# Urban infrastructure enhancement and labor-capital rent distribution: a case of China

**Developing economics**

**Abstract**:

**object:** The condition of labor search may influence their bargaining with capital. This study investigates the effects of urban infrastructure enhancement representing search conditions on labor-capital rent distribution.

**Methods:** The theoretical model suggests that labor search conditions should elevate the labor rent share. Using an event study approach combining with Chinese firm panel data, we did the empirical tests for the reasoning.

**Results:** The empirical result support the theoretical hypothesis on some conditions. Our research uncovers an unintended consequence of bolstering urban infrastructure. It offers insights that could help developing economies adjust their labor-capital income distribution.

**Keywords:** wages bargaining, infrastructure, income distribution, developing economies

# 1. Introduction

In developing countries, capital is often scarce while labor is abundant. This leads to a dominant capital and a weaker labor stance in wage bargaining. Imbalances in the labor-capital income distribution can hinder economic growth and wealth accumulation in several ways. As a result, policymakers in developing economies are tasked with adjusting this distribution to foster robust economic development. Meanwhile, given that cities are the engines of modern economic growth, the need for urbanization in developing countries is paramount. The challenge lies in identifying ways to promote urbanization while also fostering equitable income distribution. While the role of urban infrastructure in expanding urban carrying capacity and enhancing city efficiency is well-understood, recent studies suggest that infrastructure expansion can also improve income distribution within firms.

Brooks et al. (2021) discovered that transportation infrastructure connects markets across different regions, reducing firms' market power in both product and labor markets. This results in decreased product markups and wage compression. By reducing both types of market power, highways elevate the labor share by 1.8-2.2 percentage points. Conversely, Pérez and Lecaros (2022) determined that urban subway construction diminishes wage compression by weakening firms'

labor market power within the same labor market. Both of these studies pivot on the idea that infrastructure influences endogenous labor supply elasticity. In this framework, firm-specific labor supply elasticity dictates the degree of wage compression. However, this viewpoint is only pertinent to general human capital, as it can be sourced from outside the firm and has supply elasticity. In contrast, FSHC (firm-specific human capital) is exclusive to the internal operations of the firm and lacks supply elasticity, rendering the aforementioned perspective inapplicable to FSHC. Additionally, the outcomes derived from the labor supply elasticity perspective solely gauge wage compression, which represents the gap between the actual wage and the ideal wage, rather than the distribution between labor and capital.

From the perspective of FSHC, a clear result of labor-capital distribution within a firm can be ascertained, as FSHC derives its revenue by sharing the firm's rent (Aoki, 1980; Rajan and Zingales, 1998). Unlike the aforementioned studies on labor supply elasticity based on GHC (general human capital), this research delves into the impact of infrastructure expansion on the bargaining game, viewing it through the lens of FSHC's share in the firm's rent. The connection between infrastructure and labor-capital rent distribution is established by outlining the processes of an employer's replacement of its employees and vice versa. Subsequently, these processes are integrated into the Nash distribution model,

representing the external options for both firms and labor. More specifically, within the framework of the replacement processes, infrastructure bolsters on-the-job searches for both employers and employees. This enhancement increases the degree of knowledge overlap both inside and outside the firm, influencing potential gains from the replacement process. A potential theoretical contribution of this study lies in its unique approach, examining the issue through the dual prisms of firm-specific human capital and rent sharing.

There is no country better suited than China to serve as a sample for conducting empirical studies on this phenomenon. Known as an infrastructural powerhouse, China's rapid urbanization has been accompanied by a remarkable rate of infrastructure funding and expansion. Concurrently, China grapples with the significant negative impacts of uneven income distribution, particularly the disparity between employer and employee earnings. Thus, this study uses panel data from manufacturing firms in China, paired with city-level infrastructure conditions, to explore the impact of infrastructure on the income distribution between labor and capital within firms. Our findings offer policy implications that can stimulate economic growth and enhance income distribution by promoting economic agglomeration and rendering infrastructure expansion more cost-effective. By developing infrastructure that aids labor searches, we can achieve efficient labor allocation and balance income distribution within firms.

The remainder of this paper is organized as follows: Section 2 presents the theoretical model, Section 3 presents the empirical tests, and Sections 4 and 5 present the discussion and conclusion.

