

Stratification of the Elite: How *Hukou* Status Divides Advantaged Migrants in China

Mingze Li

A thesis

submitted in partial fulfillment of the
requirements for the degree of

Master of Arts

University of Washington

2026

Committee:

Peter Catron

Nathalie E. Williams

Program Authorized to Offer Degree:

Sociology

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Mingze Li

University of Washington

Abstract

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Mingze Li

Chair of the Supervisory Committee:

Peter Catron

Department of Sociology

China's *hukou* (household registration) system conditions access to the urban labor market on place of registration. Prior research establishes that rural-to-urban *hukou* conversion is positively selected and that the conversion premium is largest among migrants with the highest probability of converting, but the mechanism behind this pattern remains unspecified. Drawing on complementary capital theory, I argue that *hukou* functions as institutional clearance whose occupational value is contingent on the human and political capital its holder brings to the labor market. Using China Family Panel Studies data (2016–2022), I apply inverse probability weighting and propensity score stratification to decompose the institutional premium across the propensity distribution. The occupational gap between permanent and temporary migrants is negligible among low-propensity migrants but substantial and persistent among high-propensity migrants and is larger in coastal labor markets where complementary capital is most heavily rewarded. These findings demonstrate that the *hukou* system fractures advantaged migrants into an institutionally privileged in-group and a structurally excluded out-group, functioning as a mechanism of elite stratification.

1 Introduction

Labor markets rarely allocate desirable jobs on productive capacity alone. Access to the better positions is mediated by credentials, licenses, memberships, and legal statuses that work less as measures of what a worker can do than as permissions to compete for the work at all (Collins et al. 2019; Parkin 1979; Weeden 2002; Wu and Treiman 2007). When such permissions are scarce and unequally distributed, they become instruments of social closure: the boundary itself, rather than any underlying difference in skill, sorts otherwise similar workers into protected and excluded positions (Massey 2007; Tilly 1998). A central question for the sociology of stratification is therefore not only who holds the credentials that gate desirable jobs, but what those credentials are worth, and to whom.

The *hukou* (household registration) system, the institution regulating internal migration in contemporary China, offers a unique setting. Every Chinese citizen is registered in a specific locality (*hukou suozaidi*) and classified as agricultural or non-agricultural. This registration, inherited at birth, governs the bundle of rights, services, and labor market access available to them (Chan and Buckingham 2008; Chan and Zhang 1999). For the estimated 290 million rural-origin migrants who have moved to Chinese cities in recent decades, the *hukou* system creates a binary institutional status. Migrants may be physically present in an urban jurisdiction while retaining their rural residency, or may undergo a formal, state-approved conversion (*nongzhuanfei*) and acquire the urban registration that unlocks the primary labor market, state-sector employment, and urban social welfare (Fan 2002; Wu 2025). Because the conversion process is administratively explicit, dated, and consequential, *hukou* functions as an observable instance of a closure boundary that, in most other labor market settings, is diffuse and difficult to measure.

Extensive literature has identified two selection mechanisms that characterize this process. First, the selection of migrants into urban *hukou* is highly positive. Rural-origin migrants who successfully convert are disproportionately drawn from the most educated, politically connected, and occupationally advantaged group of the migrant population

(Chan and Buckingham 2008; Fan 2007; Zhang 2012). Second, the rural-to-urban *hukou* conversion is consistently associated with an average occupational premium, and this premium is largest for individuals with the highest estimated probability of converting, a pattern formalized as positive selection in returns (Wu and Zheng 2018). Together these results imply that the institutional boundary is most permeable, and most rewarding, for the migrants who appear to need it least in the labor market.

While current literature has demonstrated that positive selection occurs in both treatment assignment and subsequent socioeconomic returns, the mechanism of this selection among the broader migrant population remains underexplored. If urban *hukou* were simply a valuable resource, its marginal return might be expected to be largest for migrants who begin with the least, much as the return to a college degree is largest for those least likely to attend college (Brand and Xie 2010) or U.S. citizenship benefits most the migrants who were the least likely to obtain it (Catron et al. 2025). Instead, the *hukou* premium rises with migrants' pre-existing advantage.

To address this theoretical gap, I develop a complementary-capital framework that synthesizes three theories of stratification: Parkin's (1979) theory of exclusionary social closure, Doeringer and Piore's (2020) account of dual labor market segmentation, and Bourdieu's (1986) relational theory of forms of capital. The framework treats institutional clearance, *hukou*, and human capital not as competing or substitutable resources but as complementary inputs into primary-sector occupational attainment. Each is necessary, and neither is sufficient on its own. In the *hukou* case, I treat *hukou* as institutional legal clearance to cross the closure boundary protecting primary-sector jobs, and education and Communist Party membership as the human and political capital those positions require. A migrant who holds clearance but lacks human capital can cross the boundary into a sector whose positions remain out of reach. A migrant who holds human capital but lacks clearance is formally qualified for primary-sector work and institutionally barred from it. Only the migrant who holds both converts qualification into position. Therefore, the pos-

itive selection in returns (Wu and Zheng 2018) is not evidence that *hukou* is intrinsically more valuable to advantaged migrants. It is evidence that the return to *hukou* is conditional on complementary capital: clearance is worth little until there are credentials for it to activate.

Existing estimates of the *hukou* premium typically report a single-number average return across propensity strata, however, the theoretical framework yields a distributional prediction that average-effect estimates cannot evaluate. If *hukou* and human capital are complementary, the occupational consequences of conversion should be concentrated among migrants who possess complementary capital and negligible among those who do not. Among migrants with little education or political capital, permanent and temporary migrants should be occupationally indistinguishable, because clearance activates nothing. Among migrants with substantial human capital, conversion should open a wide and durable gap between converters and equally credentialed non-converters, because clearance is precisely what that capital is waiting on.

Drawing on four waves of the China Family Panel Studies (2016-2022), I restrict the sample to rural-origin migrants, individuals who held a rural *hukou* at age 12 and currently reside in an urban area and stratify them by their estimated propensity for *hukou* conversion. Using propensity score stratification, I then compare the occupational structural positions of permanent and temporary migrants within the higher- and lower-propensity strata to test how the *hukou* system produces stratification. This approach isolates the institutional premium of the *hukou* from underlying selection effects. My results support the complementary-capital framework. A substantial share of the raw occupational gap reflects who converts rather than what conversion does, and the institutional residual that remains is substantively larger and more precisely estimated in the high-propensity stratum. The pattern is replicated across coastal and inland destinations, indicating that it reflects the logic of the institution rather than the economic difference between regional labor markets.

The research makes contributions to the literature of sociology and stratification.

Moving beyond the cross-sectional data and average effects of *hukou* explored in prior work, this panel study demonstrates the uneven distribution of these occupational returns. It uses the concept of social closure to explain why migrants with comparable characteristics receive unequal benefits. In sum, this research reframes *hukou* conversion as a gate-keeping mechanism much like a work permit or professional license, whose returns should follow the same complementarity logic.

2 The *Hukou* system

2.1 The origins of *Hukou*

The social and economic landscape of contemporary China is shaped, and arguably defined, by its *hukou* (household registration) system (Chan and Zhang 1999; Cheng and Selden 1994; Kasarda and Crenshaw 1991; Wu and Treiman 2004). Initiated in cities in 1951 and expanded to rural areas by 1958 (Chan 2009; Cheng and Selden 1994), the *hukou* system serves a function beyond that of a mere statistical record. The system tied an individual's place of registration to the goods it distributed, including employment, housing, grain rations, schooling and health care (Chan and Zhang 1999; Cheng and Selden 1994; Wu and Treiman 2004). At birth, every citizen is assigned a *hukou* inherited directly from their parents, which legally establishes their geographic residency and socioeconomic classification (Wu and Treiman 2004), and transferring one's *hukou* requires a formal, government-approved bureaucratic conversion rather than simply relocation (Chan 2009). During the period of strict mobility control from roughly 1958 to 1978, migration without government permission was nearly impossible, holding rural-to-urban conversion to an annual rate of 0.15 to 0.2 percent of the rural population (Chan 2009).

To facilitate the command economy in the early 1950s, it sorted the population into "agricultural" and "non-agricultural" categories corresponding to rural and urban residents, assigning them differential economic functions: urban (non-agricultural) residents were the recipients of state-provided welfare, while rural (agricultural) residents were responsible for supplying agricultural production, labor, and capital to the industrial sectors at low cost (Chan and Buckingham 2008; Whyte 2010). The *hukou* system thereby underpinned an industrialization strategy that extracted surplus from the countryside and subsidized the urban economy (Chan and Buckingham 2008; Chan and Zhang 1999; Fan 2007).

The nationwide economic reforms, in late 1970s, relaxed the strict controls on physical mobility without dismantling the *hukou* system (Wang 2020), expanding opportunities

for rural residents to seek non-agricultural work (Goldstein et al. 1991; Liang and White 1997). Reforms on the agricultural side permitted rural residents to enter cities to establish small businesses or to seek employment in the industrial and service sectors (Wu and Xie 2003). On the urban side, a growing market demand for cheap labor attracted an increasing number of rural migrants to urban jobs (Chan and Buckingham 2008; Liang 2004). The 1990s were widely considered the "age of migration" (Liang 2001), and rural-to-urban migrants constituted the dominant pattern of internal migration in China (Chan 2001). Concurrent push and pull factors substantially increased the propensity for migration, culminating in 80 million rural migrants in cities by 1990 (Liang and Ma 2004).

Yet the formal avenue for changing one's *hukou* from rural to urban—known as *nongzhuanfei*—remained tightly restricted by quotas (Chan 2009), leaving most migrants as temporary urban residents without full local citizenship (Chan 2019). Rural migrants in cities were often excluded from social welfare and primary labor market positions, effectively forming a "second-class" of urban residents (Chan 1994; Feng et al. 2002). This exclusion also gave rise to pervasive "*hukou* discrimination" in urban labor markets (Yu et al. 2025). As a result, even in the reform era, the *hukou* system has continued to structure unequal life chances and constrain secure urban incorporation (Chan 2009; Chan and Buckingham 2008).

2.2 Temporary and Permanent Migrants

A central feature of China's *hukou* system is that migrant "status" is defined institutionally rather than by length of residence. All individuals are classified according to their place of *hukou* registration (*hukou suozaidi*), and this registered location is considered one's permanent residence (Chan and Buckingham 2008). Permanent migrants are defined as those who obtain permanent household registration at an urban destination through *nongzhuanfei*, while temporary migrants do not (Goldstein et al. 1991; Liang 2001). Reflecting this administrative logic, only relocation accompanied by registration transfer

is officially classified as *qianyi* (migration); relocation without transfer is *renkou liudong* (population movement), and those who undertake it form the floating population (Chan and Buckingham 2008).

