

# Migration and Municipal Bond Pricing: Evidence from China's Household

## Registration Reform

### Abstract

This study investigates how cross-city migration impacts municipal bond pricing in China. Traditionally, the country's household registration system, or Hukou system, has heavily restricted cross-city migration. However, with the relaxation of these restrictions, cities experiencing an influx of population show a notable decrease in the issuing yield spreads of their municipal bonds. The effect is more pronounced for cities with greater fiscal pressure and lower bond rating, consistent with a credit risk channel. Further analyses reveal that the decline in municipal bond spreads is mainly driven by increased demand for local services and infrastructure facilities and by an enhanced supply of skilled labor. Additional findings suggest that migration significantly bolsters local governments' land sale revenue, a significant channel that lowers default risk and thus municipal bond spreads.

**Keywords:** Migration; Municipal bond; Hukou policy; Household economics

**JEL Classification:** G12; J61; O15; R23

## 1. Introduction

Population migration is an important driver of regional economic growth (Chen and Fang, 2013; Bove and Elia, 2017; Borjas, 2023). The movement of people influences the supply and demand of various resources, thereby affecting the level and uncertainty of local governments' fiscal revenues. This, in turn, impacts local governments' financing needs and capabilities. As municipal bonds are a critical financing tool for local governments, they are inevitably affected by population migration. This study examines the specific impact of migration on municipal bond yield spreads. Our goal is to elucidate the mechanisms through which migration influences the financing costs of municipal bonds and to provide insights into financial stability and population policy-making.

To this end, we utilize a unique setting in China, where historical restrictions on population migration have recently been relaxed. For decades, China's "Hukou" system (literally translated as household registration system) imposed administrative restrictions on domestic migration. Recent reforms, however, have significantly eased these restrictions, enabling greater population mobility across cities. This relaxation has led to abrupt changes in local migration patterns, providing a rare opportunity to examine the causal effects of population migration.

The relaxation of the Hukou policy lifts restrictions on residency, resulting in free migration flows into and out of local regions. Heightened population inflows primarily influence local government financing through changes in the supply of labor and land, as well as the demand for local goods, services, and properties.<sup>1</sup> Specifically, on the supply side, the

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<sup>1</sup> We present our arguments from the perspective of inflows, with the understanding that outflows would produce the opposite outcomes. We verify the symmetry of these effects in our later empirical tests.

relaxation of Hukou allows for greater mobility of labor between rural and urban areas, leading to an increased labor supply from rural migrant workers in urban centers. Additionally, the Hukou relaxation encourages skilled laborers to move across regions. The influx of skilled workers can enhance labor productivity, facilitate knowledge transfer, and drive innovation (Bosetti, Cattaneo, and Verdolini, 2015; Peri, 2016; Bahar and Rapoport, 2018), ultimately bolstering local economic growth and increasing tax revenues from businesses and individuals. Furthermore, the opening of the Hukou may facilitate the transfer of land from small-scale family farms to more consolidated and efficient operations. The resultant increase in land productivity and value contributes to higher land sale revenue for local governments.

On the demand side, population inflow directly increases the consumption and utilization of infrastructure, thereby boosting revenues generated from the use of public facilities. The primary goal of municipal bonds in China is to support the development of infrastructure and public goods; improved utilization can directly enhance the cash flow sources for these bonds. Additionally, the influx of population leads to heightened demand for products and services provided by local enterprises, especially in non-tradable goods sectors. This increased demand not only raises the consumption tax collected by governments but also boosts local business income, thereby increasing income tax revenue (Moretti, 2010). Moreover, higher demand for properties can elevate real estate transaction taxes and related fees, providing an additional revenue stream for local governments.

However, while migrant inflows can increase local fiscal revenue through various taxes and fees, they can also have muted or even negative effects on fiscal revenue. For instance, if the labor influx is primarily composed of low-skilled workers, it might not positively impact

the local economy (Borjas, 2023). Instead, it can significantly increase the demand for public services and infrastructure, creating substantial pressure on local governments to provide these services, welfare programs, and infrastructure improvements. Local governments may need to finance these investments through excessive issuance of municipal bonds, which increases financial leverage and distress risk, ultimately contributing to higher municipal bond yields (Capeci, 1994; Gordon and Guerrón-Quintana, 2019).

Overall, an influx of migrants can improve a local government's creditworthiness by expanding its tax base and economic potential, potentially lowering yield spreads. Conversely, if migration leads to overburdened public services and infrastructure, it could increase the perceived risk of default, raising yield spreads.

We conduct empirical tests to assess the average effect of population migration on municipal bond yield spreads. To measure population migration induced by the relaxation of Hukou, we construct a variable defined as the Hukou relaxation indicator weighted by historical population inflows or outflows. This variable simultaneously captures the occurrence of Hukou relaxation and the direction of population migration. For municipal bond spreads, we focus on the issuing yield spreads of China's Chengtou bonds (literally translated as "municipal investment bonds"), which are local government debts issued via local government financial vehicles (LGFVs). Chengtou bonds are widely seen as local government liabilities and share similar features with municipal bonds in other countries (Gao, Ru, and Tang, 2021; Mo, Gao, and Zhou, 2021).

Examining the relaxation of Hukou across 285 cities in China during 2010–2019, we find that cities with high attractiveness (those with historical population inflow prior to the

relaxation) experience a significant reduction in yield spreads of newly issued municipal bonds after the Hukou relaxation. Specifically, a one standard deviation increase in our weighted average measure of Hukou relaxation translates to a reduction of 17 basis points (bps) in the issuing spread of municipal bonds, constituting a 6.59% reduction compared to the average issuing spread of municipal bonds in our sample. Next, we decompose our measure into Hukou relaxation-induced inflow and Hukou relaxation-induced outflow and find a symmetric effect. Cities with low attractiveness experience a significant increase in municipal bond spreads following the Hukou relaxation in other cities.

We then explore the underlying mechanisms through which Hukou relaxation affects municipal bond spreads. First, we verify that Hukou relaxation indeed brings an influx of population to cities with high attractiveness. Economically, a one standard deviation increase in our ex-ante population migration measure leads to a 1.05% increase in population growth rate. This finding not only suggests that Hukou relaxation effectively boosts local migrant inflow but also implies the effectiveness of our ex-ante measure in capturing the heterogeneity of attractiveness across cities.

Municipal bond pricing can be influenced by both credit risk and non-credit risk (Wang, Wu, and Zhang, 2008; Schwert, 2017). To investigate this, we conduct subsample analysis by splitting our sample based on cities' fiscal pressure and bond credit ratings. We find that the spread-reducing effect of migration is more pronounced for cities with greater fiscal pressure and lower credit ratings before the Hukou relaxation. This evidence suggests that local governments suffering from larger deficits or higher credit risk benefit more from the increased revenues brought by population inflows, confirming that migration influences

municipal bond spreads via the fundamental credit risk channel (Adelino, Cunha, and Ferreira, 2017).<sup>2</sup> Furthermore, the financial pressure test indicates that on average, population inflow does not impose an overwhelming burden on local governments in China, countering the spread-increasing hypothesis.

Having established the credit risk channel, we next investigate whether the observed effect is driven by increased local demand or enhanced labor supply, providing a more nuanced understanding of the underlying mechanisms. On the demand side, elevated consumer demand is expected to have a more significant impact in cities with a stronger presence of non-tradable industries, such as local food, services, education, and locally provided infrastructure services. Our analysis reveals that the reduction in municipal bond spreads is predominantly seen in cities with a substantial non-tradable sector presence and well-developed infrastructure. These findings align with the hypothesis that increased resident demand boosts consumption in these sectors, thereby enhancing local government revenues and lowering borrowing costs.

Examining the labor supply effect, we find that cities with a greater proportion of labor-intensive firms and a strong presence of manufacturing industries do not experience a stronger effect of Hukou relaxation. Since labor-intensive and manufacturing industries would presumably benefit more from an increased labor supply, these results are not in line with explanation that the local economy benefits primarily from an increase in general labor. Despite the muted effect of general labor, the supply effect could still be channeled through an enhanced provision of high-skilled labor. We find that patents granted to local firms are

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<sup>2</sup> We conduct analyses to test the non-credit risk channels such as liquidity risk and market sentiment, but find no supporting evidence.

significantly increased after the relaxation of Hukou, consistent with the notion that the documented effect on municipal bonds can be intermediated through a greater provision of high-skilled laborers.

Finally, we are interested in the specific cash flow channel through which in-migration enhances government creditworthiness and lowers municipal bond yield spreads. Taxes are the most common source of regional governments' fiscal income. Elevated population inflows likely increase tax revenue by expanding various tax bases, such as consumption taxes and income taxes. Another major component of fiscal income for China's local governments is land sale revenue. Population inflow can boost land sale revenue by driving up property prices through increased demand for real estate, rising purchasing power, and enhanced attractiveness to outside investors. In our empirical tests, while we do not find significant changes in various tax revenues after the Hukou relaxation, we do find that population inflow enhances the creditworthiness of local governments by significantly increasing land sale revenue. Specifically, we find that the marginal effect of population inflow after Hukou relaxation is more pronounced in cities that relied more on land sale revenues before the relaxation. Additionally, land sale revenue significantly increases after Hukou relaxation, likely due to land value appreciation caused by population growth, a channel suggested by the literature.

Prior research on population migration predominantly examines cross-country immigration, exploring its interplay with labor markets, international trade, economic growth, and financial market outcomes (e.g., Gould, 1994; Angrist and Kugler, 2003; Chen, 2015; Peri, 2012; Javorcik et al., 2011; Dustmann, Schönberg and Stuhler, 2016; Parsons and Vézina, 2018;

Alessandria, Deng and Bai, 2019; Borjas, 2023). Gaps remain in our understanding of how population migration specifically affects municipal bonds and local financial stability. Recent literature has started to pay attention to this area. Gordon and Guerrón-Quintana (2019) provide an analytical framework emphasizing the role of in-migration in inducing overborrowing by regional governments. Our empirical findings highlight a different role played by in-migration, i.e., enhancing cash flows and mitigating risks associated with local government borrowing. In addition, Gustafson et al. (2023) focus on migration risks related to remote work exposure during the Covid-19 pandemic period. Our study diverges by examining migration during normal periods, identifying different influencing channels.

