especially pronounced since 2000 and exhibits substantial variation across regions.

The rapid demographic shift has been driven mainly by the baby boom in earlier decades, declining fertility rates and rising life expectancy in recent years.¹ First, the one-child policy, implemented from 1979 to 2015, substantially reduced fertility rates, contributing to a lower birth rate and accelerating the aging of the population. Second, improvements in healthcare and medical technology have increased life expectancy and lowered mortality rates, thereby raising the share of older individuals.

¹ In Appendix D, we present the evolution of the birth rate, mortality rate, and natural population growth rates in China.

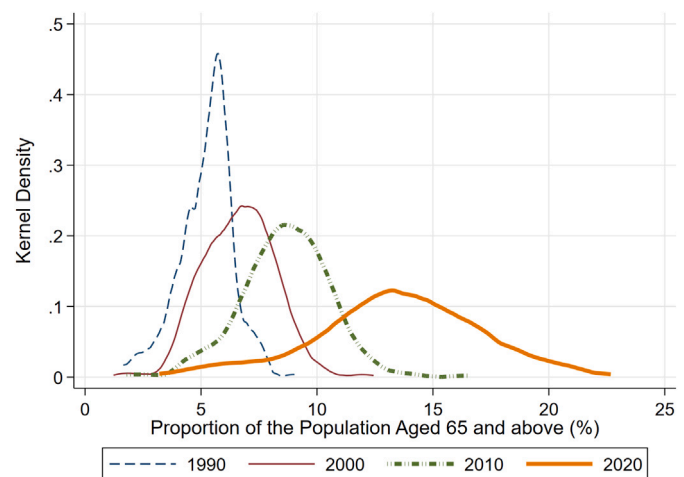


Fig. 1. Distribution of the elderly population across prefectures, 1990–2020. **Notes:** The figure plots the distribution of the proportion of individuals aged 65 and above across China's prefectures from 1990 to 2020. **Data source:** 1990–2020 population censuses of China.

Fig. 1 displays the distribution of the proportion of individuals aged 65 and older across China's prefectures between 1990 and 2020. This figure shows a marked increase in the average proportion of elderly individuals during this period, highlighting the rapid pace of population aging across Chinese cities.

3. Quantifying Hukou reform

3.1. Hukou reform measures: Insights from the literature

Before turning to our own quantification of Hukou reform, we briefly review how existing studies have measured these institutional changes. A growing literature has employed various approaches to measure the institutional evolution of China's Hukou reform, which can be broadly classified into two categories.

The first category gauges the degree of Hukou deregulation by tracking changes in the relative number of migrants obtaining local Hukou. Indicators in this category include the ratio of the planned in-migrant population to the local population (Cai et al., 2001) and the share of migrants (defined as individuals born outside the locality) who acquire local Hukou (e.g., Zi, 2025; Wu and You, 2025). While these measures partially capture shifts in local policies toward migrant friendliness, they reflect equilibrium outcomes shaped not only by Hukou reforms but also by other changes in migration barriers, such as information frictions. As a result, the realized ratios based on these measures do not directly reflect local governments' willingness to relax Hukou restrictions. More importantly, these measures focus on the realized ratios of migrants who have successfully transferred their Hukou status, introducing potential survivorship bias. For instance, even if a city adopts a generous Hukou reform — extending eligibility to all local migrants — the reform index derived from such measures may remain low if most migrants choose not to transfer their Hukou due to personal considerations, such as the high cost of urban living or limited perceived benefits of local Hukou status.

The second type of measure relies on textual analysis of policy documents issued by local governments. These studies assess Hukou reform either on the extensive margin — by coding the year in which the first local Hukou reform document was released (e.g., Chen et al., 2020; Wang et al., 2021; Jin and Zhang, 2023) — or on the intensive margin, by tracking the frequency of reform documents or the occurrence of reform-related keywords (e.g., Zhang and Tao, 2012; Liu, 2016; Fan, 2019; Zhang et al., 2019; Sun et al., 2021; Tian, 2024; Wang

et al., 2024). The strategy to construct these measures typically involves assigning scores to various eligibility criteria and aggregating them into a composite index. These measures face the following two challenges.

First, the assignment of scores is often arbitrary and lacks standardization across studies.² More importantly, it is difficult to consistently quantify multi-faceted and region-specific eligibility requirements. For instance, postgraduate degree holders may face lower thresholds in terms of age and residential duration, while junior college graduates are subject to more stringent conditions for obtaining local Hukou. Further complexity arises from regional variation—for example, Qingdao's points-based Hukou policy differs substantially from that of Hangzhou.

Second, the aggregation methods used to construct the final indicator vary widely. Some studies use simple summation (e.g., Fan, 2019; Tian, 2024) or direct multiplication (Wang et al., 2024), while others rely on more sophisticated techniques such as projection pursuit, analytic hierarchy process, equal-weighting, entropy weighting (Zhang et al., 2019), or machine learning algorithms (Tian, 2024). However, because the eligibility criteria for local Hukou have evolved significantly over time, these composite scores are often not comparable across years, thereby limiting their usefulness for tracking the evolution of Hukou policies in a consistent manner.