In practice, temporary migrants are *de facto* urban residents but *de jure* rural. This institutional distinction matters because *hukou* conversion changes migrants' legal eligibility for urban public goods. Permanent migrants are entitled to the full rights of urban *hukou* holders upon conversion, including access to urban public primary and secondary schools, state-subsidized medical insurance and pensions, low-income housing programs, and other benefits reserved for locals (Chan and Buckingham 2008; Wu and Treiman 2004). By contrast, temporary migrants largely remain outsiders to these institutions. They typically hold only a Temporary Residence Permit, pay substantial surcharges where children are permitted to enroll in local schools (Chan and Buckingham 2008), and are excluded from the *dibao* minimum-income subsidy and from subsidized public housing (Chen and Fan 2016).

These differences in legal status and welfare entitlement constitute what scholars describe as a "two-track" migration regime (Sun and Fan 2011; Whyte 2010; Yi 2005), and characterize as an incomplete urbanization that permits rural migrants to fuel the urban economy while denying them urban citizenship (Chan and Buckingham 2008). The two tracks correspond empirically to a segmented labor market: permanent migrants concentrate in primary-sector positions in state and formal employment, while temporary migrants concentrate in secondary-sector positions characterized by lower wages, weaker contracts, and more precarious tenure (Solinger 2006; Zhang and Wu 2017). Therefore, the *hukou* system organizes more than where migrants live; it allocates rural-origin migrants between segments of the urban labor market, making *hukou* status itself a structural determinant of occupational position.

2.3 Complementary Capital and Social Closure

This section develops a complementary-capital framework for understanding how institutional credentials produce occupational stratification. The framework’s central claim is that institutional credentials and human capital function as complementary inputs into primary-sector occupational attainment: each is necessary, and neither is sufficient on its own. The framework draws from Parkin’s (1979) theory the idea that institutional boundaries gate desirable positions; from Doeringer and Piore’s (2020) account of dual labor markets, the idea that desirable positions are protected within a structurally distinct primary sector with entry requirements that screen on human capital; and from Bourdieu’s (1986) relational theory of forms of capital, the principle that the value of any form of capital depends on the other capitals with which it is paired.

2.3.1 The closure boundary

Social closure is the process by which a collectivity secures advantage by restricting access to resources and opportunities to a limited circle of eligibles (Parkin 1979; Weber 1978). In its exclusionary form, closure works downward: a dominant group draws a boundary that subordinates an out-group and reserves protected positions for insiders (Collins et al. 2019; Weeden 2002). As Tilly (1998) argues, such categorical boundaries become durable when they are reinforced by institutional mechanisms that make the distinction consequential for resource allocation.

The urban primary labor market in reform-era China constitutes a site of exclusionary closure. Professional, managerial, technical, and state-sector positions are protected not only by the human-capital requirements common to primary sectors everywhere (Doeringer and Piore 2020; Piore 1972) but a local urban *hukou* is the explicit legal criterion of eligibility. Employers in the state and formal sectors screen applicants on *hukou* status, and the entitlements that make primary-sector employment secure, pensions, housing subsidies, children’s schooling, are themselves conditioned on registration (Démurger et al.

2009; Gagnon et al. 2014; Fan 2002; Zhang and Wu 2017). Empirical studies confirm this gatekeeping function, demonstrating that the migrant earnings penalty stems primarily from occupational sorting rather than unequal pay for equal work (Zhang and Wu 2017) while *hukou*-based stratification is most severe in state-sector employment, where formal credentialing and registration requirements are strictest (Li et al. 2015). *Hukou* is therefore the credential of closure or the institutional key that determines who is permitted to compete for desirable positions (Wu and Treiman 2007).

Closure theory establishes that a boundary exists and that *hukou* patrols it. On its own, however, closure generates a prediction that turns out to be too simple. If the boundary is the sole constraint on occupational attainment, or if what matters is only whether one is inside or outside, then removing the boundary should benefit all excluded individuals roughly equally. The marginal return to crossing would be largest for those with the fewest alternative routes to advantage, producing negative selection in returns, those least likely to cross would benefit most from doing so. Previous research on stratification has confirmed this pattern for college education in the United States, where the return to a degree is largest for individuals least likely to obtain one (Brand and Xie 2010). Hainmueller, Hangartner, and Ward (2019) find for Swiss citizenship, where naturalization benefits are concentrated among marginalized immigrants whose primary barrier is employer discrimination. Similar pattern for U.S. citizenship in the early twentieth century, where the earnings return to naturalization is largest among immigrants with the lowest probability of naturalizing (Catron et al. 2025). In each case, the credential operates primarily by removing a discriminatory barrier, and the return follows a logic of diminishing marginal constraint relief: those most constrained gain most from relief.

The *hukou* system, however, does not follow this pattern, and the conversion (to urban *hukou*) premium is largest among migrants with the highest predicted probability of converting, showing a positive selection in returns. Closure theory alone cannot explain this finding. The boundary must interact with something on the other side of it.

2.3.2 Segmentation and human-capital screening

The primary labor market that the closure boundary protects is not simply a sector that offers higher compensation. The internal labor markets identify a structural distinction between primary and secondary sectors that goes beyond wages (Doeringer and Piore 2020). The primary-sector positions are characterized by stable contracts, internal promotion ladders, employer-provided training, formal benefits, and entry requirements that screen applicants on education, skills, and institutional affiliations (Doeringer and Piore 2020; Piore 1972). The secondary sector absorbs workers in less stable arrangements with lower wages, weaker or absent contracts, and limited upward mobility into the primary sector regardless of individual human capital accumulation (Fan 2002; Meng and Zhang 2001; Zhang and Wu 2017). In the Chinese *hukou* migration context, this segmentation is well documented by “the elite, the natives, and the outsiders”, and in urban labor markets, showing that migrant workers without urban *hukou* are channeled into a distinct occupational stratum characterized by manual, service, and informal employment (Fan 2002). Song (2016) finds that *hukou*-based wage discrimination is concentrated among middle- and high-wage workers in state-owned enterprises, the primary-sector positions where formal credentialing matters most, while the secondary and informal sectors are relatively *hukou*-indifferent.

Connecting labor market segmentation to the closure framework shifts the prediction. If the protected sector has its own entry requirements, such as credentials, skills, and institutional affiliations that only some boundary-crossers possess, then the return to crossing depends on whether the migrant can occupy the positions the sector makes available once the boundary is removed. A migrant who crosses the closure boundary but lacks the human capital the primary sector demands enters a sector whose desirable positions remain out of reach; institutional clearance without the complementary human capital is operationally inert. This shifts the prediction from uniform returns to closure to conditional returns, which conversion benefits only those whose endowment satisfies primary-sector screening requirements, while those lacking the requisite credentials experience no

occupational gain from conversion.

In this model, *hukou* contributes a fixed increment by unlocking access to the protected sector, and human capital contributes a separate fixed increment by enabling the positions within it. The two resources are independently valuable, and each adds to occupational attainment regardless of the level of the other (Becker 1964). Under this framework, the institutional premium from *hukou* conversion would be constant across different levels of human capital. However, this constant-premium prediction is inconsistent with the case of *hukou*, as the system benefits already-advantaged migrants.

2.3.3 The relational logic of capital

This inconsistency can be explained by the principle that capital is relational, in which the value of a single form of capital depends on the field in which it is deployed and on the other capitals with which it is combined (Bourdieu 2011; Bourdieu and Wacquant 1992). This relational principle matters because it implies that the return to human capital is not a fixed attribute of the credential but a function of the institutional environment in which the credential operates.

Empirical evidence confirms that the return to education in urban China increased substantially during the market transition, not because the content of education changed but because the field in which education was rewarded shifted from a redistributive to a market-oriented system (Wu and Xie 2003). The value of schooling depends on the sector, region, and institutional context in which it is deployed, the returns to human capital in China are structured by institutional complementarities (Heckman and Yi 2012). In this framework, the primary and secondary labor markets constitute distinct fields, structured spaces with their own rules of valuation, reward, and competition (Bourdieu 2011). Human capital deployed in the secondary labor market, where contracts are informal, promotion ladders are absent, and human-capital screening is weak, generates modest occupational returns. The same human capital deployed in the primary labor market, where

employers screen on education and skills, internal ladders reward them, and institutional benefits compound them, generates substantially higher returns (Fan 2002; Li et al. 2015; Zhang and Wu 2017).

The core of this relational principle is multiplicative. In other words, if *hukou* determines the field in which human capital operates, then *hukou* changes the return structure that human capital faces. Drawing on Bourdieu’s (2011) insight that capital only holds value when deployed within a receptive field, the institutional premium of conversion is not a constant, but rather scales with the holder’s prior endowments. The more human and political capital a migrant carries across the closure boundary, the wider the occupational gap between their newly accessible primary-sector roles and the secondary-sector jobs to which they were previously restricted. This specific interaction serves as the core mechanism for positive selection in returns, producing a distributional pattern that models of closure or segmented closure fail to predict.

2.3.4 The Complementary-Capital Framework

The preceding subsections establish a cumulative logic. Closure theory identifies a boundary that *hukou* patrols (2.3.1); labor market segmentation establishes that the protected sector imposes human-capital entry requirements beyond the boundary itself (2.3.2); and relational capital theory demonstrates that the return to crossing is contingent on the endowment the migrant carries across it, because clearance changes the field in which that endowment is rewarded (2.3.3). Together, these components create the complementary-capital framework, in which the urban primary labor market is protected by a closure boundary that *hukou* gates and by human-capital requirements that primary-sector employers impose. The first determines who is permitted to compete; the second determines who, among those permitted, can occupy a primary-sector position; and the relational logic of capital ensures that the occupational value of clearance scales with the credentials it activates rather than operating as a fixed institutional bonus.

Hukou and human capital are therefore complementary inputs into primary-sector occupational attainment, in the precise sense that each is necessary and neither is sufficient on its own (Bourdieu 2011; Bourdieu and Wacquant 1992). Without urban *hukou*, a temporary migrant with high human capital holds qualifications they cannot deploy in the sector where those qualifications would be most richly rewarded (Fan, 2002; Zhang and Wu, 2017). A permanent migrant with minimal human capital holds clearance they cannot use, because the positions clearance unlocks require human capital they do not possess (Li et al. 2015). Only the migrant who holds both clearance and human capital converts qualification into position.