Municipal bonds serve as a vital financing tool for local governments, enabling them to secure necessary funds for the provision of public services. Most existing studies focus on the pricing of municipal bonds from the perspective of market structure, technical factors, or tax considerations (Green, 1993; Harris and Piwowar, 2006; Wang, Wu, and Zhang, 2008; Longstaff, 2011; Schwert, 2017; Cestau et al., 2019). While these factors contribute to understanding short-term price movements and market dynamics, as an asset class, municipal bonds do also have "fundamentals" that are closely tied to the regional development characteristics of the issuing local government. These fundamentals encompass factors such as local economic growth, demographic trends, fiscal health, and local policies, which collectively influence the creditworthiness and risk profile of municipal bonds. A growing body of literature has identified various such factors, including debt levels, political affiliation or connections, investment losses, public monitoring, climate risk, Covid containment policy, etc. (Capeci, 1994; Butler, Fauver, and Mortal, 2009; Novy-Marx and Rauh, 2012; Cestau, 2018;



Gao, Lee, Murphy, 2020; Tran and Uzmanoglu 2022; Goldsmith-Pinkham et al., 2023). Our paper documents a new determinant - migration - that affects local government creditworthiness and thereby municipal bond yields. This addition contributes to a more comprehensive understanding of the factors driving municipal bond pricing and risk assessment.

Third, we inform policy-making implications. From the angle of local financing instrument risk management, we provide another piece of evidence that population migration can impose diverging effects on inflow and outflow cities. Policymakers should pay attention to the nuanced role of population migration on local economic risk and make corresponding adjustments (Cestau et al., 2019). By analyzing the impact of these policy changes on local municipal bond yield spreads, this paper not only offers insights into local-level policy implications but also provides valuable lessons for national-level strategies to promote domestic inter-province mobility of population and its impact on financial system stability and economic growth (Reck and Wilson, 2006; Gao, Lee, Murphy, 2019).

The rest of the paper is organized as follows: Section 2 provides an overview of China's municipal bond market, household registration system and its recent reforms, and their influence on population movement. Section 3 introduces the data. Section 4 presents the baseline results and discusses the results from additional analyses. Section 5 concludes the paper.

## **2. Background**

### **2.1 Municipal Bonds in China**

In China, local governments play a crucial role in delivering public services. The 1994

tax-sharing reform significantly enhanced the central government's financial capacity but reduced resources available to local governments. This left them with unchanged fiscal obligations despite lower revenue. As a result, local governments confronted a widening gap between their fiscal resources and increasing expenditure demands, compelling them to seek solutions from the financial markets.

Before the revision of China's Budget Law, local governments were barred from issuing bonds. To work around this restriction, local governments wishing to access bond markets established "financing platform" companies, also known as local government financing vehicles (LGFVs). These entities injected local assets – ranging from infrastructure and utility companies to government-owned land – into the platform, enabling them to issue bonds under the company's name. These bonds, known as Municipal Investment Bonds or Chengtou bonds (phonetically translated from Chinese), became instrumental in raising funds for a variety of local public projects essential for economic growth and community development. Chengtou bonds represent a substantial portion of China's bond market, accounting for 75% of outstanding enterprise bonds by the end of 2018 (Amstad and He, 2019).

Chengtou bonds are issued by subnational governments at three levels in China: provincial, prefectural, and county-level. For our analysis, we focus specifically on prefecture-level Chengtou bonds.<sup>3</sup> Given that Chengtou bonds are essentially municipal bonds disguised as corporate bonds, the risk premiums demanded by investors reflect the

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<sup>3</sup> After the revision of the Budget Law in 2015, local governments are now permitted to issue "authentic" municipal bonds (referred to as local government bonds), which are issued under the local governments' name and reflected on local government balance sheets. Until now, regulation only permits provincial governments to issue such bonds, subject to central government's approval. Meanwhile, provincial Chengtou bonds continue to co-exist with the newly created local government bonds. By limiting our sample to bonds issued by prefectures, we ensure that the analyses are more comparable overtime and eliminate the duality on the provincial level. Additionally, relaxation of Hukou is a decision decentralized to prefectures and thus varies from prefecture by prefecture.

underlying economic fundamentals of the prefectural-level regions issuing them. Factors such as local economic development, fiscal capacity, industrial composition, GDP growth, debt levels, and budgetary revenues and expenditures all influence a prefecture's ability to repay creditors through direct or indirect revenue streams.

## **2.2 China's Household Registration System - Hukou Policy**

In China, the Hukou (household registration) system has persisted for nearly 50 years as a legacy of the centrally planned economy (Gilbert and Tower, 2002). This system strictly controlled inter-regional migration, rendering non-local residents ineligible for certain social welfare benefits such as medical insurance and access to children's schooling. These mandatory restrictions created labor market frictions, resulting in mismatches and inefficiencies (Merz and Yashiv, 2007). Despite China's shift towards a market economy starting in the late 1970s, these restrictions remained largely unchanged for decades. However, beginning in the 2010s, as China deepened its reform efforts, the government began gradually relaxing or removing these constraints. Although the central government provided guidance to encourage reforms, the authority to relax the Hukou system was decentralized to the prefectural level (or city level). Prefectures were granted autonomy in deciding whether to ease their own Hukou restrictions.

To visualize the effect of Hukou relaxation on population flow across prefectures over time, we compute the rate of population inflow for each prefecture. Population growth originates from two primary sources: natural growth, which includes children born to local parents with local Hukou, and migration from other prefectures. We calculate the number of migrants by subtracting the natural growth from the yearly population change. The net

population inflow rate is then defined as follows:

$$InflowRate_t = \frac{ResidentPop_{t+1} - ResidentPop_t - NaturalPopGrowth_t}{ResidentPop_t}$$

The denominator represents the total residential population of the prefecture  $i$  in year  $t$ . We then regress  $InflowRate_t$  against year fixed effects to obtain the detrended “pure” population inflow rate. Next, we calculate the difference in net population inflow rate, for each year, between prefectures that ever announced relaxation policies and those that never did ( $\Delta Pop Inflow Rate$ ). Figure 1 shows this difference in inflow rate (the vertical axis, in percentage) against the year relative to the relaxation announcement year (the horizontal axis). The figure shows a spike in population inflow immediately following the announcement of Hukou relaxation in year 0, demonstrating a notable impact of a Hukou relaxation on local population growth.

[Insert Figure 1 here]

The univariate analysis in this section confirms that relaxing the Hukou policy indeed induces a greater population inflow, validating the use of Hukou relaxation as a proxy for immigration in our study.

### 3. Data and Empirical Strategy

#### 3.1 Data

Municipal bonds in this study refer to Chengtou bonds defined by the Wind database. For each municipal bond, we collect its spread, rating, primary trading market (exchange market or over-the-counter based interbank market), and characteristics of its issuing LGFV. Municipal bonds in China include Medium-Term Notes (MTN), Enterprise Bonds (Enterprise), Corporate Bonds (Corporate), Private Placement Notes (PPN), and Commercial Papers (CP). The final sample includes 19,037 unique bonds issued by 2,781 LGFVs of 285 prefectures.

The data on Hukou policies are sourced from PKU Law, a database of Chinese laws and policies. To ensure completeness, we supplement this information with manual searches. From these sources, we extract and parse policy texts to construct our primary variable of interest: the relaxation of Hukou. This variable, *HukouRlx*, is coded as 1 if a prefecture relaxes its household registration restrictions for migrants starting from year  $t$  onwards. In order to compute our main empirical measure, we also use historical migration data from the Fifth National Population Census in 2000, which encompasses 1% of all survey respondents from across the entire Chinese population. This dataset provides individual-level characteristics, including each person's place of origin and current residence, enabling us to determine the precise scale of migration between any pair of prefectures in 2000.

Additionally, we also collect prefecture-level characteristics from China City Statistical Yearbook and Wind database between 2010 and 2019, before the outbreak of Covid 19. Specifically, we collect annual data on economic indicators, fiscal figures, and demographic characteristics from the yearbook. We supplement the missing value with regional statistical yearbooks of prefectures.

### **3.2 Identification**

Our empirical analysis is subject to the concern that population inflow is driven by regional economic growth, which also affects the pricing of local municipal bonds. To overcome this endogeneity concern, we adopt a measure that incorporates the historical attractiveness of each city that is relative exogenous to the current-period population inflow, and the Hukou reform that is exogenous to the migrants from each source city. This measure is essentially a shift-share instrument that is widely used in the labor economics literature (Bartik 1991; Hummels et al., 2014; Notowidigdo, 2020, among others).

Specifically, taking advantage of the 2000 Population Census of China data, we compute the historical share of population inflow from each city  $i$  to city  $j$ , and then aggregate these

shares to obtain city  $j$ 's population inflow in 2000,  $\sum_{i=1}^n (\frac{Popflow_{i\ to\ j}}{Pop_j})$ , which also represents the historical attractiveness of city  $j$ . Next, we multiply the indicator of Hukou relaxation in city  $j$  (i.e.,  $HukouRlx_{j,t}$ ) with the computed historical attractiveness, thus obtaining the migration-in effect due to the relaxation of Hukou relaxation policies:

$$MigrationIn_{j,t} = PopInflow_{2000} \times HukouRlx_{j,t} = \sum_{i=1}^n (\frac{Popflow_{i\ to\ j}}{Pop_j} HukouRlx_{j,t}) \quad (1)$$

Furthermore, we recognize that in addition to the potential migration-in effect of Hukou relaxation estimated in Equation (1), each city in our sample also faces a migration-out effect due to other cities' Hukou relaxation policies. We thus quantify the migration-out effect as follows.

$$MigrationOut_{j,t} = -PopOutflow_{2000} \times HukouRlx_{i,t} = -\sum_{i=1}^n (\frac{Popflow_{j\ to\ i}}{Pop_i} HukouRlx_{i,t}) \quad (2)$$

Finally, the net effect of Hukou relaxations is computed by summing the values of  $MigrationIn_{j,t}$  and  $MigrationOut_{j,t}$  ( $MigrationNet_{j,t}$ ).

$$MigrationNet_{j,t} = MigrationIn_{j,t} + MigrationOut_{j,t} \quad (3)$$

$MigrationNet$  can capture the predicted migration for city  $j$  following its Hukou relaxation. It has the following advantages in the context of studying migration due to Hukou relaxation. First, while the implementation of Hukou reform might not be entirely exogenous to local economic conditions, it is relatively exogenous to source cities' economic conditions and their residents' migration decisions. As such, the migration of city  $i$ 's residents to city  $j$  would be exogenously magnified by city  $j$ 's implementation of Hukou relaxation if city  $j$  is historically attractive to city  $i$ 's residents. Alternatively, city  $j$ 's out-migration would be exogenously enhanced when other cities that historically attracted city  $j$ 's residents have implemented a relaxation of Hukou restriction.

Second, historical attractiveness is relatively exogenous to the pricing of municipal bond issued in the recent periods. However, due to its persistence, it can well predict the population

inflow of the Hukou relaxing city because initial migrations create social networks that reduce costs and risks for future migrants from the same origin (Massey et al., 1993; Beaman, 2012; Mahajan and Yang, 2020).<sup>4</sup> To illustrate this predictability, we compute the 2000 net population inflow rate as  $PopInflow_{2000} - PopOutflow_{2000}$ , and then classify attractive cities as those having a 2000 net inflow rate greater than 0 and unattractive cities as those having a rate less than 0. Figure 2 plots the detrended population inflow rate for the two groups of cities, which shows that “attractive” cities experience a notable increase in population inflow following the relaxation of Hukou restrictions, whereas this trend is not observed in “unattractive” prefectures. This highlights predictability of historical attractiveness and Hukou policy’s effectiveness in shifting the population flows.