In Appendix A, we use Qingdao's 2018 Hukou reform as a case study to illustrate the challenges commonly encountered by existing measures of Hukou reform, and to demonstrate how our proposed measure addresses these challenges.³

In this paper, we combine a data-driven strategy that quantifies migrant eligibility with a textual analysis of official policy documents issued by local governments. Specifically, for each prefecture, we calculate the share of pre-reform migrants who would qualify for local urban Hukou under the most recent settlement criteria. This approach captures a core feature of China's Hukou reform: the adjustment of settlement thresholds that determine migrants' access to local registration. By directly quantifying the share of migrants eligible for local Hukou, our index reflects the endogenous constraints embedded in local settlement policies, while circumventing many of the challenges associated with existing measures.

3.2. Hukou policies and population data

In this subsection, we describe the policy documents and data sources used to construct our measure. Constructing this measure requires detailed data on local Hukou policies as well as individual-level information on migrant characteristics. These data are crucial for matching migrant profiles to the settlement criteria specified by local governments. First, to construct our policy dataset, we collected official Hukou policy documents for all prefecture-level cities from 1999 to 2024. Our data sources include the PKULaw database (from the website www.pkulaw.com), official municipal government websites, and local public security bureau websites. When policy documents were unavailable for specific years, we extrapolated a city's settlement requirements using the most recent preceding document. In cases where no prefecture-level documents could be located, we relied on provincial-level policy documents to determine the timing and content of reforms applicable to prefectures within that province. If neither prefecture- nor provincial-level policies were available, we referenced central policy directives — particularly the 2001 policy on Hukou reform in small towns — as a baseline for inferring local settlement criteria.

The eligibility criteria for obtaining local Hukou are extracted from Hukou reform policies issued by local governments over specific periods. In Appendix B, we present a mapping between Hukou policy

documents and the corresponding base years used to calculate the floating population. For example, to measure reform intensity for the 2000–2010 period, we calculate the proportion of migrants eligible for local urban Hukou based on the eligibility criteria outlined in policy documents issued between December 2000 and November 2010. Due to data limitations, we use the 2000 census and exclude individuals who became migrants after 1999 to estimate the size of the floating population in each city as of 1998. We then apply the Hukou policies issued prior to 2000 to compute the proportion of eligible migrants for the pre-2000 period (from January 1999 to November 2000).

We use all available population census datasets from the Official Microdata Lab at Peking University to calculate the size of the floating population at the prefecture level. These datasets include the population censuses conducted in 2000, 2010, and 2020, as well as the 2015 population survey. The individual-level data provide rich demographic and socioeconomic information, including residence type (urban, town, or rural), employment status, housing conditions, educational attainment, reasons for migration, and the duration since departure from the individual's Hukou registration prefecture.

Using these microdata, we calculate the size of the floating population at the prefecture level for each base year. We then combine this information with the eligibility criteria specified in local Hukou policy documents to compute the proportion of the floating population that meets the settlement requirements. We argue that this proportion serves as a proxy for local governments' willingness to integrate migrants into the urban Hukou-registered population, thereby capturing the intensity of local Hukou reform efforts.

3.3. Measuring settlement thresholds

To formally illustrate the construction of the Hukou reform intensity, let $\text{Threshold}_{(c,t)}$ denote the settlement threshold in prefecture c at year t . It is defined as:

$$\text{Threshold}_{(c,t)} = 100 - \frac{Q_{c,t}}{M_{c,t}} \times 100. \quad (3.1)$$

Here, $M_{c,t}$ represents the size of the floating population residing in urban areas in the base year t , and the base years consist of 1998, 2000, 2010, 2015, and 2020. The floating population consists of two categories of migrants: the first group includes local rural residents holding rural Hukou within a prefecture who have resided in the urban areas of the same prefecture for over six months. The second group comprises individuals who have lived in a prefecture for more than six months but whose Hukou registration is in another prefecture.

$Q_{c,t}$ represents the number of individuals eligible to obtain local Hukou based on the criteria outlined in official documents published in certain periods, as shown in Table B.1. When multiple Hukou reforms occur within a window, we incorporate all of them to calculate the eligible population over that period. Additionally, when reform documents specify multiple criteria for local Hukou eligibility, we classify a migrant as eligible if any one of the criteria applies to him or her. We restrict the sample to the working-age population (individuals aged 15 to 64), excluding those with pending Hukou status and students, when calculating Eq. (3.1). Given this definition, a higher proportion of eligible migrants represents a lower threshold for obtaining local Hukou, whereas a lower proportion indicates a higher threshold.⁴

Fig. 2 shows the evolution of the average settlement threshold across various city groups, categorized by distinct levels of economic development as defined by the *First Financial Weekly*.⁵ The figure reveals a consistent decline in the thresholds for migrants to obtain local Hukou across all city tiers, though the extent of the decline varies by city classification. This trend points to a broad relaxation of Hukou regulations and signals a move towards labor market liberalization in China over the period from 1996 to 2024.

² For example, Zhang et al. (2019) assign a score of 16 for a bachelor's degree when evaluating household registration criteria, while Sun et al. (2021) assign a score of only 2 for the same qualification.

³ Qingdao is a coastal city in Shandong Province, eastern China.

⁴ To further illustrate the construction of the threshold index, we use Qingdao's 2018 Hukou reform as an example, as detailed in Appendix A.

⁵ See Appendix C for a brief introduction of the city classification.