## 2. Theoretical model

The purpose of modeling is to illustrate how the underlying infrastructure (labor search conditions) affects the direction of rent-sharing and the channels through which the impact is generated. In this section, we will create a model based on the principles of FSHC to obtain rent-sharing as mentioned in the introduction. We will set up processes for both the employer replacing the employee and the employee replacing the employer. The final rent-sharing will be determined based on the revenue generated from these two processes. The fundamental idea of this model can be summarized as follows. First, according to Nash bargaining, rent sharing is determined by the total rent of the firm, the "outside option revenue" (which refers to the respective earnings of the two parties when employment is dissolved) for both parties, and their relative bargaining power. Second, the outside revenue is enhanced by the knowledge coincidence between inside and outside of the firm. Third, this knowledge coincidence is influenced by the search conditions, notably infrastructure. We can use an asymmetric Nash bargaining model that incorporates search conditions (infrastructure) to determine the rent sharing in firms.

Specifically, an expanded search scope, facilitated by infrastructure, helps employees find external jobs that more closely match their current knowledge than those found under poor search conditions. A mechanism emerges: "search conditions (urban infrastructure) -> knowledge matching -> learning period." In our model, the "learning period" is the time a new laborer needs to master the FSHC. This influences the external option revenue for both capital and labor, as discussed in section 2.2-2.3 the manuscript. Consequently, another mechanism is present: "learning period -> external option revenue -> rent sharing." Together, these two mechanisms link search conditions (due to infrastructure) to internal firm rent sharing.

### 2.1 Assumptions

The model presented in this study is based on the following assumptions:

1. Consider a representative labor and its corresponding physical capital.

2. Upon joining a firm, labor must gradually accumulate the FSHC required by the employer. As the FSHC increases, the total rent increases until the end of the learning period. The firm's max total rent is determined by its physical capital.

3. Employees' rent share follows their FSHC accumulation.[1] Over time, new employees acquire all the necessary FSHC, and labor rent reaches the max level. The max labor rent share is equal to the Nash solution; and

[1] FSHC is the fundamental of labor sharing the rent.

4. With the improvement of infrastructure, employees will not switch jobs due to finding higher-paying positions externally. (In some cases, this assumption does not hold).

The rationale and purpose behind these settings are as follows. For assumption 2, we assume that new employees must acquire the FSHC needed by the company. This assumption eliminates the reverse impact of rent-sharing on the motivation of employees to learn FSHC, thereby greatly simplifying the model. Assumption 2 further posits that the company's total rent rises as new employees enhance their proficiency in FSHC. The core principle here is straightforward: FSHC dictates an employee's capacity to generate rent. In line with the aforementioned assumption, there's an upper limit to the FSHC value accumulated by employees. Once FSHC hits this threshold, the company's total rent similarly peaks.

For assumption 3, the proportion of rent shared by new employees increases as they accumulate FSHC, aligning with the principle of FSHC-driven rent-sharing. It is stipulated that when employees have fully mastered all FSHC, their rent-sharing proportion equals the solution from the Nash model and remains constant. This is to bring the model to equilibrium. Starting from any post-learning state, with other conditions being constant, employees have no incentive to leave their employer (under assumption 4), and employers do not have an incentive to fire employees (since hiring new ones results in the same outcome). Therefore, on the

constant external conditions, rent-sharing is stable, bringing the model to local equilibrium. This equilibrium shifts with changes in labor search conditions.

Assumption 4 is set to ensure that enhancements in infrastructure do not disrupt the existing employer-employee pairing, keeping the model valid. While this might not hold true in certain scenarios, empirical studies will reveal such cases.