[Insert Figure 2 here]

### 3.3 Descriptive Statistics

Table 1 Panel A presents the statistics of bond-level data. The average spread for all municipal bonds is 2.58%, with an average issue amount of 0.84 billion and an average maturity of 4.49 years. The average bond rating is 2.57, ranging from 0 to 6, where a rating of 6 denotes the highest rating of “AAA” and a rating of 1 denotes the lowest rating of “A-”. A rating of 0 indicates the absence of rating information. The issuer ratings range from 1 to 12, with the average rating being 10.6. Regarding the trading market for municipal bonds, 61.57% are traded in the interbank market, 35.66% on the Shanghai Stock Exchange, and 2.77% on the Shenzhen Stock Exchange. Municipal bonds are categorized based on the administrative level of the issuing LGFV: district, city, and province bonds. Approximately half of the bonds are issued by city-level LGFV.

Table 1 Panel B presents summary statistics for unique prefecture-year observations. The

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<sup>4</sup> These networks develop cultural environments through businesses, media, and services, embedding migration as a longstanding tradition at both the origin and destination (Fouka et al., 2022).

average net migration effect of relaxing Hukou ( $MigrationNet_{j,t}$  is 0.16, indicating a general migration-in effect for cities that relax household registration restrictions. We also provide statistics for the *HukouRlx* indicator alone, showing that 55% of city-years occur post-relaxation. Additionally, the average GDP growth rate across all prefectures is 9.28%, with an average ratio of outstanding municipal bonds to fiscal revenue at 57.05%. The average proportions of GDP in the secondary and tertiary industries are 47.11% and 40.63%, respectively. On average, each prefecture experiences an annual population growth rate of 0.37%, a fiscal gap of 16.09 billion, and generates 750 patents annually. Regarding fiscal revenue, the averages for value-added tax, corporate income tax, individual income tax, and land sales revenue across all prefectures are 4.75 billion, 2.42 billion, 0.92 billion, and 15.09 billion, respectively.

[Insert Table 1 here]

## 4. Empirical Methods and Results

### 4.1 Hukou Relaxation and Yield Spreads of Municipal Bonds

We begin with a simple OLS regression to examine whether population inflow and municipal bond yield spread are correlated in a predictable manner. For this purpose, we regress the municipal bond yield spread against the net population inflow rate (measured by the rate of inward migration as a share of the resident population) from the previous year. Table 2 presents the results. We use two specifications: one without any control variables (Column 1) and another including all control variables (Column 2). All specifications control for province-year and prefecture fixed effects. In both columns, the net population inflow rate has a negative and significant coefficient, consistent with the notion that a population influx can reduce the issuance spread of municipal bonds.

The relationship between population inflow and spread highlights how demographic factors might influence municipal bond pricing, an aspect insufficiently studied until Bulter



and Yi (2022). However, these estimates are subject to potential bias due to endogeneity concerns: unobserved prefecture characteristics may simultaneously affect both the bond yield and population migration.

Therefore, in all subsequent analyses, we adopt the shift-share instrument in Equation (3) to examine the effect of migration triggered by the relaxation of Hukou policy on municipal bond yield spreads. To do so, we estimate the following fixed effect regression:

$$Spread_{i,j,t+1} = \alpha + \beta_1 Migration\_Net_{j,t} + \beta_2 Z_{i,j,t+1} + \beta_3 X_{j,t} + FE + \varepsilon_{j,t}, \quad (4)$$

where  $Spread_{i,j,t+1}$  represents the yield spread of municipal bonds  $i$  issued by city  $j$  in year  $t+1$ , and  $MigrationNet_{j,t}$  serves as the primary explanatory variable, measuring the net effect of population inflows induced by relaxed Hukou policies in city  $j$  in year  $t$ .  $Z_{i,j,t+1}$  includes characteristics of municipal bond  $i$  in city  $j$  in year  $t+1$ , such as the amount issued, maturity, bond ratings, bond type, and issuer ratings.  $X_{j,t}$  includes characteristics of city  $j$  in year  $t$ . We additionally control for city fixed effects to account for unobserved time-invariant traits specific to each city, and prefecture-year fixed effects to absorb unobserved time-varying characteristics at the province level. Standard errors are clustered at the city level.

The results of these tests are presented in Table 3. In column 1, using  $MigrationNet$  as the main explanatory variable, we find a statistically significant negative relationship between the net effect of Hukou relaxation in city  $j$  and the yield spread of municipal bonds issued in the subsequent year. Specifically, a one standard deviation increase in our weighted average measure of Hukou relaxation translates to a reduction of 17 basis points (bps) in the issuing spread of municipal bonds, constituting a 6.59% reduction compared to the average issuing spread of municipal bonds in our sample. This suggests that an increased net inflow of population resulting from relaxed Hukou policies indeed correlates with a reduction in the financing costs of municipal bonds in the following year.

Moving to column 2 and 3, we separately control for the migration-in effect of local Hukou

relaxation ( $MigrationIn_{j,t}$ ) and migration-out effect of Hukou relaxations by other cities ( $MigrationOut_{j,t}$ ). The results show a significantly negative coefficient on  $MigrationIn_{j,t}$ , suggesting that the potential population inflow due to local Hukou relaxation reduces local municipal bonds' issuing spreads. In addition, we find a significantly negative coefficient on  $MigrationOut_{j,t}$  as well. Since we add a negative sign before the computation of population outflow, the negative coefficient suggests a greater outflow of population due to other cities' Hukou relaxations will result in an increase in the issuing yield spread. These results further buttress the inference that population migration resulting from relaxed Hukou policies, either in the form of migration-in or migration-out, works as a key determinant of the local municipal bonds' financing costs.

Moreover, the results also reveal the relationship between various characteristics inherent to municipal bonds significantly and their yield spreads. Specifically, larger issuance sizes, higher issuer ratings, elevated bond ratings, as well as issuance in regions with higher administrative rankings, are negatively associated with the yield spreads of municipal bonds. On the other hand, longer maturity periods are associated with higher issuance costs for these bonds, which aligns with existing literature on municipal finance. Regarding other control variables, a faster growth rate in the city's GDP is correlated with a decrease in municipal bond yield spreads. Conversely, higher municipal debt-to-revenue ratios, along with higher levels of industrial and service sector development, substantially increase the issuance costs of municipal bonds. These findings are consistent with prior research on the dynamics of municipal finance.

[Insert Table 3 here]

#### **4.2 Mechanism behind the Spread-Reducing Effect of Hukou Relaxation**

In this section, we conduct comprehensive analysis to shed light on the mechanisms underlying the impact of relaxed Hukou policies on the yield spreads of municipal bonds. We

begin by investigating whether regions that implement Hukou relaxation experience population growth. Subsequently, we test whether the impact of Hukou relaxation operates through the credit risk channel or non-credit-risk channels. Next, we explore whether Hukou relaxations influence municipal bonds by boosting local demand or enhancing labor supply. Finally, we examine whether Hukou relaxations enhance the cash flow of local governments, thereby reducing the yield spreads of municipal bonds.

#### **4.2.1 Population Growth**

The relaxation of the Hukou can significantly impact city population growth rates through multiple channels. First, this relaxation directly brings new residents to the city. The influx, particularly of new labor force participants, boosts the local economy by increasing productivity, consumption, and overall economic activity. Second, the attracted labor force tends to be younger and more fertile compared to the existing population, leading to higher birth rates and a secondary population increase, which alters the age composition of the city. The combination of a growing labor force and a more balanced age structure enhances the city's long-term economic prospects, making it more attractive to investors. Consequently, the perceived risk associated with municipal bonds issued by the city decreases, resulting in lower yield spreads as investors accept lower returns for reduced risk.

The impact of Hukou relaxation on city population growth rates is presented in Table 4. Across all specifications, the coefficients of the main explanatory variables are significantly positive, indicating that Hukou relaxation policies that induce population inflow enhance the city's future population growth rate. Interestingly, the coefficients for policy variables themselves on population growth rates are either significantly negative or not significant, suggesting that pure Hukou relaxation policies alone, without considering the relaxing prefecture's attractiveness, do not stimulate subsequent city population growth.

[Insert Table 4 here]

#### **4.2.2 Credit Risk**

Bond yield changes can be driven by either credit risk or non-credit risk factors. We examine whether our results are mainly determined by the credit risk channel. When a city experiences population inflows due to Hukou policy changes, its local economy can benefit from increased labor supply, consumption, and overall economic activity. This, in turn, can lead to higher tax revenues and improved fiscal health for the local government. As a result, the city's creditworthiness improves, reducing the perceived risk of default on its municipal bonds. Investors, recognizing this reduction in credit risk, may demand lower yield spreads on the prefecture's bonds.

If our baseline finding – that Hukou relaxation reduces municipal bond yield spreads – is mainly driven by credit channels, the effect should correlate with the pre-policy creditworthiness of the prefecture. Specifically, Hukou relaxation and the resulting population inflow should have a more significant marginal impact on bond issuing yields in prefectures with lower creditworthiness, characterized by greater fiscal pressure and lower bond ratings. To test this hypothesis, we conduct subsample analyses by dividing our sample based on the cities' fiscal pressure and bond credit ratings.

Table 5 presents the results. Fiscal pressure is measured by subtracting a prefecture's fiscal revenue from its fiscal expenditure each year. In Columns 1 and 2, prefectures with fiscal pressures above the median are categorized as high fiscal pressure cities, while those below the median are categorized as low fiscal pressure cities. The dependent variable in both Columns is the next-year municipal bond yield spread. We find that the coefficient on Hukou policy-induced population inflows is significantly negative for the high fiscal pressure subgroup (Column 1), with the coefficient magnitude being larger than that in the baseline regression. This suggests that Hukou relaxation has a more pronounced positive effect on bond yields in financially strained cities. In comparison, the coefficient for the low fiscal pressure subgroup in Column 2 is insignificant, implying a diminished marginal effect of Hukou policy-induced population inflows. The difference in coefficients between subsamples

is statistically significant. The above findings are consistent with the credit risk channel, with more significant impacts observed in cities under greater financial strain.

Columns 3 and 4 further examine the role of bond ratings. Column 3 presents the regression results for the high bond rating subsample. The coefficient for population net inflow induced by Hukou policies is not significant, indicating that the spread-reducing effect of population migration does not apply to cities with high credit ratings prior to the Hukou relaxation. In contrast, Column 4 shows the results for the low bond rating subsample. Here, the results indicate that population inflows induced by Hukou policy relaxation significantly reduce bond spreads. The difference in coefficients is statistically significant. This finding suggests that local governments with higher credit risk benefit more from the increased revenues brought by population inflows.