This framework supplies a mechanism for the positive-selection-in-returns pattern (Wu and Zheng 2018). The positive correlation between conversion probability and conversion return is not evidence that *hukou* is intrinsically more valuable to advantaged migrants. It is evidence that *hukou*'s institutional return is conditional on the joint endowment of human and political capital the holder brings to the labor market (Xie et al. 2012; Xie 2013). The framework yields two testable hypotheses. First, among low-propensity rural-origin migrants, the occupational gap between permanent and temporary migrants should be small or absent. For this group, the closure boundary is not the binding constraint; both permanent and temporary migrants are held below the primary sector by a shortage of capital, and clearance activates nothing. Second, among high-propensity rural-origin migrants the gap should be large and durable, because *hukou* is the binding constraint. High-propensity permanent migrants have crossed the closure boundary and can claim primary-sector positions, while high-propensity temporary migrants with comparable qualifications are formally qualified for those positions and institutionally excluded from them.

3 Data and Methods

3.1 Data and Sample

The analysis draws on the China Family Panel Studies (CFPS), a nationally representative longitudinal survey administered biennially by the Institute of Social Science Survey at Peking University. The CFPS has collected 7 waves of data (2010, 2012, 2014, 2016, 2018, 2020, and 2022), gathering detailed information on demographic characteristics, educational attainment, occupational history, migration experience, and *hukou* status (Xie and Hu 2014; Xie and Lu 2015). I pool data from waves of 2016 to 2022 for my analysis, and the longitudinal design allows me to observe trajectories of occupational returns over time for migrants within each propensity stratum.

The analytic sample is restricted to rural-origin migrants who held a rural (agricultural) *hukou* at age 12 and currently reside in an urban area. To ensure that the sample captures genuine cross-jurisdictional migration rather than in situ urbanization, I further restrict it to individuals whose current place of residence lies beyond the county level relative to their age-12 *hukou* location. This restriction is important because a substantial share of nominal conversions in China occur when rural territory is administratively reclassified as urban and its residents are converted collectively, a policy-based process unrelated to individual selection and one that the present analysis is not designed to evaluate (Song and Smith 2021; Wu and Zheng 2018). Excluding in-place reclassification isolates the selective nongzhuanfei pathway that the theory concerns.

I include two distinct features of the sample design. First, the design conditions on a stable rural-origin migrant status observed across all waves in which a respondent participates, so treatment is assigned at the person level and is, by construction, time-invariant. This yields a clean contrast between always permanent and temporary migrants, while it excludes within-panel switchers, return migrants, and individuals whose migration or *hukou* status is observed only intermittently. Second, the rural-origin restriction excludes

urban natives, and rural non-migrants form the sample, as the comparison for a converter (permanent migrant) is a rural-origin migrant who did not convert (temporary migrant), not an urban native. The estimates therefore describe occupational stratification within the rural-origin migrant population and should not be read as describing the full population of internal migrants in China.

After these restrictions the analytic sample comprises 4,327 rural-origin migrants, of whom 3,517 are temporary migrants who retained rural *hukou* and 810 are permanent migrants who converted to urban *hukou*.

3.2 Measures

Dependent variables. To capture the market-relevant socioeconomic positioning and social recognition, this study considers the International Socio-Economic Index of Occupational Status (ISEI) as the primary outcome variable. ISEI is derived from the mapping of occupational codes to an index capturing the income and education levels typically associated with each occupation (Ganzeboom et al. 1992). ISEI is well suited for this study as it is continuous, internationally standardized, and measures structural position in the occupational hierarchy rather than short-run earnings, which are sensitive to hours, bargaining, and transitory fluctuation. ISEI is constructed for each respondent at each wave from CFPS occupational codes, with invalid codes set to missing. This study uses ISEI as the primary outcome because the complementary-capital framework concerns access to primary-sector positions rather than earnings. An outcome that measures structural occupational standing is theoretically preferred to wages or income, which fluctuate with hours, bargaining, and short-run market conditions. As a robustness check reported in Section 4.4, the analysis is re-estimated with the Standard International Occupational Prestige Scale (SIOPS), which captures the social esteem attached to occupations rather than their socioeconomic standing (Treiman 1977); SIOPS is retained as a secondary measure only.

Treatment variables. The treatment is a binary indicator of permanent migrant status, where permanent migrants who hold an urban *hukou* are coded 1 and temporary migrants who retain a rural *hukou* are coded 0, as defined in Section 3.1 above.

Covariates. The covariate vector consists of pre-treatment characteristics measured at or near the time of migration. Each covariate is anchored to the first wave in which a respondent is observed as a migrant and, where that wave is missing, filled from the nearest available wave. The covariates are gender (female = 1); age and its quadratic term (age-squared) to capture non-linear life-course effects; educational attainment, operationalized as a binary indicator for college-level education or above (three-year college, four-year university, or postgraduate, corresponding to CFPS education category 5 or higher); Communist Party membership (member = 1); marital status (married = 1); weekly work hours (cleaned to set values below zero or exceeding 168 to missing); ethnic minority status (minority vs. non-minority); and veteran status (military experience vs. non-military experience).

For merit-based converters, tertiary education and Party membership are frequently the channels through which conversion is obtained rather than characteristics that strictly predate it (Wu and Treiman 2004). In this study, I treat them as pre-treatment as they index the stock of human and political capital a migrant brings to the urban labor market, which is the quantity the complementarity framework concerns; the limits of this assumption are discussed in Section 5. By contrast, I exclude a set of covariates that are post-treatment with respect to conversion, including job tenure (*bianzhi*) status, written labor contracts, and social insurance coverage. These are the formal-sector entitlements that the theory holds *hukou* to unlock. Constructing the selection model on them would control away part of the treatment’s effect, so they are retained only as descriptive quantities.

3.3 Analytical strategies

The analytical strategy proceeds in three stages: First, I estimate the average institutional return net of compositional selection; Second, I evaluate the heterogeneity of that return across the propensity distribution to test whether that return is uniformly distributed across the propensity continuum; Then, I conduct the robustness check of both the model and measurement choices.

3.3.1 Inverse Probability Weighting

Selection into conversion is modeled with a logistic regression of permanent migrant status on the pre-treatment covariate vector

$$\Pr(\text{Permanent}_i = 1 \mid \mathbf{X}_i) = \Lambda(\mathbf{X}_i' \boldsymbol{\beta}) \quad (1)$$

Predicted propensity scores are used to construct stabilized inverse probability weights, which weight each observation by the inverse of its probability of receiving the treatment status it actually holds, with the marginal probability of treatment in the numerator to limit variance (Cole and Hernán 2008; Hernán et al. 2001; Rosenbaum and Rubin 1983). Weighting reweights the sample to a pseudo-population in which treatment is independent of the observed covariates, so the weighted contrast estimates an average treatment effect for the full migrant population rather than the average effect on the treated (Hirano et al. 2003; Morgan and Winship 2014). To limit the influence of extreme weights, which arise where a migrant's observed status is improbable given covariates, weights are trimmed to observations with propensity scores between the 5th and 95th percentiles.

As a baseline, I estimate unweighted Ordinary Least Squares (OLS) regressions of occupational status on permanent migration status and the vector of covariates. The OLS models yield the unadjusted occupational gap between permanent and temporary mi-

grants, conditional on the included controls, but without correction for the non-random selection process that sorts individuals into *hukou* conversion. The IPW-weighted regression yields the gap net of compositional selection. The difference between the two decomposes the raw gap into a compositional component, the advantages migrants bring to conversion, and an institutional residual, the return to the *hukou* status itself. All models include survey-year fixed effects and cluster standard errors by household.

3.3.2 Balance and Overlap Diagnostics

Due to the validity of weighting rests on the covariate balance it achieves and on adequate overlap in the propensity distribution, I report a full set of diagnostics, including standardized mean differences for every covariate before and after weighting, the distribution of the propensity score by treatment status, and the distribution of the weights themselves.

3.3.3 Heterogeneous Returns by Propensity Stratification

While the weighted regression estimates an overall average, the complementarity framework predicts that the average conceals a sharp gradient. To test this, migrants are stratified by their estimated propensity score, their likelihood of obtaining urban *hukou* based on the pre-existing characteristics. The baseline analysis splits the sample at the median into lower- and higher- propensity strata. Within each stratum, wave-specific mean ISEI is computed separately for permanent and temporary migrants, with 95 percent confidence intervals, and plotted as occupational trajectories over 2016-2022. This analysis is a nonparametric counterpart to the regression models as it imposes no functional form on the relationship between propensity and return to display the distribution of outcomes directly.

Because the median split is coarse, the stratification is also estimated at finer resolution across propensity, with the overlap of treated and control observations within each stratum documented to establish common support. Retaining the full sample within strata

preserves the high-propensity temporary migrants who constitute the essential counterfactual for the framework’s central prediction and whom a common-support restriction would tend to discard.

3.3.4 Machine-Learning Robustness check

Finally, because the logistic propensity model imposes additive linearity, I validate it against a propensity score estimated by gradient-boosted decision trees. The gradient boosting classifier recovers the propensity score nonparametrically, capturing non-linearities and interaction among covariates that the logit cannot. Then I use the boosted scores to reconstruct the inverse probability weights and re-estimate the ISEI regression. Stability of the institutional return across the two propensity models cross validate that the findings are not artifacts of the logit’s functional form.

4 Results

4.1 Descriptive Statistics

Table 1 shows the distribution of propensity stratum and migration status in the sample. The 4,327 total rural-origin migrants are split by propensity and migrant status. Among 2,166 high-propensity migrants, 690 (31.9 percent) converted, whereas of 2,161 low-propensity migrants only 120 (5.6 percent) did so. The unbalanced conversion ratio among the high-propensity migrants shows the conversion is not distributed uniformly through the migrant population, but it concentrates among those whose pre-treatment characteristic make them attractive to *hukou* system, and it is rare among those who lack those characteristics.

Table 1: Sample Distribution by Propensity Group and Migration Status

	Temporary Migrant	Permanent Migrant	Total
Lower Propensity	2,041 (58.03%)	120 (14.81%)	2,161 (49.94%)
Higher Propensity	1,476 (41.97%)	690 (85.19%)	2,166 (50.06%)
Total	3,517 (100.00%)	810 (100.00%)	4,327 (100.00%)

Median split at the sample median propensity score.
Column percentages in parentheses.