### 2.2 Value of the External Option of Labor

The external option revenue of labor is the integral of the rent stream received over period T. This external rent stream derives from labor's share (denoted as "los") of the rent of the external firm (represented by "lor"). When labor initially joins an external firm, they are not able to generate rent. However, following the learning period, they acquire all the necessary skills and achieve full productivity. Let "dc" signify the alignment between the labor's current knowledge and the essential knowledge needed to learn the FSHC of the new external firm. It is plausible to posit that a higher "dc" value indicates a shorter learning period. For simplicity's sake, we've assumed that the duration of the learning period is t(dc).

$$loo_1 = \int_0^{t(dc)} lor(x) \cdot los(x)\, dx \tag{1}$$

$$loo_2 = lor\big(t(dc)\big) \cdot los\big(t(dc)\big) \cdot \big(T - t(dc)\big) \tag{2}$$

Of course, the rent generated by the new match increases during the learning period (expressed as lor(x)). The rent share follows labor productivity (expressed in los(x)). The revenue of labor's external option during the learning period, loo1,

is the integral of the external rent flow over the period from 0 to t(dc) (Equation (1)). x represents the time.

$$loo = loo_1 + loo_2 \tag{3}$$

The external labor revenue after the learning period is loo2 (in equation 2), and the total outside revenue during the 0-T period is loo in equation 3.

### 2.3 Value of the External Option of Capital

When the current match is terminated, the employer brings in newly recruited labor to replace the original employees. The external option revenue for capital is the cumulative rent stream the employer receives after ending the current match. This external rent stream is determined by the capital's share (denoted as "betac") of the rent (indicated as "por") generated by the new match with the newly recruited labor. Upon hiring new labor, a firm generates minimal rent due to the absence of an FSHC. However, throughout the learning period, the newly recruited labor acquires all the necessary skills from the firm, resulting in a progressively increasing rent over that period (as expressed by "por"). The capital's share (indicated by "betac") diminishes with the rising productivity of the newly recruited labor. Let "dc" represent the alignment between the knowledge of the newly recruited labor and the basic knowledge needed to acquire the FSHC.[2] It is

[2] Assuming the two types of coincidences (as mentioned in 2.2 and 2.3) are identical, both can be denoted by "dc."

plausible to posit that a higher value of "dc" implies a shorter learning period. For the sake of simplicity, we'll denote the duration of the learning period as t(dc). The revenue of the capital's external option during the learning period, labeled as "coo1", is calculated as the cumulative total of its external rent flow over the 0-t(dc) period, as outlined in Equation (4). x represents the time.

$$coo_1 = \int_0^{t(dc)} betac(x) \cdot por(x)\, dx \tag{4}$$

$$coo_2 = betac\left(t(dc)\right) \cdot por\left(t(dc)\right) \cdot \left(T - t(dc)\right) \tag{5}$$[3]

$$coo = coo_1 + coo_2 \tag{6}$$

Capital's external revenue after the learning period is coo2 in Equation 5. and the employer's total outside revenue is coo in Equation (6).

### 2.4 Labor rent share (Betal)

We set the Nash-bargaining model to (7). According to this model, betac(t(dc)) *, which maximizes Y in Equation (7), is the rent share of capital.

$$\begin{aligned} Y = &\left(T \cdot \left(1 - betac\left(t(dc)\right)\right) \cdot por\left(t(dc)\right) - loo\right)^{b} \times \\ &\left(T \cdot betac\left(t(dc)\right) \cdot por\left(t(dc)\right) - coo\right)^{1-b} \end{aligned} \tag{7}$$

To derive the expression for labor rent share, we must specify the exact forms of all relevant functions. Therefore, we make the following settings for the

[3] betac(t(dc)) refers to the capital share of rent in the current firm, when its employees have mastered all the FSHC.

functions' form:

1. Set the rent generated by the match of the employees and external capital would be lor(x) when x∈ (0, t(dc)), and Lor when x>=t(dc). (x represents the time) Equation (8) means that the lor(x) grows linearly during the learning period, until x=t(dc), it reaches Lor and stays constant.

$$lor(x) = Lor \cdot \frac{x}{t(dc)} \tag{8}$$

$$los(x) = Los \cdot \frac{lor(x)}{lor(t(dc))} \tag{9}$$

2. The labor's share of the outside rent, produced by the match of employees and external capital, would be los(x). los(x) increases with lor(x) during the learning period, and after the learning period, it would be a fixed value, Los.