[Insert Table 5 here]

The heterogeneity analyses reveal that the impact of population net inflows induced by Hukou relaxation is more pronounced for cities experiencing greater fiscal pressures and lower bond ratings, confirming that migration influences municipal bond spreads via the fundamental credit risk channel.

#### **4.2.3 Enhanced Local Demand or Elevated Labor Supply?**

Migration can boost the local economy either through increased demand for local goods and services or through the enhanced provision of labor, including high-skilled labor. We next investigate whether the observed effect is driven primarily by enhanced demand or supply.

We first utilize the notion of tradable and non-tradable industries to test the local demand hypothesis. Elevated local consumer demand is expected to have a more significant impact in cities with a stronger presence of non-tradable industries. We consider three sectors – service sector, healthcare, and highways – as non-tradable goods, as their products and services are mostly consumed by local residents. We partition the sample by the ratio of the service sector in the prefecture’s overall economy and re-run the baseline regression in each subsample.

Columns 1 and 2 in Table 6 show the regression results when partitioning the sample using the median level of service sector presence. We observe a statistically significant negative effect of population inflow induced by Hukou relaxation on the spread of municipal bonds for prefectures with a high level of services, while the effect is not significant for prefectures with a low level of services. The difference in coefficients between subsamples is statistically significant.

Next, we classify the sample based on the median level of infrastructure, using the number of hospitals as a proxy variable. Column 3 presents the results for the subsample with more healthcare resources. In this subsample, population inflows induced by the relaxation of Hukou significantly reduce bond spreads. In contrast, Column 4 shows that cities with lower healthcare resources do not experience a reduction in municipal bond spreads due to population inflows. The difference in coefficients between subsamples is statistically significant.

In Columns 5 and 6, we use highways as a proxy variable to measure the level of infrastructure. The reason for choosing highways as a proxy for infrastructure is twofold. First, compared to other transportation infrastructure, such as railways or airports, highways are more widely distributed among prefectures in China. This widespread presence allows for a more comprehensive analysis of the impact of population inflows on local government financing costs across a broader range of cities. Second, in China, income generated from highways, such as tolls and fees, is typically allocated to local government finances. This direct link between highway revenue and local fiscal health makes highways a particularly relevant measure of infrastructure when examining the demand-side channel through which population inflows affect municipal bond yield spreads. The results in Columns 5 and 6 show that cities with higher levels of highway resources benefit more from population inflows in terms of reduced local government financing costs. The difference in coefficients between subsamples is statistically significant.

Overall, these results are consistent with the notion that enhanced local demand is a crucial mechanism through which migration reduces local government financing costs.

[Insert Table 6 here]

Next, we examine the labor supply hypothesis, which posits that the labor force influx post the relaxation of Hukou reduces the yield spread. The relaxation of Hukou policies can significantly affect labor force expansion by facilitating interregional labor mobility and aggregating human capital, particularly high-skilled labor. The influx of new workers, especially skilled individuals, can contribute to the local economy in several ways. First, as a production input, the increased labor supply supports the growth of local businesses. Second, the addition of skilled workers can enhance the overall quality of local human capital, potentially boosting productivity and innovation. These factors can collectively drive city economic growth and improve municipal facility utilization, consequently reducing municipal bond spreads.

If this labor input channel is a significant mechanism, we expect the reduction in city financing costs to be more pronounced in cities with higher levels of demand for labor force, as these cities are more likely to benefit from the increased labor supply and human capital enhancement. We construct two measures to gauge the demand for labor force: industrialization and labor density. Industrialization is measured by the ratio of the manufacturing sector in the prefecture's overall economy. This ratio quantifies the importance of manufacturing industries to the local economy and, consequently, the need for labor force, as manufacturing industries rely heavily on labor input. Labor density is directly measured by dividing the total labor force by the total fixed assets of a prefecture. This measure reflects the local economy's reliance on labor force.

Using subsample analysis, we assess whether cities with higher industrialization and labor density experience a more significant reduction in municipal bond spreads due to the influx of labor induced by Hukou relaxation. Panel A of Table 7 presents the results of

subsample analyses for cities with varying levels of industrialization and labor density. The results show that across all regression analyses, the coefficients of the primary explanatory variables exhibit significant negative values. This indicates that population inflows resulting from Hukou policy adjustments lower financing costs for all cities, regardless of their levels of industrialization and labor density. The non-distinguishable results across subsamples are not entirely consistent with the labor supply hypothesis.

However, we cannot completely rule out the labor supply channel based solely on the above results. The non-distinguishable results could be attributed to the noise in the variables we use to classify the intrinsic demand for labor provision of a prefecture. Alternatively, they could be caused by the universal labor shortages across subgroups of cities, such that the relaxation of the Hukou facilitates a more efficient allocation of labor resources among cities with different levels of industrialization and labor intensity.<sup>5</sup> In other words, the labor input channel benefits cities across the board by mitigating the common challenge of labor shortages.

Neither do we deny the possibility that the influx of high-skilled labor can boost the local innovation and competitiveness of local firms, ultimately contributing to an improved fiscal health of the local government. Therefore, we estimate the effect of Hukou relaxation and associated population inflow on the number of patents granted in the respective city. Due to the count nature of patents, we follow recent literature and use a Poisson regression to capture the effect of enhanced labor supply. To accommodate the potential time lag of granting patents since their invention and application, we use three explanatory variables, lagged by one, two, and three years, respectively.

Panel B of Table 7 reports the regression results showing the effect of net inflow caused by the relaxation of Hukou on the number of patents granted. We find significantly positive coefficients across different specifications of time lags. This finding suggests that the elevated

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<sup>5</sup> Labor shortages are a common issue across most cities in China, due to the combination of an aging population and a rapidly progressing manufacturing sector during our sample period.



provision of high-skilled labor might be an important channel through which Hukou relaxation and associated in-migration contribute to the local economy, thereby reducing municipal bond financing costs.

[Insert Table 7 here]

#### **4.2.4 Evidence on Enhanced Cash Flows for Local Governments**

A decreased bond yield can be explained by reduced uncertainty or an elevated level of cash flows for the debtor. Thus, as a final set of channel tests, we examine the implications of Hukou relaxation on the cash flow received by local governments, or through what types of cash flow the local government's creditworthiness is significantly bolstered.

In China, local governments heavily rely on two main sources of fiscal income: regular taxes and land sales. Regular taxes, such as consumption and income taxes, are the primary source of fiscal income for regional governments. These taxes are collected from individuals and businesses within the local government's jurisdiction and are used to fund various public services and infrastructure projects. On the other hand, land sales have become an increasingly important source of revenue for local governments in China, particularly since the 1990s, when the country underwent significant land reforms. Local governments acquire land from rural collectives and then sell the land-use rights to developers for a specified period, generating substantial revenue in the process.

Population inflow post Hukou relaxation is likely to increase both sources of income. As more people move into a city, they contribute to the local economy through their spending and earnings, which translates into higher tax collections for the local government. Furthermore, population inflows can boost land sale revenue by driving up property prices through increased demand for real estate, rising purchasing power, and enhanced

attractiveness to outside investors. The influx of people into a city not only escalates the demand for residential land but also stimulates investments in commerce and industry, commensurate with increased consumption. This, in turn, amplifies the need for industrial land. As a result, both the demand for and prices of urban land are expected to rise due to population influx. Given that revenue derived from land sales constitutes a primary revenue stream for local Chinese governments, the increase in land sale revenue can substantially alleviate fiscal pressures on local governments.

To capture the impact of net population inflows induced by the relaxation of Hukou on city tax revenue, we estimate regressions using the natural logarithm of value-added tax, corporate income tax, and individual income tax as dependent variables separately. The results are reported in Table 8. In Columns 1 and 2, where the dependent variables are value-added tax and corporate income tax respectively, the coefficients of *MigrationNet* are insignificant. This indicates that the relaxation of residency policies does not directly correlate with these two types of tax revenues.

In Column 3, using individual income tax as the dependent variable, the coefficient on *MigrationNet* is positive and statistically significant. This result is intuitive: as the city experiences population growth, the total tax revenue collected from an increased number of residents naturally rises. This effect is further enhanced by the potential influx of high-skilled labor, whose higher incomes generate more personal income tax.

In Column 4, we use land sale revenue as the dependent variable. The coefficient on *MigrationNet* bears a positive and significant sign, indicating that population inflows significantly increase land sale revenue. This aligns with previous findings by Zhao (2015)

and Chen and Wen (2017), who documented the mechanical growth in land sales due to the increase in housing demand from the newly added population. China's housing market exhibits characteristics of a rational bubble, where investors purchase properties in anticipation of future price appreciation. This behavior is particularly evident in prefectures experiencing population inflows, as the increased demand from new migrants is expected to boost housing prices. This investment behavior further amplifies the demand for land and contributes to the increase in land sale revenue for local governments.

In summary, we find that individual income tax revenue and land sale revenue significantly increase after Hukou relaxation. This is likely due to the increase population size and land value appreciation caused by migration, a channel suggested by the literature.

[Insert Table 8 here]

### **4.3 Endogeneity Checks**

#### **4.3.1 Predicting Relaxation of Hukou Policies**

There may be concerns regarding the selection issues of the Hukou relaxation: Prefectures facing greater financing costs and suffering from more severe fiscal deficits might be more likely to relax their Hukou restrictions. To address this concern, we first visualize that the relaxation of Hukou restrictions is not preceded by noticeable patterns of local municipal bond yields across prefectures. In Figure 3, we color-code prefectures based on the pre-relaxation municipal bond spreads relative to the national average: red represents prefectures whose municipal bond spreads exceed the national average in the same year, while blue denotes those below the national average. The map shows that relaxing prefectures do not exhibit consistent patterns regarding pre-relaxation bond yields: they may have either higher or lower yields than the national average one year before relaxation.

[Insert Figure 3 here]

Next, we perform a policy implantation prediction test. Specifically, we use the implementation of Hukou relaxation policies by prefectures as the dependent variable ( $Policy_{j,t}$ ), which is a dummy variable indicating whether prefecture  $j$  implemented Hukou relaxation policy in year  $t$  that takes the value of 1 if yes and 0 otherwise. The main explanatory variables are lagged spreads, lagged change in spreads, lagged net population inflow, and lagged net population inflow change from period  $t-1$  to  $t-2$  for each prefecture. We regress  $Policy_{j,t}$  on these variables to verify whether these factors trigger the subsequent issuance of Hukou relaxation policies by prefecture  $j$  in subsequent years. If such a relationship exists, it would undermine our assumption that Hukou relaxation is exogenous.