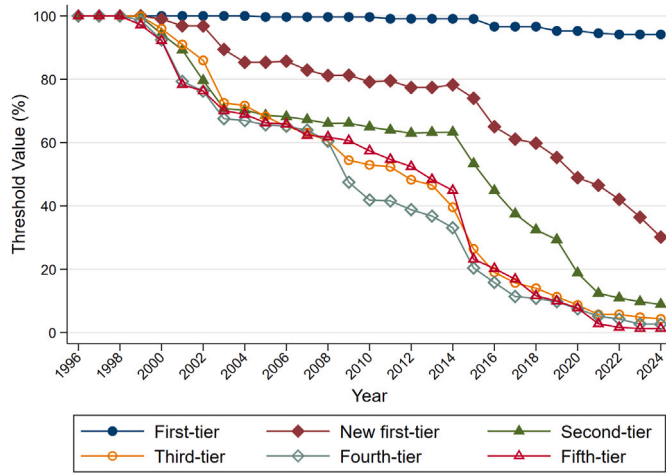


Fig. 2. Average Settlement Threshold by City Groups, 1996–2024.

Notes: Data are from the processed data of the micro dataset provided by the National Bureau of Statistics—Peking University Research Data Center.

4. Empirical strategy and data

4.1. Empirical strategy

To evaluate the impact of population aging on settlement threshold, we relate settlement threshold to the aging of the population at the prefecture level by using the following equation:

$$\text{Threshold}_{ct} = \gamma_0 + \gamma_1 \text{aging}_{ct} + \theta' Z_{ct} + I_c + I_t + \epsilon_{ct}, \quad (4.1)$$

where c and t denote city and year, respectively. Threshold_{ct} is the average settlement threshold for city c as defined in (3.1). aging_{ct} represents the proportion of individuals aged 65 and above, which serves as the measure of local aging. We also use two alternative measures of local aging: the ratio of the residence-based working-age population (15–59 years for males and 15–54 years for females) to the total residence-based population, and the ratio of the older population (those above the age of 65) to the younger population (between the ages of 15 and 64).

We use five rounds of population censuses or surveys, so t corresponds to one of the census years: 1990, 2000, 2010, 2015, or 2020. The demographic structure calculated from these census years is linked to settlement thresholds derived from Hukou policy documents issued in subsequent periods. Specifically, the 1990 demographic structure is linked to the average settlement threshold based on Hukou documents issued between January 1999 and November 2000. Similarly, the 2000 demographic structure is linked to thresholds derived from documents issued between December 2000 and November 2010; the 2010 demographic structure to thresholds from December 2010 to November 2020; and the 2020 demographic structure to thresholds from December 2020 to June 2024.

Prefecture fixed effects (I_c) control for time-invariant prefecture-level heterogeneity, including distances to major Chinese cities (Beijing, Shanghai, Guangzhou, and Shenzhen). These municipalities offer a wide range of economic opportunities and serve as the primary destinations for internal migration in China. Year fixed effects (I_t) control for time-specific macroeconomic conditions, such as year-specific demand shocks and price shocks.

Moreover, we control for various time-varying prefecture-level heterogeneity by including the vector $Z_{c,t}$ in the specification. The variables in $Z_{c,t}$ include the birth rate, the ratio of foreign direct investment to GDP, the share of the secondary industry in GDP, the share of the tertiary industry in GDP, log of education expenditure per student, the teacher–student ratio, and the number of hospital beds per 1000 people. Standard errors are clustered at the prefecture level.

4.2. Instrument variable approach

The OLS estimates do not necessarily correspond to the causal effect of demographic change on Hukou regulations for at least two reasons. First, the OLS results might have been influenced by time-varying factors, such as changes in industry composition and investments, both of which may vary across different demographic structures. To address this concern, our specifications already include the share of second and tertiary industry outputs in GDP and the ratio of foreign direct investment to GDP. In addition, we control for a range of other city-level characteristics, including the birth rate, education expenditure per student (logarithmic), the teacher–student ratio, and the number of hospital beds per 1000 people.

Second, and more importantly, local aging may be endogenous to local migration regulations because internal migration, as well as mortality patterns, could respond to regulation-induced changes in wages and employment opportunities. To deal with this concern, we employ an instrumental variable (IV) strategy that exploits variation in the predetermined component of population aging across provinces over time. To this end, we closely follow the strategy proposed by Maestas et al. (2023) and use each city’s “initial” age structure combined with nationally observed cohort survival rates to construct a predicted measure of local aging.

Specifically, for each city, we use the population in each age group and the group-specific national survival rates in year t (the initial year) to predict the fraction of the older population over the subsequent decade (i.e., the period from t to $t + 10$). The initial population in each age group was realized 10 years ago and is, therefore, less likely to be correlated with the current Hukou regulation. Similarly, the survival rate at the national level, lagged by 10 years for each age group, is likely to be independent of current Hukou policies in the city.