3. After the employment was dismissed, the employer would recruit new labor. The rent generated would be por(x) during the learning period, and after the learning period, it reaches its maximum rent por.

$$por(x) = Por \cdot \frac{x}{t(dc)} \tag{10}$$

$$betac(x) = 1 - Betal \cdot \frac{por(x)}{por(t(dc))} \tag{11}$$

4. The proportion of rent obtained by capital would be betac(x) during the learning period, and betac(x) decreases with time x, until it becomes constant 1-

Betal after the learning period. Betal represents the share of rent for labor in the normal state, which we need.

Based on the properties of the Nash distribution model, the derivative of Y with respect to Betal can be set to zero to obtain the expression for Betal:

$$Betal = \frac{2(b-1)\cdot t(dc)}{3T}\cdot ratio - (b-1)\cdot ratio + \frac{3b}{4} \tag{12}$$

Where ratio=(Lor*Los)/Por, is the ratio of the labor's external revenue (after the learning period) to the total rent of the current match. The ratio (firm competition) and dc (knowledge coincidence) should both increase with the search scope.

**2.5 Channel labor searching (infrastructure) influencing rent-sharing.**

$$\frac{\partial Betal}{\partial dc} = \frac{2(b-1)t'(dc)}{3T}\cdot ratio > 0 \tag{13}$$

$$\frac{\partial Betal}{\partial ratio} = \frac{2(b-1)\cdot t(dc)}{3T} - (b-1) > 0 \tag{14}$$

Equations (13) and (14) represent the two channels through which the search scope (positively related to infrastructure) affects rent sharing, namely the knowledge coincidence channel and the firm competition channel. Equation (13) indicates that the Betal increases with the degree of knowledge coincidence (dc). Equation (14) indicates that Betal increases with the competition (ratio) from external firms. Therefore, we can conclude: Infrastructure enhances rent sharing by expanding the on-the-job search scope for labor and thus through the two

channels.

**Proposition 1**: **Infrastructure will certainly help increase labor rent share.**

To understand how the effects of these two channels are influenced by labor bargaining power, we derive both channels with respect to b. Equations (15) and (16) indicate that both channels are weakened by the bargaining power of labor (b), so the impact of infrastructure on Betal is inevitably weakened as the bargaining power of labor increases.

$$\frac{\partial_{dc} betal}{\partial b} = \frac{2t'(dc)}{3T} \cdot ratio < 0 \tag{15}$$

$$\frac{\partial_{ratio} betal}{\partial b} = \frac{2t(dc)}{3T} - 1 < 0 \tag{16}$$

**Proposition 2**: **The strength of the main effect will be weakened by labor bargaining power.**

## 3. Event studies on infrastructure enhancement

The purpose of this empirical research is to validate Hypothesis 1 and Hypothesis 2, namely:

1. The enhancement of infrastructure increases the proportion of rent shared by employees.

2. The effect of infrastructure is diminished by labor bargaining power.

We utilize both firm-level data and information on the city's infrastructure (urban rail and broadband internet). We test the aforementioned hypotheses using an

event study approach. The analysis employs the city-level clustering standard deviation on a global scale.

**Rationality of the Quasi-Experiment Design with Infrastructure Expansion**

Urban infrastructure can facilitate labor searches in several ways. First, the expansion of a city's rail transit system extends the commuting range for workers living near rail stations, thereby broadening their search scope. This is because when laborers can commute easily to further areas, they may consider job opportunities in those areas. Second, internet infrastructure facilitates information transmission, enhancing labor market information efficiency. Third, rail transit and Internet connections reduce search and commuting time costs, enabling workers to engage in more on-the-job searches. Finally, wage policies among firms within a city can exert peer effects due to labor market competition. If infrastructure enhances rent sharing in some firms, it might influence other firms in the city through these peer effects. Urban infrastructure will activate the two channels (knowledge match and firm competition) we described in section 2.5.

**Avoiding Endogeneity Issues with Infrastructure Enhancements**

The event study method draws on the differences-in-differences (DID) principle. By controlling for fixed effects, we can mitigate the influence of firm heterogeneity on rent sharing and address endogeneity concerns in the estimation. Regarding reverse causality, latest trends in rent-sharing among firms are unlikely to exert a strong reverse effect on infrastructure construction, as construction plans are

typically formulated several years in advance. Another consideration is anticipation. Strong anticipatory effects are unlikely because, in situations where capital is dominant and labor is weaker, capital typically drives wage-setting. Thus, even if both parties expect that infrastructure expansion might benefit labor, firms do not need to modify their distribution policy until the actual implementation of this expansion.