The results are reported in Table 9. In Column 1, the primary explanatory variables are the average spread of municipal bonds for prefecture  $j$  in the previous period  $t-1$  and municipal bonds spreads differences in period  $t-1$  and  $t-2$  for prefecture  $j$  ( $\Delta Spread_{t-1}$ ). The result indicates that the lagged spread and lagged spread difference of municipal bonds do not exhibit significant correlation with the subsequent implementation of Hukou relaxation policies in the prefecture for the following year. The result in Columns 1 suggests that the initiation of Hukou relaxation by prefecture is seemingly exogenous to the performance of municipal bonds.

Furthermore, we examine whether the implementation of Hukou relaxation policies in prefectures is associated with the migration patterns of their populations. In Column 2, besides spread variables, we further add net migration of population in prefecture  $j$  during period  $t-1$  and net population inflow change from period  $t-1$  to  $t-2$  serve as the additional primary explanatory variables. Nonetheless, the lagged net migration of population fails to exhibit a direct relationship with the decision to implement Hukou relaxation in the subsequent year. In Column 3, we further add other economic factors of prefecture  $j$  as control

variables, and the policy prediction result remains insignificant. Collectively, these results indicate that neither the expansion of municipal bond spreads nor population outflow serves as a catalyst for the implementation of Hukou relaxation policies.

[Insert Table 9 here]

#### **4.3.2 Placebo Test**

Next, to account for the pre-existing differences in trends between the treatment and control groups prior to the actual policy intervention, we conduct a placebo test. In particular, we replace prefectures with relaxed Hukou policies with their matched prefectures using nearest-neighbor, propensity-score matching, and then rerun the baseline regression. To do so, we first estimate the probability of treatment for each unit based on selected pre-treatment covariates, including GDP growth rate, municipal debt-to-revenue ratio, the proportion of the secondary industry, the proportion of the tertiary industry, population growth rate, fiscal expenditure and fiscal revenue. We then replace original treated prefectures with an untreated prefecture that has a similar propensity score in the regression.

The results are presented in Table 10. As shown in Columns 1 through 3, the impact of net population flows resulting from the relaxation of Hukou on the yield spreads of municipal bonds is found to be statistically insignificant. This suggests that the impact of Hukou policies on bond spreads does not occur in placebo cities when using nearest neighbor matching and the changes in the yield spreads of municipal bonds are not attributable to unobserved variables related to the cities themselves.

[Insert Table 10 here]

## **5. Conclusion**

Our study investigates the dynamics between the relaxation of household registration (Hukou) and the yield spreads of municipal bonds in China. Our results highlight that

population inflows induced by Hukou relaxation reduce the financing costs of local governments. These effects are more pronounced in cities with greater fiscal pressures and lower bond ratings, emphasizing the role of credit risk in municipal bond markets. Additionally, increased resident demand, particularly in cities with a strong presence of non-tradable industries, is crucial in lowering municipal bond spreads. While we do not find evidence that the general labor supply significantly impacts municipal bond yields, we observe increased innovation outcomes for local firms. This supports the notion that the inflow of high-skilled labor due to Hukou relaxation contributes significantly to the reduction in bond spreads. Furthermore, Hukou relaxation enhances government creditworthiness and reduces municipal bond yield spreads by increasing fiscal income and land sale revenue.

In summary, our findings contribute to a comprehensive understanding of how urban policy reforms, specifically the relaxation of Hukou, impact municipal bond markets. By revealing the nuanced influencing mechanisms of residency policies, our study provides valuable insights for policymakers seeking to optimize local government financing strategies and foster sustainable urban development in China.

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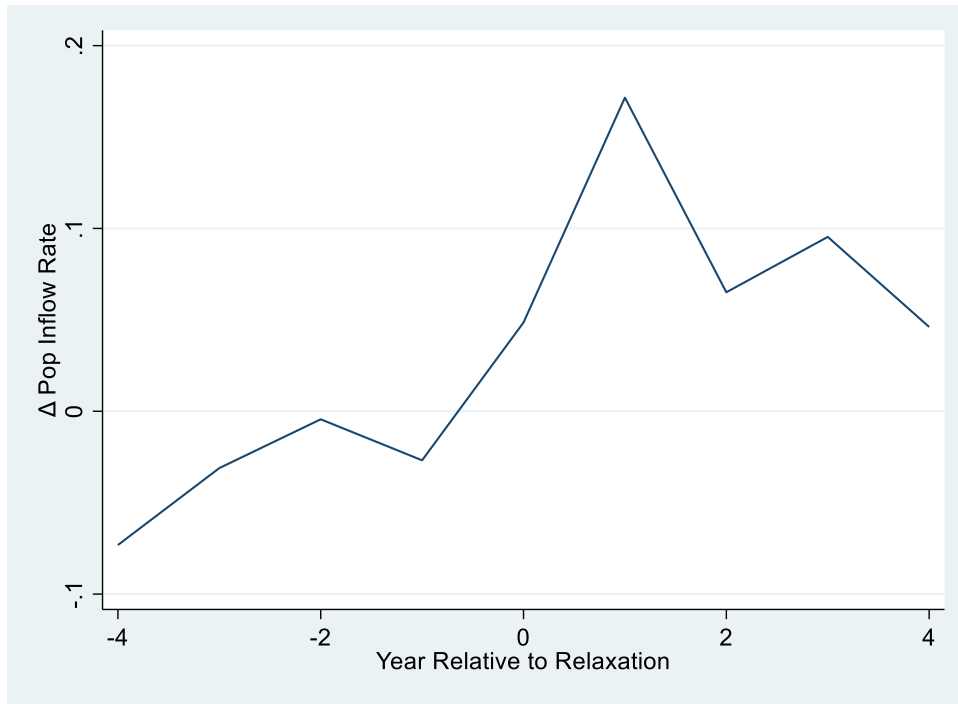
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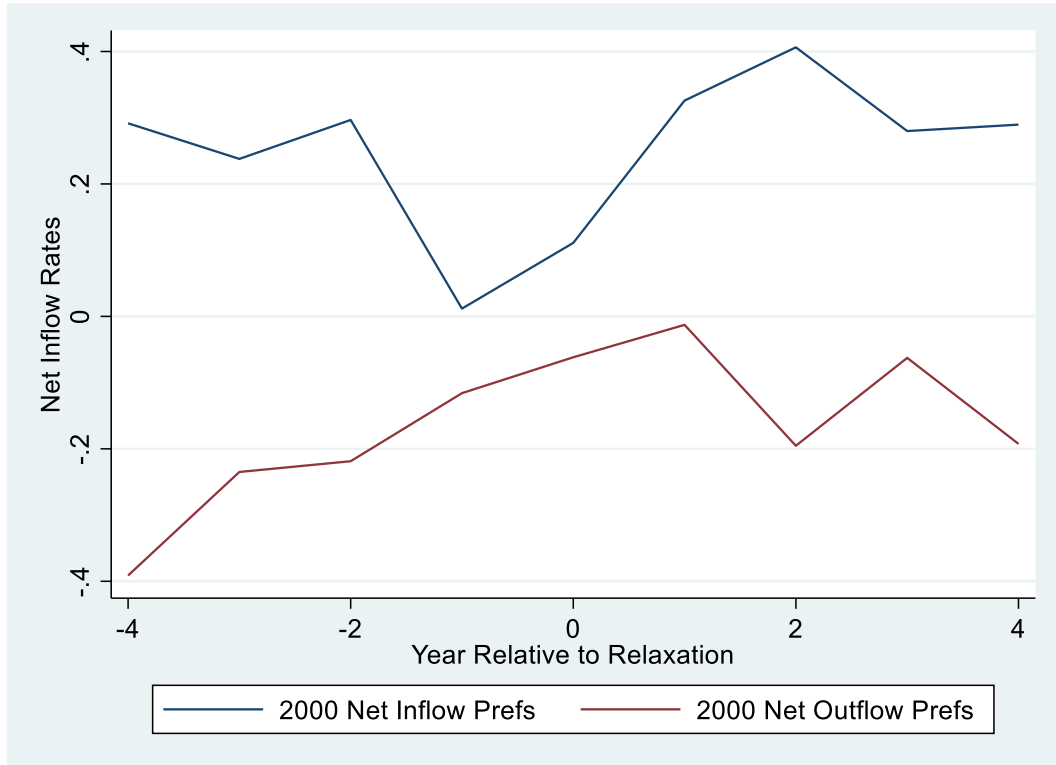
**Figure 1. Population Growth around the Hukou Relaxation**

The figure plots the difference in population inflow rate between Hukou relaxing prefectures and other prefectures. The vertical axis represents the difference in inflow rate between the two groups each year. The horizontal axis is the year relative to the policy announcement year.



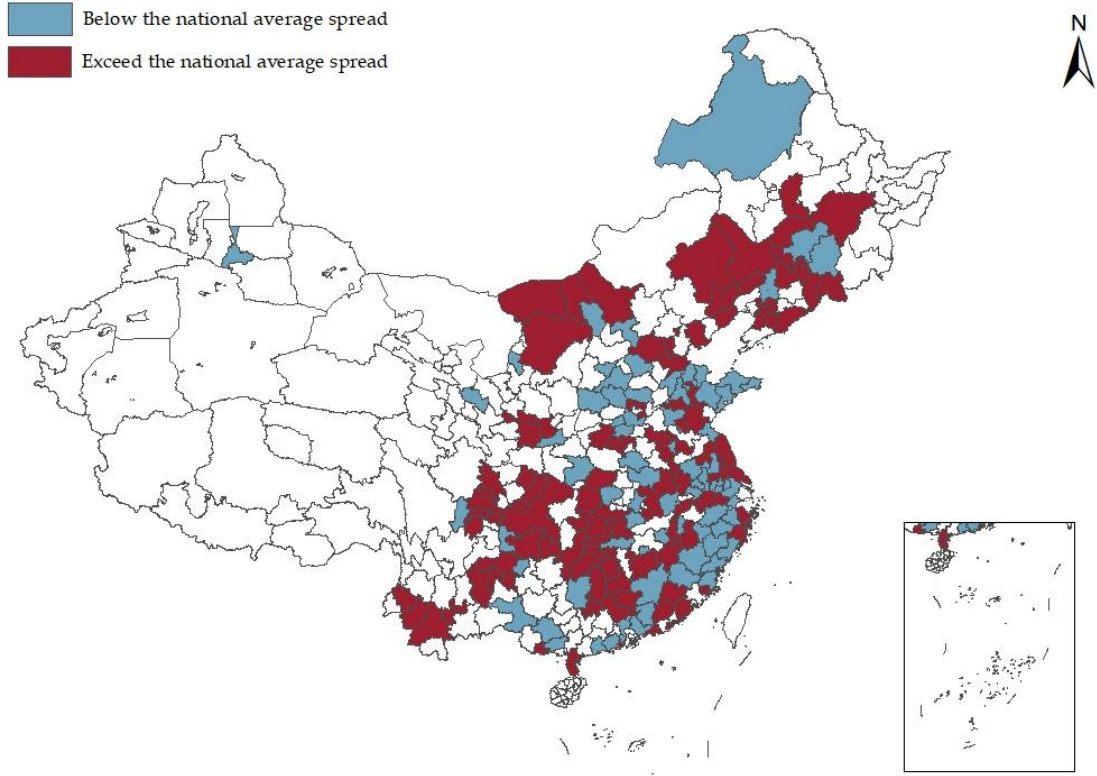
**Figure 2. Population Growth for Attractive (Blue) and Unattractive Prefectures (Red)**

The figure shows the population inflow rate for historically attractive prefectures and unattractive ones, respectively. The vertical axis represents the inflow rate. The horizontal axis is the year relative to the policy announcement year.