The descriptive statistics, Table 2, for the two group show the compositional differences are significant and confirm prior studies' results on selection into *hukou* conversion. Permanent migrants are roughly ten years older on average, more than twice as likely to hold a college degree (28.1 versus 11.8 percent), more than four times as likely to be Communist Party members (18.9 versus 4.4 percent), and three to four times as likely to hold job tenure (*bianzhi*) status (13.6 versus 3.0 percent). Permanent migrants enter the panel with a mean ISEI score of 46.61, nearly 8.3 points higher than the temporary migrant mean of 38.3. The pattern is similar for occupational prestige, in which permanent

migrants report a mean SIOPS score of 43.3 compared to 38.6 for temporary migrants. Calculated with those characteristics, the estimated propensity score differs accordingly, with a mean of 0.351 among permanent migrants and 0.149 among temporary migrants.

Table 2: Descriptive Statistics by Migration Status

	Temporary Migrants		Permanent Migrants	
	Mean	SD	Mean	SD
Age	33.288	15.869	43.691	16.993
Female	0.453	0.498	0.491	0.500
College education	0.118	0.323	0.281	0.450
Party Member	0.044	0.205	0.189	0.391
Married	0.080	0.272	0.051	0.219
Weekly work hours	51.090	18.669	48.919	14.705
Minority	0.062	0.241	0.046	0.209
Veteran	0.016	0.126	0.046	0.209
Establishment Post (Bianzhi)	0.030	0.171	0.136	0.343
Labor Contract	0.290	0.454	0.343	0.475
Social Insurance Count	0.845	1.767	1.191	2.043
ISEI	38.345	14.453	46.614	16.283
SIOPS	38.529	11.830	43.231	14.562
Propensity score	0.149	0.139	0.351	0.218

For binary variables, the mean represents the proportion.
 ISEI ranges from 16 to 90; SIOPS ranges from 12 to 78.

The two groups differ on essentially every characteristic that is itself rewarded in the urban labor market, making the raw comparison of occupational status between permanent and temporary migrants unidentifiable. Thus, for the next steps, I isolate the residual return that remains after this compositional difference are weighted out.

The validity of that weighting rests on balance and overlap. Table 3 reports standardized mean differences for every pre-treatment covariate before and after IPW. Pre-weighting imbalance is substantial on the dimensions most strongly tied to conversion, age (0.63), Party membership (0.46), the intermediate education category (0.32), and veteran status (0.17) all exceed the conventional 0.1 threshold. After weighting, every covariate falls below it. Minority status has the largest post-IPW imbalance of 0.08; Party membership and age, the two strongest predictors of conversion, are reduced to 0.01 and 0.05

respectively. Figures A1 and A2 confirm the supporting conditions. The propensity score densities overlap throughout the trimmed range (5th-95th percentile, propensities ≈ 0.02 to 0.56), and the stabilized weights have a mean of 1.00, a 99th percentile of 2.60, and a maximum of 12.39, with no concentration of extreme weights in either treatment group. The IPW estimates that follow therefore reweight to a sample with adequate common support and no observed compositional imbalance.

Table 3: Covariate Balance Before and After Weighting

Covariate	Before Weighting				After Weighting			
	Treated	Control	SMD	SMD	Treated	Control	SMD	SMD
Female	0.491	0.453	0.075	0.075	0.500	0.482	0.036	0.036
Age	43.691	33.288	0.633	0.633	36.053	35.267	0.048	0.048
Married	0.051	0.080	-0.120	0.120	0.069	0.079	-0.040	0.040
Party Member	0.189	0.044	0.464	0.464	0.043	0.047	-0.012	0.012
Minority	0.046	0.062	-0.072	0.072	0.045	0.064	-0.080	0.080
Veteran	0.046	0.016	0.171	0.171	0.016	0.019	-0.017	0.017
Education 1	0.115	0.121	-0.020	0.020	0.149	0.129	0.060	0.060
Education 2	0.138	0.160	-0.062	0.062	0.138	0.155	-0.048	0.048
Education 3	0.222	0.367	-0.322	0.322	0.337	0.330	0.015	0.015
Education 4	0.224	0.218	0.015	0.015	0.230	0.230	-0.001	0.001

SMD denotes standardized mean difference; |SMD| denotes absolute standardized mean difference.

4.2 Heterogeneous Returns to *Hukou* Conversion

Table 4 reports the results of the baseline regression models estimating the average effect of permanent migration status on occupational attainment, with and without inverse probability weighting. The unweighted OLS (Model 1) places the raw permanent migrant premium at 5.38 ISEI points ($p < 0.001$). Weighting on the propensity score reduces this to 3.39 points ($p < 0.001$), an attenuation of roughly 37 percent. This decomposition shows a more than third of the observed occupational gap between rural-origin permanent and temporary migrants is compositional, attributable to differences in education, age, Party membership, and the other pre-treatment characteristics on which the propensity model conditions. The remaining 3.4 ISEI points constitute the average institutional return to conversion, the amount by which a migrant’s expected occupational standing rises when the institutional barrier is removed, holding compositional differences fixed.

Table 4: OLS and IPW Estimates of Occupational Returns to *Hukou* Conversion

	(1) ISEI: OLS	(2) ISEI: IPW
Permanent Migrant	5.392*** (0.738)	3.395*** (0.825)
College or above	11.482*** (0.769)	12.107*** (0.795)
Female	0.816* (0.463)	0.999** (0.494)
Age	-0.344*** (0.117)	-0.389*** (0.121)
Party member	3.982*** (1.237)	4.826*** (1.316)
Married	-0.362 (0.678)	-0.156 (0.732)
Ethnic minority	-1.838* (1.012)	-2.052* (1.139)
Veteran	2.367 (1.455)	2.014 (1.364)
Weekly work hours	-0.005 (0.011)	-0.005 (0.012)
Observations	6,379	6,379
R-squared	0.224	0.223

Standard errors in parentheses.

All models control for age-squared, a work-hours missing flag, and year FE. IPW from the full-specification propensity model, trimmed at the 5th/95th PS percentiles.

Standard errors clustered by household; *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

Education and Party membership remains the strongest predictors in the IPW model. A college degree is associated with 12.1 ISEI points and Party membership with 4.8 points, both far larger than the institutional return to *hukou* and both robust to weighting. Considering the complementary capital framework, these are the capitals whose deployment *hukou* permits as the largest occupational rewards accrue to human and political capital, while *hukou* is the institutional clearance that allows the holder of that capital to enter the segment of the labor market in which they are rewarded.

If the institutional return were uniformly distributed across the rural-origin migrant population, the 3.4-point average would describe every subgroup’s experience equally well. The complementary capital framework predicts that these average masks significant heterogeneity: it understates the returns for migrants with complementary capital, while overstating them for those whose lack of capital renders conversion ineffective.

Table 5: Descriptive Statistics by Propensity Strata and Migration Status

Variable	Low Prop. Temp.		Low Prop. Perm.		High Prop. Temp.		High Prop. Perm.	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Age	25.908	9.791	32.042	13.500	43.491	16.980	45.741	16.725
Female	0.425	0.494	0.475	0.501	0.493	0.500	0.494	0.500
College education	0.062	0.241	0.042	0.201	0.196	0.397	0.322	0.467
Party Member	0.018	0.132	0.033	0.180	0.080	0.271	0.216	0.412
Married	0.103	0.305	0.117	0.322	0.048	0.214	0.039	0.194
Weekly work hours	52.643	18.631	51.612	16.069	48.942	18.520	48.463	14.423
Minority	0.078	0.269	0.058	0.235	0.039	0.194	0.043	0.204
Veteran	0.007	0.083	0.008	0.091	0.029	0.168	0.052	0.223
Establishment Post (Bianzhi)	0.028	0.166	0.025	0.157	0.033	0.177	0.155	0.362
Labor Contract	0.291	0.454	0.317	0.467	0.289	0.454	0.346	0.476
Social Insurance Count	0.787	1.716	0.742	1.632	0.925	1.833	1.264	2.094
ISEI	37.500	13.159	39.037	13.555	39.437	15.910	48.102	16.354
SIOPS	37.338	11.094	36.902	12.648	40.068	12.558	44.506	14.617
Propensity score	0.058	0.037	0.084	0.035	0.275	0.129	0.398	0.203

Sample divided at the median propensity score.

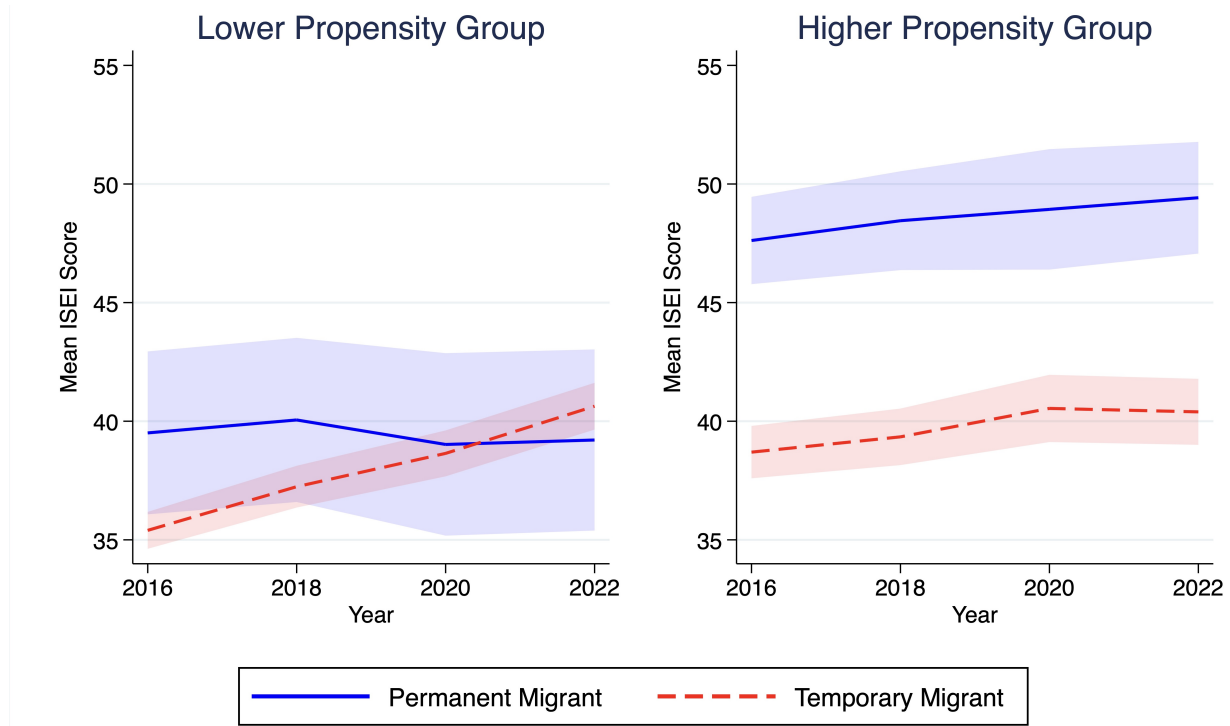
For binary variables, the mean represents the proportion.