## Data and Variables

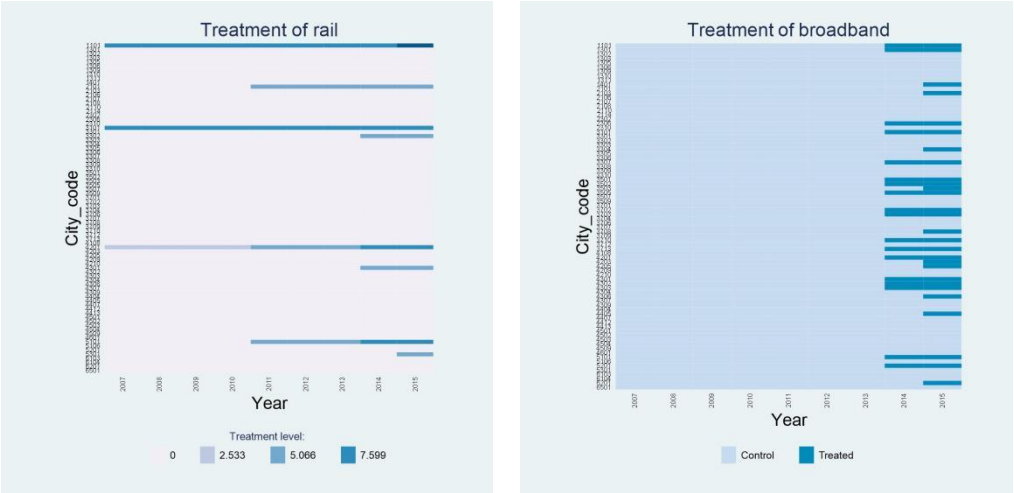
This section utilizes panel data from 80 Chinese cities with complete infrastructure information for 2007–2015 and conducts event studies in conjunction with the China Enterprise Tax Survey database. The expansion of urban rail transit is represented by the weighted sum of trains[4] that encompasses both the expansion of routes and improvements in the carrying capacity of these routes. The dependent variable is firm rent sharing (Betal), calculated as the ratio of labor rent to the firms' total rent.[5] We excluded Betal outliers with values beyond the 5% and 95% percentiles for each year. Figure 1 shows the status of urban rail transit and

[4] China's rail trains include metro, light rail, monorail, rail, maglev, and are summed according to a weighting of 5:2:2:1:2.5. The weights are derived from the ratio of the transmission capacity of the various rails.

[5] We use the minimum firm wage in every industry-province as the industrial reservation wage. The reason is that employees of firms with the lowest wages receive the smallest amount of rent, which is closest to the industrial reservation wage. Labor rent=payroll−reservation wage. Total rent = labor rent + operating profit.

broadband China project[6] in each city for each year. The color on the left side represents the rail transit system capability. As shown, the events occurred in a staggered pattern, and the sample included a sizable proportion of untreated cities. Therefore, this condition was suitable for the event study design. Considering continuous and additional treatment adoption at different time points, we employed the estimation method proposed by de Chaisemartin et al. (2022), which permits flexible settings.

**Figure 1 (treatment status)**




### 3.2 Baseline results

We chose ex-ante leads of two periods and ex-post lags of three periods to examine the dynamic effects of Rail Transit expansion. Subsequently, we selected ex-ante leads of one period and ex-post lags of one period to investigate the dynamic effects of broadband in China. We use the year before treatment (period

[6] A project aimed to enhance the internet and portable internet connection.

-1) as the baseline reference. Figure 2 displays an upward trend in Betal following these treatments, suggesting that the main effects might be present but are not significantly pronounced.