### Figure 3: Population flow and Municipal Bond Spreads

The figure shows whether the average municipal bond spread of a certain prefecture was higher or lower than the national average municipal bond spread before the relaxation of Hukou.



### Table 1. Summary Statistics

This table reports summary statistics for the sample of municipal bonds acquired from Wind, covering bonds across 285 cities that were issued from 2011 through 2020. Panel A reports bond-level variables in period  $t+1$  winsorized at 1% and 99% including the difference between bond coupon rate and risk-free rate (*Spread*); the total amount of the issue (*Amount issue*); the maturity of the bond; a numerical scale of issuer ratings from AAA to BB (*Issuer rating*); a numerical scale of bond ratings from AAA to A- (*Bond rating*); distribution of trading market, municipal investment company's administrative level, and bond type. Panel B reports city-level variables winsorized at 1% and 99% including Hukou relaxation policies effect related variables in period  $t$  (*MigrationNet*, *MigrationIn*, *MigrationOut*, *Policy*); GDP growth rate; municipal debt-to-revenue ratios (*Debt ratio*); the proportion of the secondary industry (*Industrialization level*); the proportion of the tertiary industry (*Service level*); population growth rate; fiscal expenditure minus fiscal revenue (*Fiscal pressure*); patent; lagged value and change in municipal bond spread; lagged value and change in net population inflow; tax revenue (value added tax, corporate income tax, individual income tax); land sales revenue.

**Panel A: Summary statistics for bond data**

	N	Mean	SD	$p_{10}$	$p_{25}$	$p_{50}$	$p_{75}$	$p_{90}$
Spread <sub>t+1</sub> (%)	19,037	2.58	1.33	0.96	1.60	2.53	3.52	4.41
Amount issue <sub>t+1</sub> (BN)	19,037	0.84	0.53	0.30	0.50	0.74	1.00	1.50
Maturity <sub>t+1</sub>	19,037	4.49	2.32	0.74	3.00	5.00	7.00	7.00
Issuer rating <sub>t+1</sub>	18,707	10.60	0.79	10.00	10.00	10.00	11.00	12.00
Bond rating <sub>t+1</sub>	19,037	2.57	2.37	0.00	0.00	4.00	5.00	6.00
Trading market <sub>t+1</sub> (%)								
Interbank	Shanghai			Shenzhen				
61.57	35.66			2.77				
Administrative level <sub>t+1</sub> (%)								
District	City			Province				
41.18	51.83			7.00				
Bond type <sub>t+1</sub> (%)								
CP	MTN	Enterprise	Corporate	PPN	Others			
15.66	14.46	28.49	25.25	16.05	0.09			

**Panel B: Summary statistics for city data**

	N	Mean	SD	$p_{10}$	$p_{25}$	$p_{50}$	$p_{75}$	$p_{90}$
MigrationNet <sub>t</sub>	2,850	0.16	4.99	-3.16	-1.78	-0.64	-0.06	3.81
MigrationIn <sub>t</sub>	2,850	2.14	4.88	0.00	0.00	0.71	1.78	5.89
MigrationOut <sub>t</sub>	2,850	-1.98	1.63	-4.37	-2.79	-1.66	-0.67	-0.19
Policy <sub>t</sub>	2,850	0.55	0.50	0.00	0.00	1.00	1.00	1.00
GDP growth rate <sub>t</sub> (%)	2,822	9.28	3.75	5.20	7.10	8.70	12.00	14.30
Debt ratio <sub>t</sub> (%)	2,826	57.05	59.13	0.00	4.81	39.67	87.47	146.43
Industrialization level <sub>t</sub> (%)	2,823	47.11	10.59	33.69	40.94	47.61	53.92	59.75
Service level <sub>t</sub> (%)	2,823	40.63	9.78	28.88	33.81	39.81	46.52	53.13
Population growth rate <sub>t+1</sub> (%)	2,827	0.37	1.48	-0.85	-0.19	0.31	0.87	1.57
Fiscal pressure <sub>t</sub> (BN)	2,826	16.09	12.19	4.76	7.97	13.27	20.78	30.50
Patent <sub>t+1</sub> (K)	2,845	0.75	1.92	0.02	0.04	0.11	0.43	1.78
Average Spread <sub>t-1</sub> (%)	1,614	3.08	0.93	1.88	2.46	3.08	3.67	4.32
$\Delta$ Average Spread <sub>t-1</sub> (%)	1,387	-0.10	0.96	-1.30	-0.71	-0.09	0.49	1.12
Net population inflow <sub>t-1</sub> (MM)	2,819	0.00	0.06	-0.06	-0.03	-0.01	0.01	0.04
$\Delta$ Net population inflow <sub>t-1</sub> (MM)	2,815	0.00	0.10	-0.07	-0.03	0.00	0.02	0.07
Value added tax <sub>t+1</sub> (BN)	2,659	4.75	9.33	0.38	0.76	1.74	4.42	10.81
Corporate income tax <sub>t+1</sub> (BN)	2,670	2.42	5.52	0.17	0.35	0.71	1.81	5.13
Individual income tax <sub>t+1</sub> (BN)	2,623	0.92	2.50	0.06	0.12	0.23	0.57	1.94
Land sales revenue <sub>t+1</sub> (BN)	2,830	15.06	26.45	0.87	2.36	5.76	14.60	37.99

**Table 2: Population Inflow and Municipal Bond Spread**

This table reports the results of the impact of net population inflow on municipal bonds. The dependent variable is the next-year municipal bond yield spread. t-statistics, based on errors clustered by city, are in parentheses. \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% levels, respectively.

Dependent variable:	(1)	Spread <sub>t+1</sub>	(2)
Net population inflow <sub>t</sub>	-0.196*** (-2.882)		-0.114** (-2.554)
Ln(amount issue) <sub>t+1</sub>			-0.128*** (-8.873)
Maturity <sub>t+1</sub>			0.052** (2.588)
Issuer rating <sub>t+1</sub>			-0.450*** (-12.968)
Bond rating <sub>t+1</sub>			-0.289*** (-13.427)
Trading market <sub>t+1</sub>			-0.188*** (-11.951)
Administrative level <sub>t+1</sub>			-0.072*** (-5.911)
Industry <sub>t+1</sub>			-0.001 (-0.256)
Bond type <sub>t+1</sub>			-0.112*** (-8.003)
GDP growth rate <sub>t</sub>			-0.136*** (-3.958)
Debt ratio <sub>t</sub>			0.254*** (6.960)
Industrialization level <sub>t</sub>			0.294** (2.588)
Service level <sub>t</sub>			0.523*** (3.079)
Province-year FE	Yes		Yes
Prefecture FE	Yes		Yes
Observations	18818		18410
R-squared	0.343		0.516

**Table 3. The Impact of Hukou Relaxation on Municipal Bond Yield Spreads**

This table reports the results of the impact of population inflows induced by the relaxation of Hukou on municipal bonds. The dependent variable is the next-year municipal bond yield spread. Columns 1, 2, and 3 report the results using  $MigrationNet_t$ ,  $MigrationIn_t$ , and  $MigrationOut_t$ , respectively. t-statistics, based on errors clustered by city, are in parentheses. \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% levels, respectively.

Dependent variable:	(1)	(2)	(3)
	Spread <sub>t+1</sub>		
MigrationNet <sub>t</sub>	-0.171*** (-3.424)		
MigrationIn <sub>t</sub>		-0.173*** (-3.288)	
MigrationOut <sub>t</sub>			-0.192*** (-2.707)
Policy <sub>t</sub>	0.132 (1.548)	0.132 (1.519)	-0.027 (-0.389)
Ln(amount issue) <sub>t+1</sub>	-0.124*** (-8.694)	-0.124*** (-8.699)	-0.125*** (-8.689)
Maturity <sub>t+1</sub>	0.052*** (2.622)	0.052*** (2.624)	0.052*** (2.633)
Issuer rating <sub>t+1</sub>	-0.451*** (-13.161)	-0.451*** (-13.160)	-0.451*** (-13.113)
Bond rating <sub>t+1</sub>	-0.286*** (-13.244)	-0.286*** (-13.243)	-0.286*** (-13.265)
Trading market <sub>t+1</sub>	-0.186*** (-11.774)	-0.186*** (-11.760)	-0.186*** (-11.850)
Administrative level <sub>t+1</sub>	-0.072*** (-5.923)	-0.072*** (-5.922)	-0.072*** (-5.923)
Industry <sub>t+1</sub>	-0.001 (-0.254)	-0.001 (-0.250)	-0.001 (-0.251)
Bond type <sub>t+1</sub>	-0.112*** (-8.014)	-0.111*** (-8.004)	-0.112*** (-8.066)
GDP growth rate <sub>t</sub>	-0.137*** (-3.861)	-0.137*** (-3.820)	-0.149*** (-4.242)
Debt ratio <sub>t</sub>	0.236*** (6.387)	0.241*** (6.571)	0.252*** (6.566)
Industrialization level <sub>t</sub>	0.192* (1.852)	0.199* (1.904)	0.256** (2.339)
Service level <sub>t</sub>	0.386** (2.455)	0.401** (2.527)	0.441*** (2.696)
Province-year FE	Yes	Yes	Yes
City FE	Yes	Yes	Yes
Observations	18594	18594	18594
R-squared	0.518	0.517	0.517



**Table 4. Hukou Relaxation and Population Growth**

This table reports the results of the impact of population inflows induced by the relaxation of Hukou on population growth. The dependent variable is the next-year population growth rate. Columns 1, 2, and 3 report the results using  $MigrationNet_t$ ,  $MigrationIn_t$ , and  $MigrationOut_t$ , respectively.  $t$ -statistics, based on errors clustered by city, are in parentheses. \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% levels, respectively.