Our IV is conceptually similar to Bartik instrumental variables or Shift-Share Instrumental Variables (SSIV) (Goldsmith-Pinkham et al., 2020). Specifically, we use national age-specific survival rates, lagged by ten years, to predict the local share of the older population. This construction strengthens validity by ensuring that the “shift” component is plausibly exogenous to current Hukou policies. Thus, our identification relies on the assumption that the national survival rates, lagged by 10 years for each age group, are independent of current Hukou policies. More formally, our instrumental variable, represented by SSIV_{ct} , is as follows:

$$\text{SSIV}_{ct} = \frac{\hat{A}_{c,t}}{\hat{N}_{c,t}} = \frac{\sum_{j \geq 60-x} N_{j,c,t-x} \cdot \frac{N_{j+x,t}}{N_{j,t-x}}}{\sum_{j \geq 20-x} N_{j,c,t-x} \cdot \frac{N_{j+x,t}}{N_{j,t-x}}}. \quad (4.2)$$

Specifically, we proceed in three steps to construct the IV in Eq. (4.2).

First, we calculate the population survival rate for age group j at the national level, denoted as $\frac{N_{j+x,t}}{N_{j,t-x}}$. These rates are defined as the ratio of the national size of the population aged $j + x$ in one census to the size of the cohort population aged j in the previous census.

Second, we predict the population aged 60 and above ($\hat{A}_{c,t}$) and the population aged 20 and above ($\hat{N}_{c,t}$) for each city in year t based on the national survival rates $\frac{N_{j+x,t}}{N_{j,t-x}}$ and the initial population counts for each age j in city c at time $t - x$ (denoted as $N_{j,c,t-x}$). This is computed by multiplying the population counts at age j ($N_{j,c,t-x}$) in a specific city from one census by the corresponding national survival rate $\frac{N_{j+x,t}}{N_{j,t-x}}$ to predict the population at age $j + x$ in the subsequent census. The predicted counts for specific age ranges are then summed to obtain the predicted population aged 60 and above ($\hat{A}_{c,t}$) and the predicted population aged 20 and above ($\hat{N}_{c,t}$). It is important to note that j here represents age ranges, as census data is provided in segments (e.g., 10–14 years, 15–19 years).

Third, we divide the predicted population aged 60 and above ($\hat{A}_{c,t}$) by the predicted population aged 20 and above ($\hat{N}_{c,t}$) to obtain the predicted aging rate, which serves as the instrumental variable, SSIV_{ct} .

4.3. Data and descriptive statistics

Our analysis is based on individual-level data from China's population censuses, supplemented by official documents detailing China's Hukou policies. The population census data provide the most comprehensive insights into demographic and socioeconomic characteristics and their trends in China. To construct demographic variables and the instrumental variable (IV), we use data from the censuses conducted in 1982, 1990, 2000, 2010, and 2020. The datasets encompass a broad range of information, including population size, age distribution, gender ratios, education levels, employment status, household composition, migration patterns, housing demand, and urbanization rates.

The 1990 census shows that China's population had reached 1.13 billion, making it the world's most populous country at the time. By 2020, the latest census showed that China's population had reached 1.41 billion. The censuses also highlighted a significant rise in urbanization, with 64% of the population living in urban areas in 2020, up from just 26% in 1990. During the same period, China experienced a rapid shift in its demographic structure, as the proportion of people aged 65 and older grew from 5.57% in 1990 to 13.50% in 2020.

We also use several additional data sources. Information on the number of job seekers, pension income, pension expenses, pension insurance contributors, and retirees is drawn from various editions of the Labor Statistics Yearbooks of China. Provincial-level data on housing, including the area of housing for sale and the annual completed housing area, are obtained from CEIC (China Economic Information Center). The intensity of housing demand, measured as the proportion of rental households, is calculated using county-level data from the 2000, 2010, and 2020 population censuses. Furthermore, other control variables at the prefectural level are also sourced from CEIC. The summary statistics of these variables are reported in Appendix E.

5. Empirical results

5.1. OLS results

We begin by presenting estimates using the proportion of the population aged 65 and above as the primary measure of population aging. Results based on alternative aging indicators are consistent with the baseline findings and are reported in Appendix F. In the first two columns of Table 1, we present the OLS estimates, with the second column incorporating a comprehensive set of control variables. These results show a negative correlation between population aging and the local settlement threshold. Specifically, based on the estimate in Column 2, a 1-percentage-point increase in the proportion of the population aged 65 and above is associated with a 0.910-percentage-point reduction in the settlement threshold in the subsequent period.

5.2. IV results

In Columns 5 and 6 of Table 1, we present the IV estimates using the predicted aging rate as the IV, with the first-stage regression results displayed in Columns 3 and 4. Consistent with our OLS estimates, an increase in the proportion of the population aged 65 and above significantly reduces the local settlement threshold, with the IV coefficients being larger in magnitude. The results are not driven by weak instruments, as evidenced by the large KP F-statistic (greater than 480) reported in Columns 3 and 4. Quantitatively, the estimates in Column 6 suggest that a 1-percentage-point increase in the proportion of the population aged 65 and above decreases the settlement threshold for migrants obtaining local Hukou by approximately 1.086 percentage points.

5.3. Heterogeneity: Higher vs. Lower fertility rates

Cities face differing pressures from population aging depending on their fertility rates. In this subsection, we examine how the effects of demographic structure on Hukou reform vary across prefectures with different fertility levels. Specifically, we categorize prefectures into two groups based on their fertility rates in 2000, which marks the approximate starting point of the Hukou reform. We then replicate the estimates from Columns 5 and 6 of Table 1, reporting the results in Table 2. Panel A presents the estimates for low-fertility prefectures, while Panel B reports those for high-fertility prefectures.