**Figure 2 (baseline results)**

Figure 2 1) Urban rail

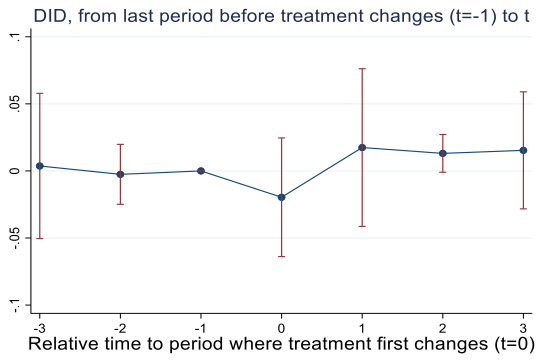
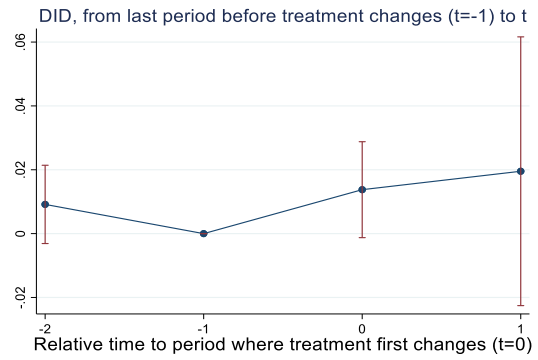



Figure 2 2) Broadband China




### 3.3 Heterogeneity analysis based on labor bargaining power.

Section 2.5 demonstrated that labor bargaining power weakens the effect of infrastructure (as posited in Hypothesis 2). To investigate the moderating role of labor bargaining power on this main effect, it is crucial to identify a proxy variable for labor bargaining power (lbp). Ideally, the FSHC would represent the bargaining power of labor. However, our database does not contain variables representing the number or significance of FSHC. As a result, we adopted a proxy variable, capital density, to differentiate the sample into high lbp and low lbp groups. Because a greater volume of physical capital necessitates more human capital for its effective operation and maintenance, as posited by the capital-skill complementarity theory. Hence, firms with higher capital density are likely to have

a larger amount of FSHC, granting employees increased bargaining power. This perspective aligns with the empirical findings of Brock and Dobbelaere (2006) and Martins (2009), who observed higher labor bargaining power in firms with high capital density. Consequently, we separated the sample into high and low labor bargaining power groups based on the firms' capital density and conducted empirical tests on each subset. The results, presented in Figure 3, reveal that the low lbp group (left) exhibits more remarkable results both in terms of significance and intensity compared to the high lbp group (right). These outcomes corroborate Hypothesis 2, suggesting that firms with heightened labor bargaining power are less likely to be impacted by enhancements in labor search conditions (infrastructure).