Table 5 shows the descriptive statistics by propensity and migration status. Across both strata, permanent migrants are older and more likely to have college degree and affiliate with the Communist party. The numerical difference in ISEI between permanent and temporary migrants is small in the lower stratum (1.5 points) and substantial in the higher stratum (8.7 points), exhibiting an asymmetric distribution of occupational returns,

which is small at the bottom, large at the top.

Figure 1 display this asymmetrical form of occupational trajectories from 2016 to 2022 within each half of the propensity distribution, and Table 6 reports corresponding IPW-weighted regression estimates.

Figure 1: ISEI Trajectories by Propensity Stratum and Migration Status



In the lower-propensity panel, the trajectories for permanent migrants (blue) and temporary migrants (red) are statistically indistinguishable; their confidence intervals overlap at every wave. For migrants whose capital place them in the lower half of the propensity distribution, holding urban *hukou* does not lift their occupational standing significantly above the level reached by their unconverted counterparts, low propensity temporary migrants. Thus, instead of the closure boundary, human capital is their binding constraint. In the higher-propensity panel, the trajectories between the two migrant group show a divergent pattern. The average ISEI for the Permanent migrants is between roughly 47 to 50 while Temporary migrants have an average ISEI of 38 to 41. The confidence in-

tervals do not overlap throughout the waves.

Table 6: Heterogeneous Returns to *Hukou* by Propensity Stratum (ISEI, IPW)

	(1) Pooled (interaction)	(2) Lower propensity	(3) Higher propensity
Permanent Migrant	2.473* (1.303)	2.122* (1.289)	3.920*** (0.970)
Higher Propensity	5.112*** (0.634)		
Permanent $\times$ Higher	1.600 (1.630)		
College or above	9.810*** (0.813)	6.262*** (1.432)	10.906*** (1.035)
Party member	3.157** (1.380)	6.984** (3.197)	1.249 (1.444)
Ethnic minority	-0.329 (1.118)	-2.019* (1.219)	3.701* (2.234)
Veteran	0.956 (1.405)	0.056 (3.895)	1.781 (1.483)
Observations	6,379	3,276	3,103

Standard errors in parentheses.

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

The pooled interaction model, in Table 6, provides a direct test of whether the institutional return differs across propensity strata. The Permanent $\times$ Higher Propensity interaction is 1.60 ISEI points (SE = 1.63), with a positive in the predicted direction. The stratum-specific estimates that this interaction decomposes are 2.12 (SE = 1.29, $p < 0.10$) in the lower-propensity stratum and 3.92 (SE = 0.97, $p < 0.001$) in the higher-propensity stratum. The high-propensity return is substantively large, while the low-propensity return not distinguishable from zero at the 5 percent level, reflecting the small number of permanent migrants in the lower stratum ($n = 120$). The formal interaction test lacks power to reject equal returns, but the pattern of point estimates, a marginally significant, smaller return at the bottom and a precisely estimated, nearly twice as large return at the top, is consistent with the complementary-capital framework prediction. The nonparametric evidence in Figure 1, which shows overlapping confidence intervals throughout the

lower-propensity panel, corroborates this asymmetry without imposing functional form.

The occupational gap among the higher-propensity panel, in figure 1, exceeds the IPW-adjusted return 3.9 because the regression conditions on the pre-treatment characteristics through which the propensity to convert is itself constructed. Education, Party membership, age, and the other components of the propensity model are themselves substantial predictors of occupational position, and the IPW-adjusted return represents what remains of the conversion premium once these compositional factors are weighted out.

This is the predicted pattern of the complementary framework. *Hukou* confers access without conferring skill, and its occupational value depends on what institutional clearance permits the holder to do, which depends in turn on the capitals and characteristics the holder brings to the urban labor market. The propensity score summarizes this joint pre-treatment endowment in a single index. Although the formal interaction test does not reach significance, the cumulative pattern across specifications stratum-specific point estimates, trajectory plots, SIOPS replication (Figure A3), tercile stratification (Table A3), and geographic subsamples (Table 8), consistently show a larger institutional return among migrants with greater pre-treatment endowment. This convergence of evidence across multiple analytic approaches is consistent with the framework’s claim that *hukou*’s institutional value is conditional on the joint endowment of its holder. In sum, the closure boundary that *hukou* patrols cuts most consequentially through the rural-origin migrants whose joint pre-treatment endowment position them to deploy it.

4.3 Geographic Heterogeneity

The complementarity framework implies that institutional returns to *hukou* should be largest where complementary capital is most heavily rewarded by the local labor market (Heckman and Yi 2012; Wang et al. 2025). Coastal provinces in China are dominated by the export economy and the concentration of higher-status service and professional employment in tier-one and tier-two cities, offer a denser ladder of positions demanding high

human capital than the inland regions, where labor markets remain more agricultural and informal in composition (Fan 2002; Wang 2020). To test whether the institutional return varies with the regional structure, I re-estimate the returns on coastal and inland subsamples.

Table 7: *Hukou* Conversion and ISEI by Destination Region

	Coastal Destinations			Inland Destinations		
	OLS	IPW Baseline	IPW + Education	OLS	IPW Baseline	IPW + Education
Permanent Migrant	5.247*** (1.059)	4.120*** (1.177)	4.779*** (1.339)	5.304*** (1.009)	2.747** (1.121)	2.721** (1.210)
College Education	11.106*** (1.028)	11.626*** (1.054)	12.244*** (1.128)	11.951*** (1.143)	12.439*** (1.198)	12.406*** (1.324)
Age	-0.172 (0.149)	-0.217 (0.149)	-0.217 (0.148)	-0.731*** (0.149)	-0.638*** (0.146)	-0.639*** (0.145)
Minority	-0.824 (1.352)	-1.223 (1.469)	-1.242 (1.482)	-2.572* (1.392)	-2.327 (1.651)	-2.331 (1.657)
Veteran	1.353 (1.854)	1.862 (2.016)	1.892 (2.016)	2.433 (2.101)	1.731 (1.803)	1.732 (1.804)
Migrant $\times$ College			-3.461 (2.808)			0.210 (3.048)
Observations	3,133	3,133	3,133	3,246	3,246	3,246
R-squared	0.212	0.217	0.218	0.237	0.229	0.229

Standard errors in parentheses.

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

The OLS regression reports near-identical raw gaps where the premium is 5.25 ISEI points in coastal areas and 5.30 in inland areas. Weighting reveals that the institutional residual differs substantially across the two. In coastal areas the IPW-adjusted premium is 4.12 points, and it remains across specifications. In inland areas it falls to 2.75 points and is significant at the 5 rather than the 1 percent level. The two regions begin from approximately the same raw gap, but on the coast a larger share of that gap is institutional return, while in inland regions a larger share is compositional. This pattern is consistent with the complementary-capital framework, where institutional clearance has more to unlock, its value scales accordingly. The coastal labor market rewards human and political capital more steeply than the inland market does, and the conversion premium scales accordingly.

The overall trajectories across geographic regions and propensity show a similar

Table 8: Heterogeneous Returns to *Hukou* by Region and Propensity Stratum (ISEI)

	(1) Coastal: Low	(2) Coastal: High	(3) Inland: Low	(4) Inland: High
Permanent Migrant	3.584** (1.694)	3.906*** (1.419)	1.240 (1.786)	4.102*** (1.251)
College or above	3.943** (1.750)	10.934*** (1.390)	8.344*** (2.180)	10.562*** (1.589)
Party member	4.365 (3.720)	-1.179 (1.814)	9.721** (4.676)	3.457 (2.170)
Ethnic minority	-0.940 (1.262)	3.871 (3.785)	-2.486 (1.908)	3.229 (2.965)
Veteran	-4.853*** (1.376)	5.524** (2.460)	7.622 (8.380)	-0.249 (1.699)
Observations	1,586	1,547	1,690	1,556
R-squared	0.157	0.304	0.193	0.309

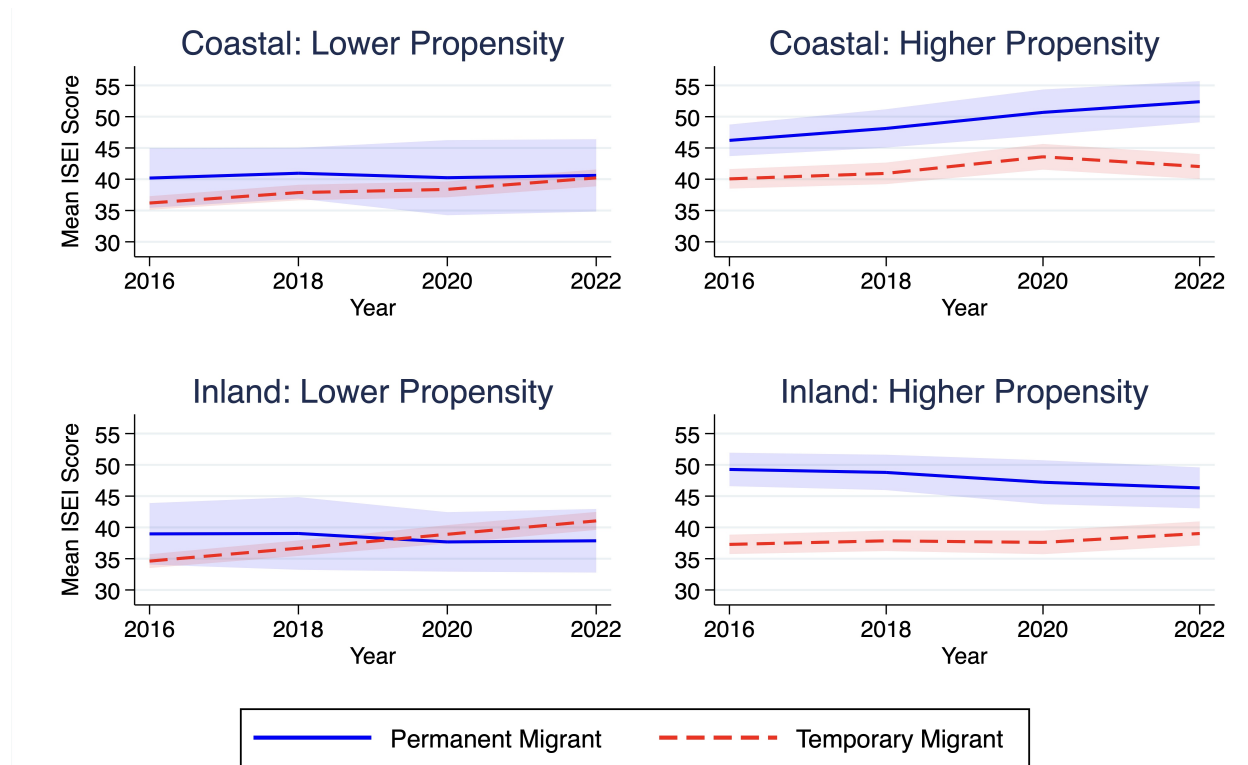
Standard errors in parentheses. Trimmed at 5th/95th percentiles. Standard errors clustered by household. All models include age, age-squared, gender, marital status, work hours, year FE, and missing-data dummies. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

pattern to figure 1, convergence at the bottom and divergence at the top. In both coastal and inland high-propensity panels the institutional gap is present, though the inland gap is visibly narrower than the coastal gap and consistent with the smaller IPW coefficient in Table 7. In the low-propensity panel across the two regions *hukou* conversion doesn't provide statistically distinguishable occupational returns as the confidence intervals overlap.