Across various definitions of aging, the estimated impact of population aging on Hukou reform is more pronounced in low-fertility regions, which experienced greater demographic pressure from accelerated aging in the following decade. In contrast, we find no significant effects in high-fertility regions. These heterogeneous patterns further reinforce our main finding that increasing demographic pressures from population aging are prompting local governments to accelerate Hukou reform.⁶

6. Mechanism analysis

In the preceding sections, we provide evidence that cities with higher levels of population aging are more likely to lower the threshold for migrants to acquire local Hukou. This finding implies that policymakers are employing labor market liberalization to alleviate the adverse impacts of shifts in local demographic compositions. To gain a deeper insight into the mechanisms driving governments' responses to local aging, we examine four potential mechanisms: escalating scarcity of the local labor force, local government's aspirations to bolster real estate demand, strain on the pension system, and aging-induced downward pressure on economic growth. In doing so, we estimate the following equation:

$$Y_{c,t} = \gamma_0 + \gamma_1 \text{aging}_{c,t} + \theta' Z_{c,t} + \alpha' I_c + \beta' I_t + \epsilon_{c,t}, \quad (6.1)$$

where $Y_{c,t}$ represents various outcome variables for mechanism analysis. $\text{aging}_{c,t}$ is the ratio of people aged 65 and above in the local population. Other variables are the same as those in Eq. (4.1). Consistent with the baseline results presented in Table 1, Table 3 reports estimates using the proportion of the population aged 65 and above as the measure of aging. Additionally, Appendix H provides additional results based on alternative aging measures for robustness. Overall, these findings remain consistent across different definitions of aging.

6.1. Impact of population aging on labor scarcity

The first potential factor driving local governments to attract migrants is the increasing scarcity of the working-age population, which may constrain local economic growth by pushing up labor costs. To explore this mechanism, we estimate the impact of population aging on local labor costs. We use average wages as the primary measure of labor costs, with data sourced from CEIC. Additionally, we use the ratio of placed job seekers to total registered job seekers as an alternative measure of labor scarcity, based on data from the China Labor Statistical Yearbook. A higher ratio indicates a greater ease of finding a job, thus signaling a higher level of labor scarcity. Since this data is available only at the provincial level, all prefecture-level cities within the same province share the same scarcity figures.

Panel A of Table 3 presents the results from estimating Eq. (6.1), with labor costs as the outcome variable. The results in Columns 3 and 4 show a positive correlation between aging and local labor costs.

⁶ In Appendix G, we examine whether, in response to local aging, local governments disproportionately reduced Hukou barriers for younger relative to older migrants.

Table 1
Effects of Population Aging on Hukou Reform.

	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	OLS	2SLS	2SLS	2SLS	2SLS
	First Stage			Second Stage		
Age 65 and above ratio	−1.304*** (0.401)	−0.910** (0.365)			−1.473** (0.581)	−1.086* (0.582)
SSIV			0.577*** (0.023)	0.523*** (0.024)		
Control variables	No	Yes	No	Yes	No	Yes
FE	Yes	Yes	Yes	Yes	Yes	Yes
R ²	0.888	0.900	0.953	0.958	0.017	0.120
N	1164	1164	1164	1164	1164	1164
KP F-statistic					643.2	486.7

Notes: Age 65 and above ratio refers to the proportion of the population aged 65 and above. Control variables include the birth rate, the ratio of foreign direct investment to GDP, the share of the secondary industry in GDP, the share of the tertiary industry in GDP, log of education expenditure per student, the teacher–student ratio, and the number of hospital beds per 1000 people; FE represents year and city fixed effects. Standard errors are clustered at the city level and are reported in parentheses. *p < 0.1, ** p < 0.05, *** p < 0.01.

Table 2
Effects of Aging on Hukou Reform: Higher vs. Lower Fertility Rates.

Dependent variable: Settlement threshold values						
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Panel A: Cities with fertility rates below the median level in 2000</i>						
Age 65 and above ratio	−3.179*** (0.673)	−2.301*** (0.780)				
Working-age pop ratio			2.660*** (0.710)	1.761*** (0.671)		
Old dependency ratio					−2.086*** (0.457)	−1.510*** (0.525)
Control variables	No	Yes	No	Yes	No	Yes
FE	Yes	Yes	Yes	Yes	Yes	Yes
N	580	580	580	580	580	580
KP F-statistic	316.8	200.3	87.29	63.61	228.9	140.4
<i>Panel B: Cities with fertility rates above the median level in 2000</i>						
Age 65 and above ratio	1.498 (0.907)	1.524 (0.993)				
Working-age pop ratio			−0.686* (0.413)	−0.710 (0.455)		
Old dependency ratio					0.835* (0.503)	0.862 (0.557)
Controls variables	No	Yes	No	Yes	No	Yes
FE	Yes	Yes	Yes	Yes	Yes	Yes
N	584	584	584	584	584	584
KP F-statistic	311.8	332.3	413.6	254.2	314.6	335.2

Notes: Age 65 and above ratio refers to the proportion of the population aged 65 and above; Working-age pop ratio refers to the proportion of the working-age population (15–59 years for males and 15–54 years for females); Old dependency ratio refers to the old-age dependency ratio. Control variables include the birth rate, the ratio of foreign direct investment to GDP, the share of the secondary industry in GDP, the share of the tertiary industry in GDP, log of education expenditure per student, the teacher–student ratio, and the number of hospital beds per 1000 people; FE represents year and city fixed effects. Standard errors are clustered at the city level and are reported in parentheses. *p < 0.1, ** p < 0.05, *** p < 0.01.