**Figure 3 (heterogeneity analysis based on labor bargaining power)**

Figure 3 1) urban rail, low lbp

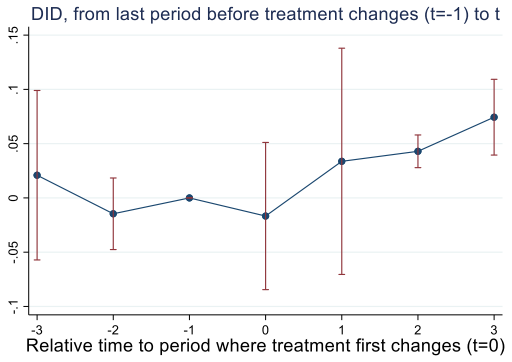



Figure 3 2) urban rail, high lbp

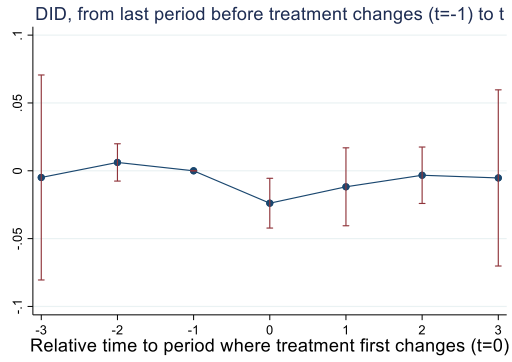



Figure 3 3) broadband project, low lbp

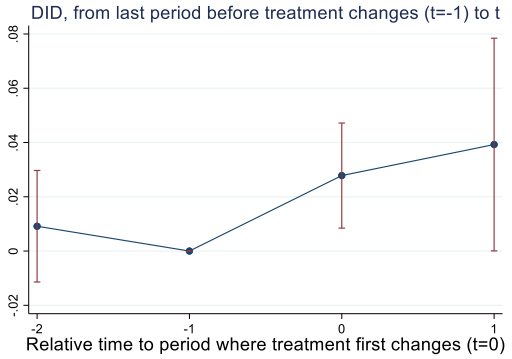
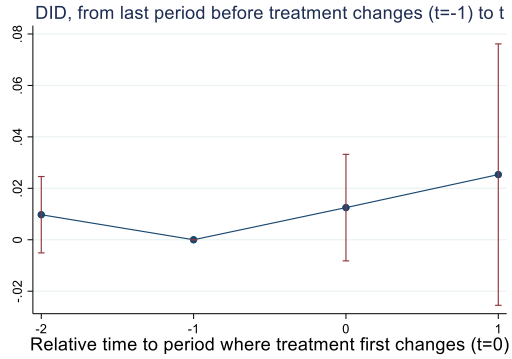



Figure 3 4) broadband project, high lbp




It can be observed from Figure 3 (parts 1 and 2) that during the period from -1 to 0, the scatter declines, especially in part 2. This outcome contradicts our prior theoretical predictions. A potential reason could be that the competition channel is exceptionally potent, prompting labor to switch employers. Our previous theoretical reasoning is built on the assumption that labor will not switch their employers. If high bargaining power labor are more likely to switch due to urban rail expansion, this switch may explain the dynamic style in Figure 3 (2). Here is the reason: For certain firms employees depart, the newly recruited labor, due to a lack of FSHC, shares less rent. This results in a decrease in the scatter. Then, as

these newly recruited workers gradually acquire the FSHC, their share of the rent reverts to standard levels, which accounts for the subsequent recovery in scatters. We will evaluate this explanation further in section 3.4.

### 3.4 Heterogeneity analysis Based on the "ratio."

Section 3.3 inferred that a sufficiently high ratio (representing the competition channel) might entice employees to switch employers. This section seeks to validate this hypothesis using a subgroup test. Firstly, we computed the proxy variable for the ratio[7]. Subsequently, we categorized the sample into high- and low-ratio groups. We then carried out the same event studies on each subsample as done previously. The logic behind this design is: Employees in the high-ratio group are more inclined to encounter higher-paying opportunities outside due to urban rail transit expansion. In contrast, for the low-ratio group, employees are less apt to discover these attractive external opportunities stemming from transit growth. Hence, firms in the high-ratio group are more susceptible to workforce switching compared to the low-ratio group. Based on the discussion in Section 3.3, such labor switching is expected to first reduce the scatter and then raise it. Consequently, we project that the scatterplot for the right-side sample in Figure 4 will exhibit a downward then upward trajectory, while the left side will not. The

[7] The proxy variable for this ratio is determined by the expected rent an employee could secure externally, divided by the firm's per capita value-added. This calculation is similar to the definition of the ratio described in section 2.4.

empirical data presented in Figure 4 corroborates this anticipation, implying that an over-strong competition channel (ratio) might indeed catalyze employee switching their employers.

**Figure 4 (heterogeneity analysis based on the "ratio")**

Figure 4 1) rail, high lbp, low ratio

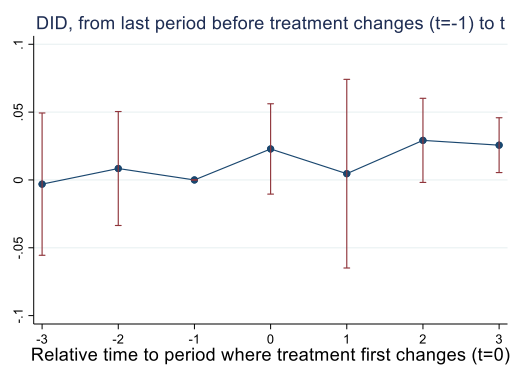
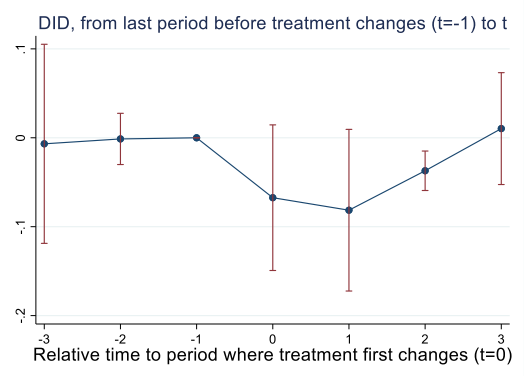