Dependent variable:	(1)	(2)	(3)
	Population growth rate $t+1$		
MigrationNet <sub>t</sub>	1.049*** (6.609)		
MigrationIn <sub>t</sub>		1.023*** (5.665)	
MigrationOut <sub>t</sub>			0.288** (2.586)
Policy <sub>t</sub>	-0.221** (-2.275)	-0.193** (-2.002)	0.035 (0.370)
GDP growth rate <sub>t</sub>	0.074 (0.713)	0.076 (0.735)	0.106 (1.003)
Debt ratio <sub>t</sub>	-0.081 (-1.489)	-0.089 (-1.622)	-0.096 (-1.603)
Industrialization level <sub>t</sub>	-0.177 (-0.916)	-0.185 (-0.941)	-0.338* (-1.728)
Service level <sub>t</sub>	-0.344 (-1.591)	-0.364 (-1.637)	-0.520** (-2.339)
Province-year FE	Yes	Yes	Yes
City FE	Yes	Yes	Yes
Observations	2766	2766	2766
R-squared	0.525	0.523	0.515

**Table 5. The Effect of Fiscal Pressure and Bond Rating of Issuing Prefectures**

This table reports the subgroup results of the impact of the net population inflows induced by the relaxation of Hukou on municipal bonds. The dependent variable is the next-year municipal bond yield spread. Columns 1 and 2 respectively represent bonds under high and low fiscal pressure. Columns 3 and 4 respectively represent bonds with high and low bond rating. t-statistics, based on errors clustered by city, are in parentheses. \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% levels, respectively.

Dependent variable:	Fiscal pressure		Bond rating	
	High (1)	Low (2)	High (3)	Low (4)
	Spread <sub>t+1</sub>			
MigrationNet <sub>t</sub>	-0.284*** (-3.830)	-0.060 (-1.082)	0.024 (0.279)	-0.214*** (-4.205)
Policy <sub>t</sub>	0.111 (1.015)	0.274** (2.414)	-0.010 (-0.077)	0.181** (1.977)
Ln(amount issue) <sub>t+1</sub>	-0.123*** (-6.692)	-0.107*** (-6.335)	-0.065** (-2.553)	-0.134*** (-8.635)
Maturity <sub>t+1</sub>	0.055** (2.488)	0.016 (0.492)	-0.101*** (-3.067)	0.117*** (4.983)
Issuer rating <sub>t+1</sub>	-0.537*** (-14.098)	-0.313*** (-9.510)	-0.436*** (-8.518)	-0.472*** (-13.580)
Bond rating <sub>t+1</sub>	-0.279*** (-10.749)	-0.302*** (-7.108)	-0.579*** (-2.945)	-0.284*** (-7.771)
Trading market <sub>t+1</sub>	-0.201*** (-9.233)	-0.157*** (-8.922)	-0.024** (-2.004)	-0.202*** (-9.319)
Administrative level <sub>t+1</sub>	-0.064*** (-4.118)	-0.074*** (-4.791)	-0.036** (-2.018)	-0.086*** (-6.372)
Industry <sub>t+1</sub>	-0.005 (-0.572)	0.008 (0.938)	-0.002 (-0.269)	-0.001 (-0.211)
Bond type <sub>t+1</sub>	-0.106*** (-5.752)	-0.138*** (-7.068)	0.159*** (4.033)	-0.085*** (-5.318)
GDP growth rate <sub>t</sub>	-0.046 (-0.950)	-0.087 (-1.596)	-0.142** (-2.135)	-0.125*** (-3.161)
Debt ratio <sub>t</sub>	0.171*** (2.855)	0.347*** (6.346)	0.202*** (3.810)	0.255*** (5.115)
Industrialization level <sub>t</sub>	0.321** (2.103)	0.435** (1.983)	0.526*** (2.971)	0.202 (1.627)
Service level <sub>t</sub>	0.532** (2.423)	0.428 (1.282)	0.786*** (2.937)	0.443** (2.460)
Province-year FE	Yes	Yes	Yes	Yes
City FE	Yes	Yes	Yes	Yes
Observations	11923	6636	5204	13349
R-squared	0.513	0.578	0.583	0.527

**Table 6. Local Demand Hypothesis**

This table reports the subgroup results of the impact of the net population inflows induced by the relaxation of Hukou on municipal bonds. The dependent variable is the next-year municipal bond yield spread. Columns 1 and 2 respectively represent bonds under high and low service level. Columns 3 and 4 respectively represent bonds with high and low numbers of hospitals. Columns 5 and 6 respectively represent bonds with high and low highways. t-statistics, based on errors clustered by city, are in parentheses. \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% levels, respectively.

Dependent variable:	Service level		Infrastructure: Hospital		Infrastructure: Highway	
	High (1)	Low (2)	High (3)	Low (4)	High (5)	Low (6)
	Spread <sub>t+1</sub>					
MigrationNet <sub>t</sub>	-0.160*** (-3.171)	0.231 (1.178)	-0.181*** (-2.763)	-0.060 (-0.555)	-0.352*** (-4.537)	-0.210*** (-3.878)
Policy <sub>t</sub>	0.259** (2.269)	-0.122 (-0.979)	0.103 (0.884)	0.037 (0.195)	0.004 (0.046)	0.432*** (3.863)
Ln(amount issue) <sub>t+1</sub>	-0.126*** (-7.791)	-0.107*** (-3.486)	-0.112*** (-6.557)	-0.152*** (-7.002)	-0.138*** (-6.518)	-0.103*** (-5.535)
Maturity <sub>t+1</sub>	0.030 (1.274)	0.154*** (4.824)	0.053** (2.340)	0.052 (1.289)	0.046* (1.772)	0.055* (1.898)
Issuer rating <sub>t+1</sub>	-0.459*** (-11.579)	-0.436*** (-9.925)	-0.450*** (-10.524)	-0.460*** (-12.865)	-0.523*** (-11.373)	-0.373*** (-11.372)
Bond rating <sub>t+1</sub>	-0.275*** (-11.276)	-0.372*** (-8.510)	-0.282*** (-10.638)	-0.295*** (-8.358)	-0.274*** (-8.730)	-0.301*** (-10.549)
Trading market <sub>t+1</sub>	-0.185*** (-9.355)	-0.184*** (-10.832)	-0.183*** (-8.789)	-0.188*** (-8.779)	-0.193*** (-8.406)	-0.171*** (-8.691)
Administrative level <sub>t+1</sub>	-0.063*** (-4.494)	-0.125*** (-6.612)	-0.076*** (-5.504)	-0.060** (-2.467)	-0.065*** (-3.897)	-0.075*** (-4.498)
Industry <sub>t+1</sub>	-0.000 (-0.079)	-0.010 (-0.738)	-0.005 (-0.844)	0.008 (0.793)	-0.005 (-0.562)	0.003 (0.404)
Bond type <sub>t+1</sub>	-0.116*** (-7.339)	-0.104*** (-3.667)	-0.112*** (-6.122)	-0.111*** (-6.172)	-0.094*** (-4.344)	-0.137*** (-9.138)
GDP growth rate <sub>t</sub>	-0.169*** (-3.686)	-0.045 (-0.800)	-0.100* (-1.770)	-0.185*** (-4.337)	-0.049 (-0.815)	-0.176*** (-4.297)
Debt ratio <sub>t</sub>	0.277*** (5.870)	0.171*** (3.130)	0.256*** (4.707)	0.258*** (4.128)	0.204*** (3.362)	0.240*** (5.382)
Industrialization level <sub>t</sub>	0.143 (0.726)	0.019 (0.125)	0.140 (0.919)	0.152 (1.050)	0.093 (0.562)	0.185 (1.268)
Service level <sub>t</sub>	0.306 (1.160)	0.111 (0.422)	0.429** (2.010)	0.247 (0.997)	0.274 (1.155)	0.340 (1.540)
Province-year FE	Yes	Yes	Yes	Yes	Yes	Yes
City FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	14519	4057	13068	5508	9860	8692
R-squared	0.518	0.506	0.531	0.500	0.483	0.569

**Table 7. Labor Supply Hypothesis**

Panel A reports the subgroup results of the impact of the net population inflows induced by the relaxation of Hukou on municipal bonds. The dependent variable is the next-year municipal bond yield spread. Columns 1 and 2 respectively represent bonds under high and low industrialization level. Columns 3 and 4 respectively represent bonds with high and low labor intensity. t-statistics, based on errors clustered by city, are in parentheses. Panel B reports the Poisson regression of the number of patents on the net population inflows induced by Hukou relaxation. Columns 1, 2, and 3 report the results using  $MigrationNet_t$ ,  $MigrationNet_{t-1}$ , and  $MigrationNet_{t-2}$ , respectively. t-statistics, based on cluster-robust standard errors, are in parentheses. \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% levels, respectively.

**Panel A: The effect of industrialization level and labor intensity**

	Industrialization level		Labor intensity	
	High	Low	High	Low
	(1)	(2)	(3)	(4)
Dependent variable:	Spread <sub>t+1</sub>			
MigrationNet <sub>t</sub>	-0.171** (-2.404)	-0.223*** (-3.181)	-0.138** (-2.378)	-0.208*** (-3.985)
Policy <sub>t</sub>	0.154 (1.469)	0.086 (0.564)	-0.068 (-0.495)	0.292*** (3.553)
Ln(amount issue) <sub>t+1</sub>	-0.115*** (-5.699)	-0.123*** (-5.973)	-0.116*** (-6.134)	-0.124*** (-6.010)
Maturity <sub>t+1</sub>	0.046* (1.676)	0.055* (1.903)	0.080*** (2.965)	0.022 (0.821)
Issuer rating <sub>t+1</sub>	-0.445*** (-17.787)	-0.455*** (-7.365)	-0.448*** (-8.062)	-0.460*** (-13.198)
Bond rating <sub>t+1</sub>	-0.260*** (-10.219)	-0.307*** (-9.514)	-0.256*** (-8.713)	-0.313*** (-9.741)
Trading market <sub>t+1</sub>	-0.186*** (-9.974)	-0.187*** (-7.530)	-0.173*** (-7.604)	-0.197*** (-9.105)
Administrative level <sub>t+1</sub>	-0.063*** (-3.622)	-0.084*** (-5.133)	-0.064*** (-3.899)	-0.076*** (-4.266)
Industry <sub>t+1</sub>	-0.001 (-0.097)	-0.001 (-0.107)	-0.010 (-1.408)	0.008 (0.995)
Bond type <sub>t+1</sub>	-0.101*** (-6.090)	-0.121*** (-5.289)	-0.086*** (-4.328)	-0.136*** (-7.624)
GDP growth rate <sub>t</sub>	-0.158*** (-2.845)	-0.162*** (-2.633)	-0.052 (-1.170)	-0.214*** (-5.849)
Debt ratio <sub>t</sub>	0.222*** (5.237)	0.139** (2.149)	0.143*** (2.642)	0.259*** (5.927)
Industrialization level <sub>t</sub>	0.044 (0.268)	0.141 (0.809)	0.317* (1.777)	-0.003 (-0.022)
Service level <sub>t</sub>	0.098 (0.393)	0.187 (0.712)	0.446* (1.702)	0.144 (0.761)
Province-year FE	Yes	Yes	Yes	Yes
City FE	Yes	Yes	Yes	Yes
Observations	9329	9251	9483	9093
R-squared	0.511	0.539	0.511	0.542

**Panel B: Patents of local firms**

Dependent variable:	(1)	(2)	(3)
		Patent <sub>t+1</sub>	
MigrationNet <sub>t</sub>	0.231*** (4.783)		
MigrationNet <sub>t-1</sub>		0.186*** (3.125)	
MigrationNet <sub>t-2</sub>			0.152** (2.265)
Policy <sub>t</sub>	0.051 (0.806)		
Policy <sub>t-1</sub>		0.000 (0.003)	
Policy <sub>t-2</sub>			-0.042 (-0.747)
GDP growth rate <sub>t</sub>	-0.022 (-0.510)	-0.013 (-0.287)	0.012 (0.262)
Debt ratio <sub>t</sub>	0.145*** (3.113)	0.139*** (3.008)	0.121** (2.522)
Industrialization level <sub>t</sub>	1.228*** (6.343)	1.067*** (4.911)	0.907*** (3.710)
Service level <sub>t</sub>	1.072*** (5.573)	0.946*** (4.422)	0.825*** (3.420)
Year FE	Yes	Yes	Yes
City FE	Yes	Yes	Yes
Observations	2822	2541	2260

**Table 8. Fiscal Revenue: Level of Cash Flows**

This table reports the impact of net population inflows induced by the relaxation of Hukou on city fiscal revenue. In Columns 1, 2, 3, and 4, the dependent variables are the next-year value added tax, corporate income tax, individual income tax, and land sales revenue, respectively. t-statistics, based on errors clustered by city, are in parentheses. \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% levels, respectively.