Additionally, we observe a positive correlation between aging and labor scarcity, as expected. These findings suggest that local governments may have an incentive to boost the local labor supply by lowering the settlement threshold.

6.2. Impact of population aging on housing market

Rapid aging may also reduce local housing demand. Since the real estate industry is a crucial sector contributing significantly to local fiscal revenue in China, local governments may consider lowering the settlement threshold to stimulate and revive the real estate market. To explore this, we examine the impact of aging on local housing demand using three variables: local housing prices, housing vacancy rates, and housing demand intensity. Due to data limitations, our measure of the local housing vacancy rate is constructed at the provincial level as well.

We first use the proportion of rental households among all family households as a measure of local housing demand intensity. This measure assumes that short-term renters are potential buyers of local housing. As an alternative, we use the housing vacancy rate, defined as the ratio of housing for sale area to the annual completed housing area (housing vacancy rate). Finally, we use the log value of local housing prices as a measure. Panel B of Table 3 presents the results from estimating Eq. (6.1). Overall, these results consistently indicate that aging reduces local housing demand, increases the housing vacancy rate, and has a negative impact on housing prices.

6.3. Strain on the pension system

Another potential factor driving local governments to attract migrants is the possibility that population aging depletes social security

Table 3
Effects of Aging on Labor Market, Housing Market, Pension Fund, and Economic Growth.

	(1)	(2)	(3)	(4)	(5)	(6)
<i>Panel A: Labor Market</i>						
DV	Log of wage		Labor force scarcity			
Age 65 and above ratio	0.027** (0.011)	0.023* (0.012)	0.011* (0.006)	0.033*** (0.006)		
Control variables	No	Yes	No	Yes		
FE	Yes	Yes	Yes	Yes		
N	1160	1160	1164	1164		
KP F-statistic	643.2	485.5	643.2	486.7		
<i>Panel B: Housing Market</i>						
DV	Demand intensity		Vacancy rate		Log of housing price	
65 and above ratio	-0.017*** (0.003)	-0.016*** (0.003)	0.027*** (0.010)	0.035*** (0.007)	-0.022** (0.010)	-0.022* (0.010)
Control variables	No	Yes	No	Yes	No	Yes
FE	Yes	Yes	Yes	Yes	Yes	Yes
N	1164	1164	1164	1164	1164	1164
KP F-statistic	643.2	486.7	643.2	486.7	643.2	486.7
<i>Panel C: Pension Fund</i>						
DV	Pension income ratio		Pension contri. ratio			
Age 65 and above ratio	-0.015*** (0.003)	-0.012*** (0.004)	-0.291*** (0.032)	-0.236*** (0.034)		
Control variables	No	Yes	No	Yes		
FE	Yes	Yes	Yes	Yes		
N	1164	1164	1164	1164		
KP F-statistic	643.2	486.7	643.2	486.7		
<i>Panel D: Economic Growth</i>						
DV	Log of GDP					
Age 65 and above ratio	-0.091*** (0.015)	-0.100*** (0.019)				
Control variables	No	Yes				
FE	Yes	Yes				
N	1164	1164				
KP F-statistic	643.2	486.7				

Notes: Age 65 and above ratio refers to the proportion of the population aged 65 and above. Control variables include the birth rate, the ratio of foreign direct investment to GDP, the share of the secondary industry in GDP, the share of the tertiary industry in GDP, log of education expenditure per student, the teacher-student ratio, and the number of hospital beds per 1000 people; FE represents year and city fixed effects. Due to data limitations, the variables for labor force scarcity, vacancy rate, and pension fund are measured at the provincial level. Standard errors are clustered at the city level and reported in parentheses. *p < 0.1, ** p < 0.05, *** p < 0.01.

funds. This may lead to a situation where pension fund income falls short of expenditures, putting additional strain on the pension system. As a result, local governments may be prompted to relax Hukou regulations. To examine this possibility, we estimate the impact of population aging on local pension pressure, measured by the income-expenditure ratio of the pension fund and the ratio of contributors to recipients (i.e., the ratio of workers to retirees). Due to data limitations, we assess the impact at the provincial level, similar to the estimates for other mechanisms.

Panel C of Table 3 presents the results from estimating Eq. (6.1) using local pension pressures as the outcome variable. These estimates consistently indicate that aging significantly decreases both the pension fund's income-expenditure ratio and the ratio of contributors to recipients in the pension insurance system.

6.4. Aging-induced downward pressure on economic growth

Finally, when formulating Hukou policies, local governments consider not only the directives from central and provincial authorities but also their own local economic growth, a critical factor for the promotion of local officials (Li and Zhou, 2005). To explore this potential channel, we estimate the impact of local population aging on economic growth.

Panel D of Table 3 presents the results from estimating Eq. (6.1), where the economic output serves as the dependent variable. The

estimates reveal a significant negative correlation between local aging and economic growth. Specifically, a 1-percentage-point increase in the population aged 65 and above is associated with a 0.100-percentage-point decline in local GDP.