Figure 4 2) rail, high lbp, high ratio




## 4. Discussion

The empirical analysis in the preceding sections supports the overall theoretical predictions. However, in certain cases, it also yields results that contradict the theoretical reasoning, especially in the analysis of the high labor bargaining power samples in the urban rail study. Specifically, during the -1 to 0 period, the labor's share of rent decreased. Based our previous theoretical analysis, we expected infrastructure to only increase the labor rent share. We suspect this discrepancy may arise from the effect of an overly intense firm competition and a higher likelihood of high-bargaining-power labor switching due to this effect (This violates premise assumption 4 of the model.). To verify this explanation, we

conducted the study described in Section 3.4. It is found that the high ratio group (with a stronger competition effect) experienced a similar trend as Figure 3(2). These results suggest that an overly intense competition effect can indeed lead employees to switch to other firms.

Due to data limitations, we also omitted controls for certain key factors, such as firm-provided training and non-wage attractions of firms. Both aspects can have an impact on labor-capital bargaining and relate to labor-searching conditions (infrastructure). Kim (1990) pointed out that improving search conditions reduces the expense of firm training. These reduced expenses will be shared with labor. Kim's (1990) mechanism could be one of the possible channels needed to control this analysis. Additionally, Hirsch (2020) found that non-monetary aspects of jobs may endow firms with monopoly power in the labor market. It can be inferred that the larger the search scope, the weaker the non-monetary effect. In sum, future studies could control for these two mechanisms. Additionally, since we cannot obtain firm-level human capital information, we are unable to control for it in the empirical analysis. In the future, empirical research can be conducted using large-scale employer-employee matched data.

## 5. Conclusion and policy implications

In China, given its status as an infrastructural powerhouse, the nation's experience offers a pertinent case study for exploring the effects of infrastructure on the

economy. This study examines how infrastructure, as it pertains to labor search conditions, influences labor rent sharing. The principle is that infrastructure broadens labor's external options by aiding them in locating higher-wage firms and fostering knowledge coincidence between inside and outside of the firm. Using historical data from Chinese manufacturing industries, we ascertain our hypothesis that while infrastructure bolsters labor rent sharing, this effect diminishes in the face of strong labor bargaining power. This suggests that labor bargaining power and search scope function as mutual substitutes.

Unlike other studies (Pérez, 2022; Brooks, 2021) in the same field that are based on the perspective of wage compression, this study is grounded on the Nash bargaining model of cooperative rent sharing. The wage compression approach is founded on analyzing the elasticity of external labor supply, and as such, can only explain the pricing of GHC (General Human Capital). In contrast, the Nash bargaining model is built upon the negotiation of internal factors, allowing it to explain the gains achieved by FSHC. The potential theoretical contribution of this study lies in integrating the principle of FSHC (Firm-Specific Human Capital) rent-sharing with the principles of the Nash bargaining model. Through this integration, we have constructed a firm-level partial equilibrium to elucidate the effect of changes in labor search conditions on rent-sharing. A theoretical limitation is that the model does not consider the general equilibrium results of labor-switching

employers, only focusing on a partial equilibrium. Another limitation is the overly simplified treatment of the rent-sharing evolution process for new employees. Lastly, we were not able to provide a compelling reason to explain why labor with higher bargaining power is more likely to switch employers due to an expanded search scope, as found in sections 3.3 and 3.4. Future research could construct a general equilibrium model, while also considering the more complex rent-sharing evolution process for new employees.

The insights of this study can guide developing economies in balancing labor-capital income distribution. Based on these conclusions, we suggest the following policy implications for developing economies aiming to increase their labor share: Invest in infrastructure that facilitates labor searching. Encourage economic agglomeration to make infrastructure construction more efficient. Given that labor with lower bargaining power benefits more from infrastructure expansion, urban administrators should not restrict their entry into the city.

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