The geographic split strengthens the theoretical framework. Two patterns converge on the same conclusion. First, the institutional residual is larger where the labor market rewards complementary capital more heavily; on the coast, where the export economy and large-scale service sector both reward human capital and political connections. Second, within each region, that residual is concentrated among migrants whose pre-treatment endowment positions them to deploy *hukou* clearance once it is granted. The institutional function of *hukou*, clearance whose value depends on what it unlocks, is therefore robust to the substantial economic and labor market differences between coastal and inland China. This geographic pattern also shows the heterogeneity-along-propensity general finding of

entire *hukou* migrant population is not an artifact of pooling regions whose conversion premiums are themselves heterogeneous.

Figure 2: ISEI Trajectories by Region and Propensity Stratum



4.4 Robustness

I include a set of robustness checks, including an alternative outcome, finer stratification of propensity groups and Machine-learning-based propensity score.

Alternative outcome. I re-estimate every specification with SIOPS as the outcome variable, and it yields same pattern across the models. In Table A1, the raw SIOPS premium is roughly 2.2 points and the IPW-adjusted premium roughly 1.3, an attenuation similar in proportional terms to that observed for ISEI. Within propensity strata, the same pattern reappears as the confidence intervals overlap throughout the lower-propensity panel, and a persistent gap separates permanent from temporary migrants in the higher-propensity panel (Table A2; Figure A3). Despite measuring a distinct dimension of oc-

cupational standing, SIOPS reproduce the ISEI results indicates that the findings reflect structural occupational positioning rather than an artifact of any single scoring system. The two distinct outcomes further strengthen existing results that *hukou* conversion produces an institutional return that is concentrated among migrants whose pre-treatment endowment positions them to occupy the primary-sector positions that *hukou* unlocks.

Tercile stratification. The main result of this study relies on the median split to display the clarity of the stratification due to limited sample size. However, the binary split may obscure the shape of the gradient between the lower and higher strata. To probe this, I re-estimate the stratified analysis on propensity terciles, producing low, middle, and high propensity groups. Table A3 reports the corresponding stratum-specific IPW regressions; Figure A4 plots ISEI trajectories within each tercile. In the lowest tercile the migration coefficient is 2.49 ISEI points (SE 2.02) and not statistically distinguishable from zero. In the middle tercile it rises to 3.41 points (SE 1.12, $p < 0.01$), and in the highest tercile it remains at 3.41 (SE 1.10, $p < 0.01$). The pattern is consistent with the median-split finding as the low-propensity migrants receive no statistically distinguishable institutional return, while migrants with substantial pre-treatment endowment do. The migration coefficient jumps from the lowest to the middle tercile and then plateaus, indicating that the institutional return materializes once a migrant’s joint pre-treatment endowment is sufficient to clear primary-sector demands, and remains substantively stable at higher endowments. The tercile stratification tells a slightly different picture across migrant group but consistent with *hukou* as institutional clearance. This clearance is a binary input whose value depends on whether the holder has sufficient complementary capital to deploy it, not a continuous resource whose return multiplies smoothly with each additional capital.

Machine-learning-based propensity score. The logistic propensity model imposes additive linearity on the relationship between covariates and the conversion probability. While this assumption is conventional in IPW applications, a sufficiently flexible specification of the covariate-by-covariate interactions could alter the propensity estimates and

the resulting weights. To check that the findings do not depend on the logit’s functional form, I re-estimate the propensity score from a gradient-boosted decision tree (GBM) classifier, which recovers non-linearities and interactions among covariates nonparametrically.

In Table A4, the IPW-GBM estimate of the institutional return on ISEI is 1.85 points (SE 0.90, $p < 0.05$), smaller than the 3.40 obtained from the logit-weighted specification but positive and statistically significant. The corresponding estimate for SIOPS is 0.74 (SE 0.65) and is not statistically significant. Figures A5 and A6 plot the corresponding ISEI and SIOPS trajectories under GBM-based stratification, confirming the same asymmetric pattern observed in the logit-based analysis. The within-stratum asymmetry also reproduces under GBM-based stratification, in Table A5 the ISEI gap between permanent and temporary migrants is 3.0 points in the lower-propensity stratum and 8.4 points in the higher, mirroring the asymmetric pattern of IPW-weighted model. The institutional return documented in main results thus survives a different specification of the selection model, indicating that the heterogeneous-returns finding is not an artifact of the logit’s additive-linearity assumption.

5 Discussion and Conclusion

My study set out to evaluate whether China’s *hukou* system rewards all rural-origin migrants who convert to urban registration, or whether its occupational returns are concentrated mostly among those whose pre-treatment endowment of human and political capital position them to exploit the institutional boundary. The analysis first confirms the patterns of positive selection into treatment (Wu and Treiman 2004; Wu and Zheng 2018). On average, the rural-origin migrants who hold permanent urban *hukou* are substantially more educated, more politically connected, and occupationally better positioned than their temporary counterparts.

Then, to determine whether the observed occupational advantage of permanent migrants reflects pre-existing compositional differences or a genuine institutional effect of *hukou* conversion, I apply inverse probability weighting to decompose the raw occupational gap into its constituent sources. The results demonstrate that approximately 37% of the raw ISEI gap between permanent and temporary rural-origin migrants is attributable to compositional selection, which is the fact that the most advantaged migrants are disproportionately the ones who convert. The remaining statistically significant institutional premium of 3.4 ISEI points, after adjustment, confirms that the *hukou* system confers a genuine occupational advantage for positive selection into treatment that align with previous finding (Wu and Zheng 2018).

However, the propensity score stratification demonstrates that these average institutional premium masks an unequal distribution of returns. Among low-propensity rural-origin migrants, the occupational positioning of permanent and temporary migrants is statistically insignificant, but there is a large structural gap that separates the permanent and temporary migrants within the high-propensity group. The occupational premium from the pooled IPW models is therefore predominantly attributable to stratification among migrants whose pre-treatment endowment positions them to deploy *hukou* clearance once it is granted; for migrants whose endowment of human and political capital is limited, *hukou*

conversion confers no meaningful occupational advantage.

My findings also provide empirical support for the theoretical framework of this study. The *hukou* system operates as a state-mandated mechanism of exclusionary closure (Collins et al. 2019; Parkin 1979) that regulates access to the primary labor market (Doeringer and Piore 2020; Fan 2002; Piore 1972). Rather than acting as an institutional resource that improves occupational outcomes for all who acquire it, *hukou* functions as legal clearance that permits holders to bypass the gatekeeping boundary between the secondary and primary labor markets. The occupational value of that clearance, however, is contingent on whether the holder possesses the human and political capital required to occupy primary-sector positions once the boundary is breached. The propensity score, which summarizes the joint endowment of pre-treatment characteristics, predicts the magnitude of the institutional return more reliably than any single covariate does in isolation. *Hukou* clearance and pre-treatment endowment are complementary inputs into primary-sector occupational attainment, and the institutional return materializes only where both are present.

In sum, the two patterns, *hukou* has no statistically distinguishable occupational consequence at the bottom of the propensity distribution but separates elite migrants into an institutionally admitted group and an excluded group with comparable qualification at the top; this result extends the "positive selection in returns" finding of Wu and Zheng (2018) by revealing its distributional mechanism. The positive slope in returns across the propensity continuum is not a general feature of institutional rewards. Operating through labor market segmentation, exclusionary closure concentrates its penalties among the highly endowed migrant population. For this elite group, the institutional boundary is the binding constraint; in contrast, the institution imposes no consequences on migrants whose primary barrier is a lack of human capital rather than institutional status. The geographic split reinforces this interpretation. The institutional residual is roughly 1.5 times larger in coastal regions, where the labor market most heavily rewards complementary capital, than

in inland labor market, where the returns to capital are attenuated. Thus, *hukou*, the legal clearance whose value depends on what it unlocks, remains valid along both the propensity dimension within each region and the regional dimension within each propensity stratum.

The main findings carry implications for ongoing *hukou* reform debates. The post-2014 National New-type Urbanization Plan has expanded *hukou* access in small and medium-sized cities while maintaining point-based systems in megacities (Trémon 2025; Wang 2020). The present results suggest that extending urban *hukou* to all rural-origin migrants would not, by itself, equalize occupational outcomes. For migrants whose pre-treatment endowment of human and political capital is limited, *hukou* conversion confers no meaningful occupational boost because the human capital that primary-sector employers screen for is absent; clearance unlocks doors to positions the holder cannot occupy. For migrants who possess the requisite capitals, by contrast, the institutional boundary is what generates the occupational premium, and its removal would shift them into primary-sector positions for which they are already qualified. Effective reform would therefore need to address both dimensions, removing the *hukou* boundary itself, and addressing the labor-market discrimination against rural-origin migrants that operates independently of legal status (Chan and Buckingham 2008; Zhang and Wu 2017).

Finally, I acknowledge several limitations of this study. First, as with much social science research, my analysis relies on observational panel data and cannot fully rule out unobserved heterogeneity in the determinants of both conversion and occupational attainment. Rural-origin migrants who convert may differ from non-converters on unmeasured dimensions, such as ambition, strategic networking, or even the quality of institutional connections, that independently predict occupational success. The propensity score adjusts for observed covariates but cannot address selection on unobservables. The robustness check using a gradient-boosted propensity score addresses one form of bias, that arising from misspecification of the parametric selection model, but it cannot recover information about characteristics that are not in the data at all. Second, the binary treatment vari-

able does not distinguish among conversion channels. Merit-based converters who secured *hukou* through state-sector employment or educational credentials may experience different occupational dynamics than those who converted through marriage, property purchase, or other pathways. The CFPS data does not provide sufficient detail to disaggregate these channels, although the geographic restriction excluding in situ urbanization, partially addresses the most common form of non-meritocratic conversion.