Dependent variable:	(1) Ln(value added tax) <sub>t+1</sub>	(2) Ln(corporate income tax) <sub>t+1</sub>	(3) Ln(individual income tax) <sub>t+1</sub>	(4) Ln(land sales revenue) <sub>t+1</sub>
MigrationNet <sub>t</sub>	0.041 (1.182)	0.043 (1.321)	0.102** (2.461)	0.178** (2.397)
Policy <sub>t</sub>	-0.033 (-1.272)	-0.019 (-0.674)	-0.027 (-0.965)	-0.039 (-0.835)
GDP growth rate <sub>t</sub>	0.022 (1.170)	0.050*** (3.581)	0.040*** (2.956)	0.063** (2.092)
Debt ratio <sub>t</sub>	0.016 (1.002)	0.004 (0.231)	-0.013 (-0.716)	-0.054* (-1.897)
Industrialization level <sub>t</sub>	0.357*** (6.741)	0.283*** (5.482)	0.215*** (3.419)	0.118 (1.300)
Service level <sub>t</sub>	0.249*** (4.820)	0.146** (2.551)	0.118* (1.726)	0.113 (1.111)
Province-year FE	Yes	Yes	Yes	Yes
City FE	Yes	Yes	Yes	Yes
Observations	2605	2619	2566	2766
R-squared	0.985	0.982	0.983	0.932

**Table 9. Policy predicts**

This table reports the regression of investigating how a prefecture's municipal bond spread, net population inflow, and macro economy predicts the locally initiated Hukou relaxation policy. *Policy* is a dummy variable indicating whether a prefecture implemented Hukou relaxation policy in year  $t$ , taking the value of 1 if yes and 0 otherwise. All independent variables are lagged for one year.  $t$ -statistics, based on errors clustered by city, are in parentheses. \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% levels, respectively.

Dependent variable:	(1)	(2)	(3)
		Policy <sub><math>t</math></sub>	
Average Spread <sub><math>t-1</math></sub>	-0.009 (-0.477)	-0.011 (-0.534)	-0.014 (-0.597)
$\Delta$ Average Spread <sub><math>t-1</math></sub>	0.007 (0.479)	0.007 (0.534)	0.009 (0.654)
Net population inflow <sub><math>t-1</math></sub>		-0.009 (-0.512)	-0.013 (-0.614)
$\Delta$ Net population inflow <sub><math>t-1</math></sub>		0.012 (0.884)	0.015 (1.043)
GDP growth rate <sub><math>t-1</math></sub>			-0.017 (-0.452)
Debt ratio <sub><math>t-1</math></sub>			-0.018 (-0.840)
Industrialization level <sub><math>t-1</math></sub>			-0.097 (-1.188)
Service level <sub><math>t-1</math></sub>			-0.139 (-1.467)
Fiscal pressure <sub><math>t-1</math></sub>			0.040 (1.120)
Value added tax <sub><math>t-1</math></sub>			0.038 (0.621)
Corporate income tax <sub><math>t-1</math></sub>			-0.152 (-1.529)
Individual income tax <sub><math>t-1</math></sub>			0.102 (1.505)
Land sales revenue <sub><math>t-1</math></sub>			0.020 (0.485)
Province-year FE	Yes	Yes	Yes
City FE	Yes	Yes	Yes
Observations	1285	1272	1189
R-squared	0.418	0.418	0.441

**Table 10. Placebo Tests**

This table reports the placebo tests results of the impact of population inflows induced by the relaxation of Hukou on municipal bonds. The dependent variable is the next-year municipal bond yield spread. The placebo cities are assigned using nearest neighbor matching. Columns 1, 2, and 3 report the results using  $MigrationNet_t$ ,  $MigrationIn_t$ , and  $MigrationOut_t$ , respectively. t-statistics, based on errors clustered by city, are in parentheses. \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% levels, respectively.

Dependent variable:	(1)	(2)	(3)
	Spread <sub>t+1</sub>		
MigrationNet <sub>t</sub>	0.040 (0.657)		
MigrationIn <sub>t</sub>		0.020 (0.310)	
MigrationOut <sub>t</sub>			0.128* (1.895)
Policy <sub>t</sub>	-0.060 (-0.831)	-0.062 (-0.854)	-0.064 (-0.903)
Ln(amount issue) <sub>t+1</sub>	-0.125*** (-8.702)	-0.125*** (-8.695)	-0.125*** (-8.693)
Maturity <sub>t+1</sub>	0.053*** (2.652)	0.053*** (2.649)	0.053*** (2.652)
Issuer rating <sub>t+1</sub>	-0.451*** (-13.087)	-0.451*** (-13.085)	-0.451*** (-13.068)
Bond rating <sub>t+1</sub>	-0.286*** (-13.230)	-0.286*** (-13.231)	-0.286*** (-13.218)
Trading market <sub>t+1</sub>	-0.186*** (-11.798)	-0.186*** (-11.799)	-0.186*** (-11.824)
Administrative level <sub>t+1</sub>	-0.072*** (-5.906)	-0.072*** (-5.907)	-0.072*** (-5.918)
Industry <sub>t+1</sub>	-0.001 (-0.222)	-0.001 (-0.229)	-0.001 (-0.208)
Bond type <sub>t+1</sub>	-0.112*** (-8.041)	-0.112*** (-8.039)	-0.112*** (-8.048)
GDP growth rate <sub>t</sub>	-0.152*** (-4.254)	-0.152*** (-4.260)	-0.150*** (-4.179)
Debt ratio <sub>t</sub>	0.267*** (6.822)	0.267*** (6.836)	0.271*** (6.938)
Industrialization level <sub>t</sub>	0.299** (2.570)	0.301** (2.582)	0.291** (2.536)
Service level <sub>t</sub>	0.512*** (2.952)	0.514*** (2.961)	0.507*** (2.948)
Province-year FE	Yes	Yes	Yes
City FE	Yes	Yes	Yes
Observations	18594	18594	18594
R-squared	0.517	0.517	0.517



## Appendix Variable definitions

Variable	Definition
Spread <sub>t+1</sub> (%)	The difference between bond coupon rate and treasury bond rate with the same maturity.
MigrationNet <sub>t</sub>	The comprehensive effect of the relaxation of Hukou in city j and other cities on the population mobility in city j, which is the sum of both positive and negative effects. The positive effect of the relaxation of the Hukou on a city's population inflow is computed according to the 2000 Chinese census data on population inflows and outflows across different cities. The negative effect arises from other cities' relaxation of such policies in the same year.
MigrationIn <sub>t</sub>	The impact of population inflows resulting directly from local Hukou relaxation.
MigrationOut <sub>t</sub>	The impact of population outflows triggered by Hukou relaxations by other cities.
Policy <sub>t</sub>	Hukou relax is coded as 1 if the prefecture adopts a universal Hukou relaxation from year t onwards.
Amount issue <sub>t+1</sub> (BN)	The total amount of the issue by each municipal bond.
Maturity <sub>t+1</sub>	The maturity of municipal bond.
Issuer rating <sub>t+1</sub>	A numerical scale of issuer ratings from AAA to BB, ranging from 12 to 1
Bond rating <sub>t+1</sub>	A numerical scale of bond ratings from AAA to A-, ranging from 6 to 1, and a rating of 0 indicates the absence of rating information.
Trading market <sub>t+1</sub>	The trading venues for municipal bonds including the interbank market, the Shanghai Stock Exchange and the Shenzhen Stock Exchange.
Administrative level <sub>t+1</sub>	The administrative level of the issuing entity.
Industry <sub>t+1</sub>	The industry of issuing entity.
Bond type <sub>t+1</sub>	Types of municipal bond s, including "Medium-Term Notes" (MTN), "Enterprise Bonds" (Enterprise), "Corporate Bonds" (Corporate), "Private Placement Notes" (PPN), and "Commercial Paper" (CP).
GDP growth rate <sub>t</sub> (%)	GDP growth rate of each prefecture
Debt ratio <sub>t</sub> (%)	The ratio of total outstanding amount of municipal bonds to fiscal revenue.
Industrialization level <sub>t</sub> (%)	The proportion of GDP in the secondary industry
Service level <sub>t</sub> (%)	The proportion of GDP in the tertiary industry
Labor intensity <sub>t</sub> (PP/MM)	Labor force divided by fixed assets
Population growth rate <sub>t+1</sub> (%)	Gross population growth rate of each prefecture
Fiscal pressure <sub>t</sub> (BN)	Fiscal expenditure minus fiscal revenue
Patent <sub>t+1</sub> (K)	Number of patents of each prefecture
Average Spread <sub>t-1</sub>	Lagged average municipal bond spread of each prefecture
ΔAverage Spread <sub>t-1</sub>	Lagged changes in average municipal bond spread of each prefecture
Net population inflow <sub>t-1</sub> (MM)	Lagged net population inflow of each prefecture
ΔNet population inflow <sub>t-1</sub> (MM)	Lagged changes in net population inflow of each prefecture
Value added tax <sub>t+1</sub> (BN)	Value added tax revenue of each prefecture
Corporate income tax <sub>t+1</sub> (BN)	Corporate income tax revenue of each prefecture
Individual income tax <sub>t+1</sub> (BN)	Individual income tax revenue of each prefecture
Land sales revenue <sub>t+1</sub> (BN)	Land sales revenue of each prefecture