Our estimates also remain consistent with the present literature (e.g., Zhang et al., 2015; Du and Feng, 2021; Feng and Li, 2023; Maestas et al., 2023), all of which consistently demonstrate the significant adverse impact of population aging on economic growth. Notably, Feng and Li (2023) document a potential mechanism through which aging affects local economic vitality by reducing firm entry. Consequently, in response to the negative repercussions of population aging on economic growth, local governments have the incentive to adopt measures aimed at addressing this demographic shift. These measures may include not only the implementation of pro-natal policies to bolster birth rates but also strategies to retain existing migrant populations and attract inflows of population from other regions.

7. Final remarks

This study constructs a panel dataset on settlement thresholds related to Hukou reform spanning 1998 to 2024, alongside aging variables at the city level for each census year. Using this dataset and an instrumental variable similar to Bartik IV, we examine whether and how population aging influences local governments' relaxation

of Hukou regulations. Our findings show that demographic changes, lagging by a decade, are driving governments to lower settlement thresholds for migrants to obtain local Hukou. This effect is more pronounced in prefectures with lower fertility rates over the period.

The primary mechanisms through which aging drives Hukou reform include local labor scarcity, suppressed housing demand and prices, increased burdens on elderly care, and pressure on economic growth. Cities facing more severe aging report lower pension fund income-expenditure ratios and a smaller ratio of contributors to recipients. These results suggest that demographic changes, through endogenous reform by local governments, may have had a more substantial impact on local economic growth than previously anticipated.

Even in first-tier cities in China, the old-age dependency ratio began to increase significantly between 2010 and 2020. To mitigate the negative impacts of aging, it is crucial to focus on reducing settlement thresholds in high-threshold cities. This will help develop a unified national labor market, promote domestic circulation, tap into the demographic dividend, and enhance talent dividends to support local economic growth.

CRedit authorship contribution statement

Zhu Chen: Writing – original draft, Conceptualization, Data curation, Methodology, Software, Formal Analysis, Investigation, Visualization. **Jipeng Zhang:** Writing – review & editing, Validation, Supervision, Project Administration, Funding Acquisition, Conceptualization. **Kang Zhou:** Writing – original draft, Writing – review & editing, Conceptualization, Methodology, Formal Analysis, Investigation.

Appendix A. Supplementary data

Supplementary material related to this article can be found online at <https://doi.org/10.1016/j.jdeveco.2025.103674>.

Data availability

Data will be made available on request.