Future research should extend this framework in several directions. First, with larger samples or pooled-across-survey data, finer propensity stratification, at the decile or even percentile level, could pin down the location along the propensity continuum at which the gatekeeping mechanism becomes operative. Then a comparative application of the exclusionary closure framework to other institutional credentials, such as citizenship acquisition among international migrants, professional licensing, or work permits, would test the generalizability of the finding that institutional credentials function as mechanisms of elite stratification rather than serving as instruments of reducing inequality. The framework developed here predicts where institutional returns will concentrate within a labor-market hierarchy, and that prediction can be tested wherever a comparable closure boundary can be identified.

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A Appendix

Table A1: OLS and IPW Estimates of the *Hukou* Premium on SIOPS

	(1)	(2)
	SIOPS: OLS	SIOPS: IPW
Permanent Migrant	2.216*** (0.624)	1.328* (0.753)
College Education	8.726*** (0.631)	8.860*** (0.657)
Female	-0.184 (0.377)	-0.120 (0.404)
Age	-0.453*** (0.083)	-0.481*** (0.095)
Party Member	2.287** (1.051)	2.785** (1.104)
Married	-0.640 (0.547)	-0.231 (0.635)
Weekly Work Hours	-0.048*** (0.009)	-0.048*** (0.010)
Observations	6,379	6,379
R-squared	0.124	0.123

Notes: Standard errors in parentheses. All models control for age-squared, a work-hours missing flag, and year FE. IPW from the full-specification propensity model, trimmed at the 5th/95th PS percentiles.

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

Table A2: Heterogeneous Returns to *Hukou* by Propensity Stratum (SIOPS)

	(1)	(2)
	Lower Propensity	Higher Propensity
Permanent Migrant	0.827 (1.227)	1.364* (0.776)
College Education	4.669*** (1.241)	8.025*** (0.841)
Female	-0.304 (0.566)	-0.620 (0.586)
Party Member	5.920** (3.015)	-0.095 (1.185)
Minority	0.733 (0.987)	5.671*** (1.687)
Observations	3,276	3,103
R-squared	0.096	0.169

Standard errors in parentheses.

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

Table A3: Heterogeneous Returns to *Hukou* by Propensity Tercile (ISEI)

	(1)	(2)	(3)
	Low propensity	Middle propensity	High propensity
Permanent Migrant	2.488 (2.015)	3.411*** (1.118)	3.411*** (1.103)
College or above	4.318*** (1.486)	4.060** (1.974)	9.670*** (1.311)
Party member	7.249 (5.202)	-5.912** (2.462)	0.503 (1.587)
Ethnic minority	-1.443 (1.610)	0.076 (1.471)	5.000* (3.027)
Veteran	-2.487 (1.565)	-1.549 (3.492)	0.837 (1.657)
Observations	1,968	2,599	1,812

Standard errors in parentheses. IPW from full propensity specification, trimmed at 5th/95th percentiles. Standard errors clustered by household. All models include age $\times$ year FE and full controls. Tercile cutpoints based on the distribution of propensity scores in the analytic sample.

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

Table A4: *Hukou* Premium on ISEI and SIOPS, Machine-Learning Propensity Specification

	(1)	(2)	(3)	(4)
	ISEI: OLS	ISEI: IPW-GBM	SIOPS: OLS	SIOPS: IPW-GBM
Permanent Migrant	4.582*** (0.736)	1.849** (0.901)	1.672*** (0.622)	0.739 (0.649)
College Education	11.420*** (0.758)	12.041*** (0.773)	8.648*** (0.626)	8.801*** (0.606)
Female	0.707 (0.459)	1.245** (0.518)	-0.189 (0.379)	0.055 (0.394)
Age	-0.413*** (0.103)	-0.291** (0.126)	-0.457*** (0.081)	-0.449*** (0.085)
Party Member	6.555*** (1.186)	7.907*** (1.289)	3.658*** (0.984)	4.172*** (0.999)
Married	-0.755 (0.689)	-0.434 (0.699)	-0.891 (0.558)	-0.627 (0.577)
Weekly Work Hours	-0.000 (0.011)	0.001 (0.012)	-0.043*** (0.009)	-0.045*** (0.009)
Observations	6,273	6,273	6,273	6,273
R-squared	0.225	0.217	0.125	0.125

Standard errors in parentheses. All models control for age-squared, a work-hours missing flag, and year FE. IPW from GBM propensity model, trimmed at the 5th/95th PS percentiles. Standard errors clustered by household.

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

Table A5: Descriptive Statistics by Propensity Strata and Migration Status (GBM)

Variable	Low Prop. Temp.		Low Prop. Perm.		High Prop. Temp.		High Prop. Perm.	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Age	28.068	14.082	25.750	8.136	41.101	15.173	45.124	16.698
Female	0.427	0.495	0.500	0.504	0.493	0.500	0.490	0.500
College education	0.084	0.278	0.033	0.181	0.169	0.375	0.301	0.459
Party Member	0.041	0.199	0.017	0.129	0.048	0.213	0.202	0.402
Married	0.116	0.320	0.067	0.252	0.027	0.162	0.049	0.217
Weekly work hours	52.304	18.376	50.600	16.892	49.273	18.962	48.784	14.520
Minority	0.085	0.279	0.000	0.000	0.028	0.164	0.049	0.217
Veteran	0.018	0.131	0.000	0.000	0.014	0.118	0.049	0.217
Establishment Post (Bianzhi)	0.029	0.168	0.017	0.129	0.032	0.176	0.145	0.352
Labor Contract	0.294	0.456	0.383	0.490	0.284	0.451	0.340	0.474
Social Insurance Count	0.796	1.725	1.200	1.990	0.918	1.826	1.190	2.048
ISEI	38.024	13.472	40.976	13.421	38.773	15.661	47.149	16.442
SIOPS	37.853	11.259	39.262	11.485	39.429	12.500	43.609	14.776
Propensity score (GBM)	0.037	0.027	0.064	0.025	0.240	0.127	0.520	0.277

Sample divided at the median GBM propensity score. For binary variables, the mean represents the proportion.

Figure A1: Propensity Score Overlap

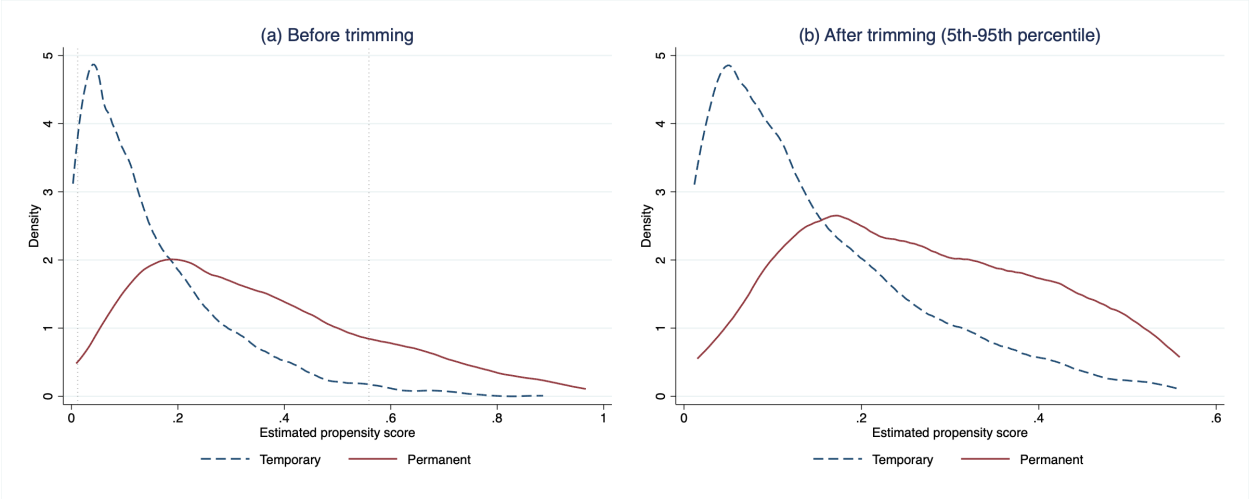


Figure A2: Weight Distribution

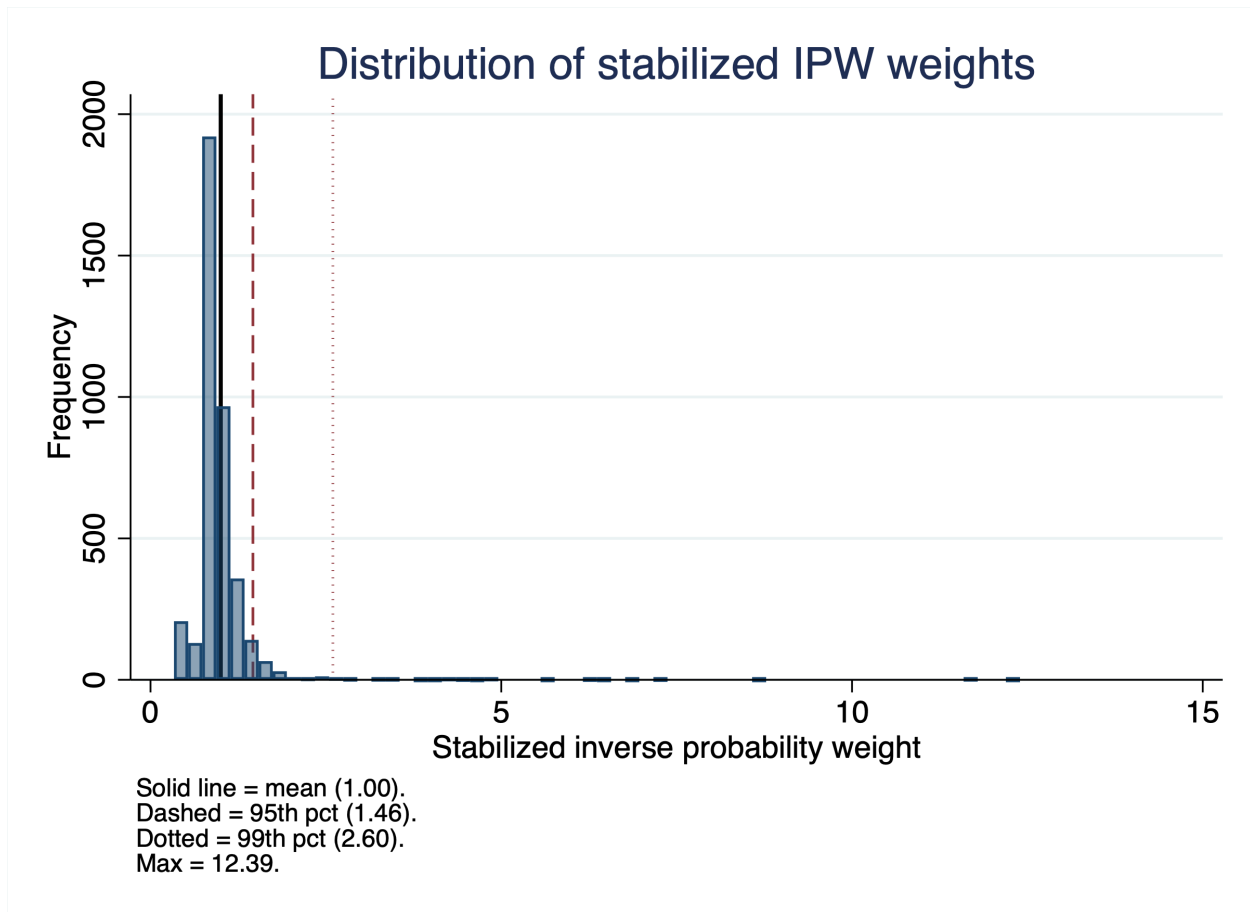


Figure A3: SIOPS Trajectories by Stratum

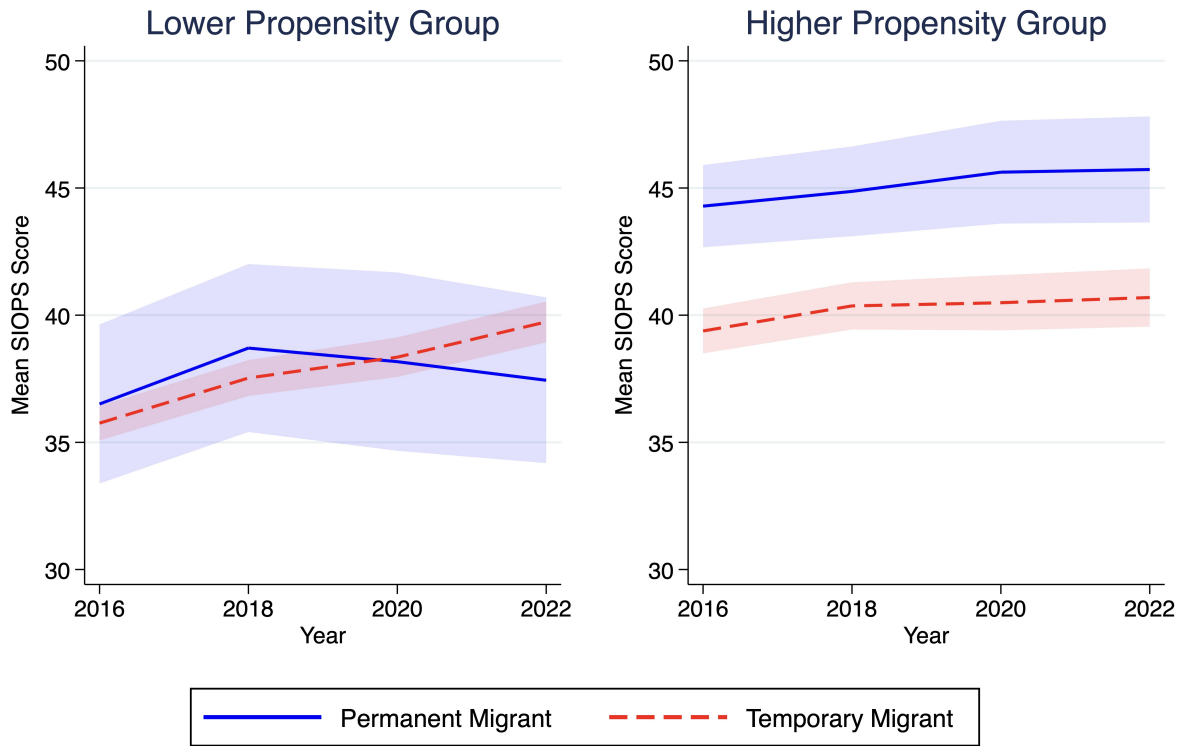


Figure A4: ISEI Trajectories by Tercile

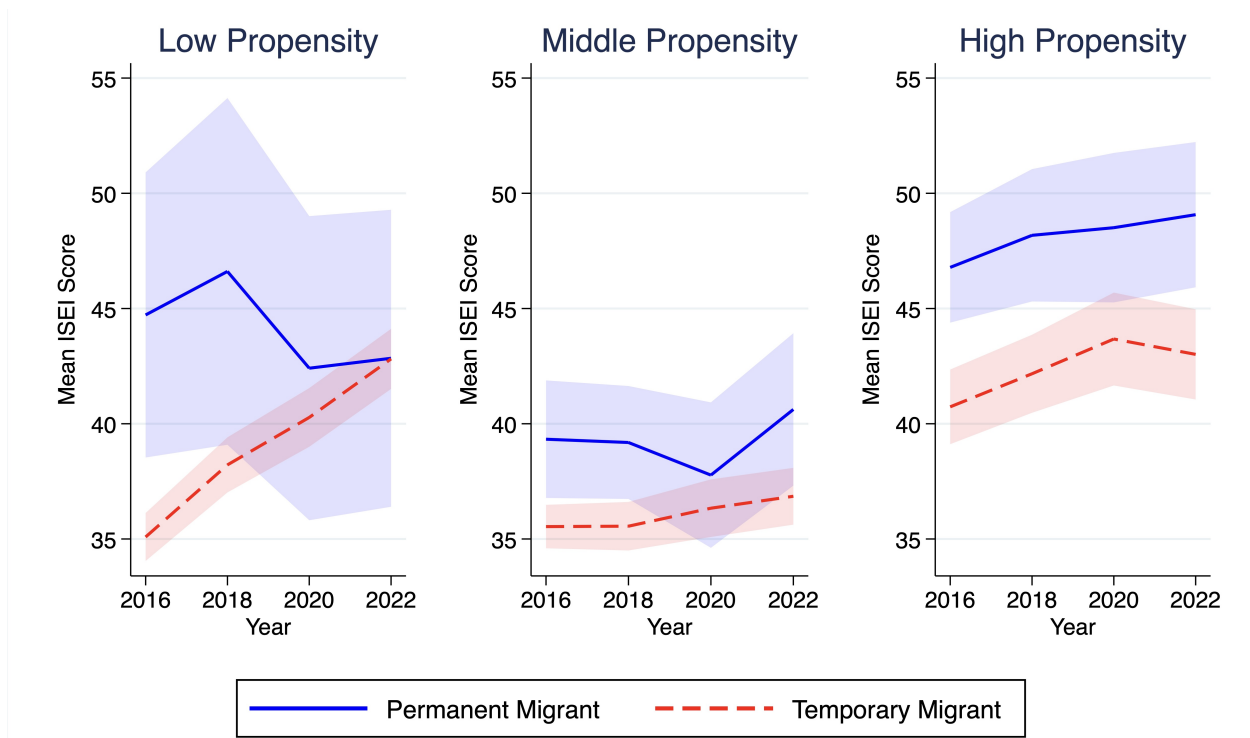


Figure A5: GBM ISEI Trajectories by Stratum

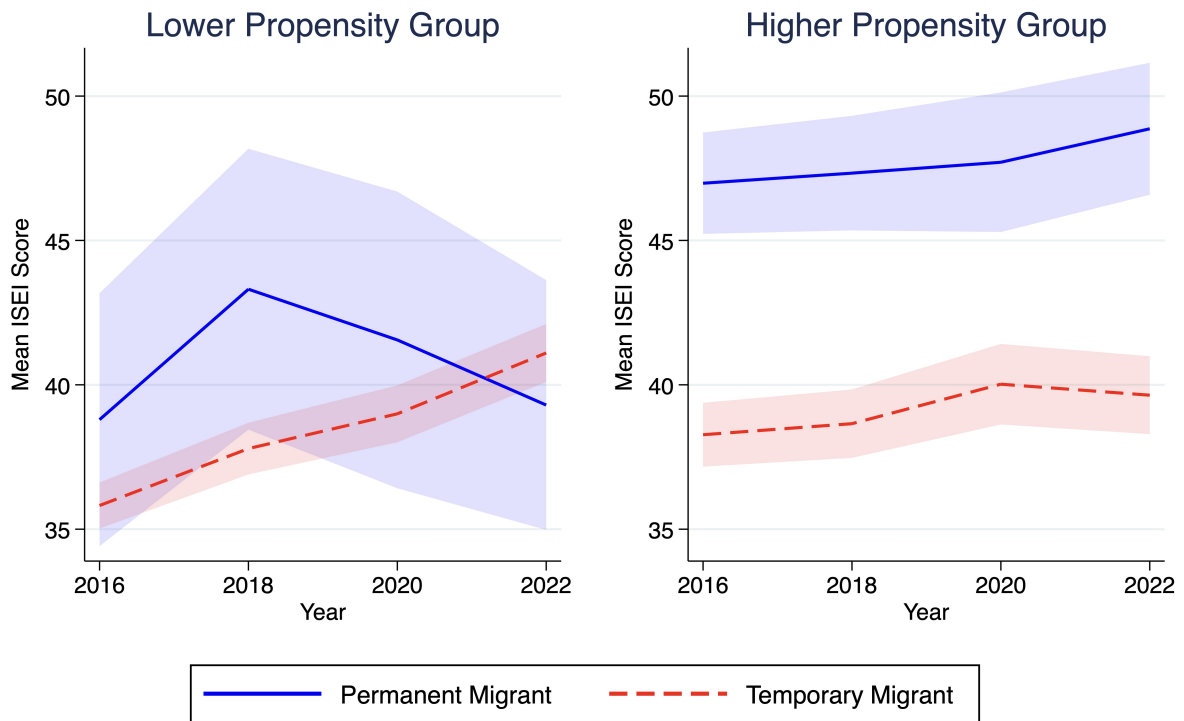


Figure A6: GBM SIOPS Trajectories by Stratum