References

- Acemoglu, Daron, Restrepo, Pascual, 2022. Demographics and automation. *Rev. Econ. Stud.* 89 (1), 1–44.
- Baldwin, Richard, Teulings, Coen, 2014. *Secular Stagnation: Facts, Causes and Cures*. Centre for Economic Policy Research-CEPR, London.
- Cai, Fang, Du, Yang, Wang, Meiyan, 2001. Household registration system and labor market protection. *Econ. Res.* 12 (12), 41–49.
- Chen, Yuanyuan, Feng, Shuaizhang, 2013. Access to public schools and the education of migrant children in China. *China Econ. Rev.* 26, 75–88.
- Chen, Deqiu, Gao, Huasheng, Luo, Jiang, Ma, Yujing, 2020. The effects of rural-urban migration on corporate innovation: Evidence from a natural experiment in China. *Financ. Manag. (Wiley-Blackwell)* 49 (2).
- Chen, Heng, Li, Bingjing, Zhu, Xiaodong, 2024. Bottom-up institutional change and growth in China. Working Paper 2024/024, HKU Jockey Club Enterprise Sustainability Global Research Institute, Available at SSRN: <https://ssrn.com/abstract=5097745> or <http://dx.doi.org/10.2139/ssrn.5097745>.
- Chen, Yu, Shi, Shaobin, Tang, Yugang, 2019. Valuing the urban hukou in China: Evidence from a regression discontinuity design for housing price. *J. Dev. Econ.* 141, 102381.
- Du, Yang, Feng, Yonggang, 2021. The shock of accelerating population aging on economic growth. *Econ. Res.* 56 (02), 71–88.
- Fan, Jingting, 2019. Internal geography, labor mobility, and the distributional impacts of trade. *Am. Econ. J.: Macroecon.* 11 (3), 252–288.
- Fang, Jingyi, Zhou, Kang, 2024. Cities with invisible walls: Labor liberalization and misallocation in China. USC USC Working Paper.
- Feng, Jin, Li, Yuting, 2023. Population aging and firm entry: A study based on China's prefecture-level cities. *J. World Econ.* 46 (04), 170–191.
- Foster, Andrew D., Rosenzweig, Mark R., 2007. Economic development and the decline of agricultural employment. In: *Handbook of Development Economics*. vol. 4, Elsevier, pp. 3051–3083.
- Ge, Suqin, Zhang, Junsen, Zhou, Kang, 2023. Aging in a dual economy: Urban aging, massive migration, and agricultural development. Available At SSRN 4577837.
- Goldsmith-Pinkham, Paul, Sorkin, Isaac, Swift, Henry, 2020. Bartik instruments: What, when, why, and how. *Am. Econ. Rev.* 110 (8), 2586–2624.
- Hsu, Wen-Tai, Ma, Lin, 2021. Urbanization policy and economic development: A quantitative analysis of China's differential hukou reforms. *Reg. Sci. Urban Econ.* 91, 103639.
- Imbert, Clément, Monras, Joan, Seror, Marlon, Zylberberg, Yanos, 2023. Floating population: Migration with (out) family and the spatial distribution of economic activity. Federal Reserve Bank of San Francisco Working Paper, Federal Reserve Bank of San Francisco.
- Jin, Zhangfeng, Zhang, Junsen, 2023. Access to local citizenship and internal migration in a developing country: Evidence from a hukou reform in China. *J. Comp. Econ.* 51 (1), 181–215.
- Jones, Charles I., 2022. The end of economic growth? Unintended consequences of a declining population. *Am. Econ. Rev.* 112 (11), 3489–3527.
- Kinnan, Cynthia, Wang, Shing-Yi, Wang, Yongxiang, 2018. Access to migration for rural households. *Am. Econ. J.: Appl. Econ.* 10 (4), 79–119.
- Lee, Ronald D., 2014. Macroeconomic consequences of population aging in the United States: Overview of a national academy report. *Am. Econ. Rev.* 104 (5), 234–239.
- Li, Xiaolu, Ma, Lin, Tang, Yang, 2024. Migration and resource misallocation in China. *J. Dev. Econ.* 167, 103218.
- Li, Hongbin, Zhou, Li-An, 2005. Political turnover and economic performance: the incentive role of personnel control in China. *J. Public Econ.* 89 (9–10), 1743–1762.
- Liu, Jinwei, 2016. Analysis of the opening degree of urban household registration and its influencing factors in China - based on the assessment of 63 sample cities nationwide. *J. Chin. Acad. Gov.* 05 (05), 91–95+143–144.
- Maestas, Nicole, Mullen, Kathleen J., Powell, David, 2023. The effect of population aging on economic growth, the labor force, and productivity. *Am. Econ. J.: Macroecon.* 15 (2), 306–332.
- Meng, Xin, 2012. Labor market outcomes and reforms in China. *J. Econ. Perspect.* 26 (4), 75–102.
- Ngai, L. Rachel, Pissarides, Christopher A., 2007. Structural change in a multisector model of growth. *Am. Econ. Rev.* 97 (1), 429–443.
- Ngai, L. Rachel, Pissarides, Christopher A., Wang, Jin, 2019. China's mobility barriers and employment allocations. *J. Eur. Econ. Assoc.* 17 (5), 1617–1653.
- Sieg, Holger, Yoon, Chamma, Zhang, Jipeng, 2023. The impact of local fiscal and migration policies on human capital accumulation and inequality in China. *Internat. Econom. Rev.* 64 (1), 57–93.
- Sun, Wenkai, Zhao, Zhong, Shan, Shuang, Liu, Wending, 2021. Construction and testing of the China's labor marketization index. *China Econ. Q. Int.* 1 (2), 120–134.
- Sun, Yue, Zhao, Liqiu, Zhao, Zhong, 2025. Hukou status and children's education in China. *Econ. Dev. Cult. Chang.* 73 (2), 000–000.
- Suzuki, Yuta, 2023. Local shocks and regional dynamics in an aging economy. Available At SSRN 4360965.
- Tian, Yuan, 2024. International trade liberalization and domestic institutional reform: Effects of WTO accession on Chinese internal migration policy. *Rev. Econ. Stat.* 106 (3), 794–813.
- Tombe, Trevor, Zhu, Xiaodong, 2019. Trade, migration, and productivity: A quantitative analysis of China. *Am. Econ. Rev.* 109 (5), 1843–1872.
- Wang, Feicheng, Milner, Chris, Scheffel, Julianne, 2021. Labour market reform and firm-level employment adjustment: Evidence from the hukou reform in China. *J. Dev. Econ.* 149, 102584.
- Wang, Shaoda, Yang, David Y., 2025. Policy experimentation in China: The political economy of policy learning. *J. Political Econ.* 133 (7), 000–000.
- Wang, Julia Shu-Huah, Zhu, Yiwen, Peng, Chenhong, You, Jing, 2024. Internal migration policies in China: Patterns and determinants of the household registration reform policy design in 2014. *China Q.* 258, 457–478.
- Wu, Wenbin, You, Wei, 2025. Should governments promote or restrain urbanization? *J. Int. Econ.* 104084.
- Zhang, Jipeng, Huang, Jin, Wang, Junhui, Guo, Liang, 2020. Return migration and hukou registration constraints in Chinese cities. *China Econ. Rev.* 63, 101498.
- Zhang, Xiaomeng, Paliivos, Theodore, Liu, Xiangbo, 2022. Aging and automation in economies with search frictions. *J. Popul. Econ.* 35 (2), 621–642.
- Zhang, Li, Tao, Li, 2012. Barriers to the acquisition of urban hukou in Chinese cities. *Environ. Plan. A* 44 (12), 2883–2900.
- Zhang, Jipeng, Wang, Ru, Lu, Chong, 2019. A quantitative analysis of hukou reform in Chinese cities: 2000–2016. *Growth Chang.* 50 (1), 201–221.
- Zhang, Haifeng, Zhang, Hongliang, Zhang, Junsen, 2015. Demographic age structure and economic development: Evidence from Chinese provinces. *J. Comp. Econ.* 43 (1), 170–185.
- Zi, Yuan, 2025. Trade liberalization and the great labor reallocation. *Internat. Econom. Rev.* 66 (1), 933–963.