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How Commuting Time Affects Employees' Income in China's Urbanization Process

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Abstract: With the deepening of China's urbanization, the commuting time of employees is increasing. Much evidence in Western developed countries supports the positive relationship between commuting time and income, but the relationship has not been verified in China. To determine whether the relationship is in effect in China, this paper constructs a theoretical model. From the perspective of long-term equilibrium analysis, the best choice for individuals is a hard-work strategy. The increase in long-term commuting time will eventually lead to individuals working harder, thus increasing personal income. The OP model established based on the survey data of Beijing residents' time allocation in 2011, 2016, and 2021 also verified the positive impact of commuting time on employee income, which is more significant for groups with longer commuting time and shorter leisure time. The innovation of this paper has three parts. First, the long-term dynamic decision-making game was introduced into the personal choice model to reveal the long-term impact of commuting on income. Second, we verified the positive impact of commuting time on income in China. Third, we discussed the policy implications of increasing commuting time for improving urban operation efficiency in China's urbanization process. Finally, it is suggested that the government should reasonably plan the urban functional structure and increase the construction of public transport in infrastructure, and enterprises should explore the staggered commuting system.

Keywords: commuting time; leisure time; income; urbanization; urban efficiency

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1. Introduction

Commuting time is a very important part of personal time allocation [1,2]. With the continuous development of urbanization and the growing size of cities in China, commuting time is inevitably increasing [3,4]. The impact of increased commuting time on individual income is a social problem about which workers are generally concerned. Many studies in Western developed countries show that there is a positive relationship between commuting time and income [5–12]. However, this result has not been verified in China. Is the impact of commuting time on the income of Chinese workers positive or negative? What is the positive impact of increased commuting time on China's urbanization process? These problems remain to be solved. In the context of the deepening urbanization in China and the increasing commuting time of employees, exploring the relationship between commuting time and income may help officials gain a deeper understanding of this relationship. Understanding the significance of increasing commuting time and its connection to income may enable the government to improve urban operation efficiency and the enterprises to improve management efficiency.

In recent years, whether or not a linkage exists between commuting time and income has aroused the extensive attention of academic researchers. A vast body of studies has investigated the relationship between the two variables, with most confirming the positive impact of commuting time on income [5–12]. For example, Morris and Zhou

(2018) quantified the payback rate of a one-hour commute in the United States as 7.5% [10], which confirmed the 8.2% wage premium set by Ross and Zenou (2007) for blue-collar workers [13]. Data from European countries show that in the Netherlands, the average willingness to pay for a one-hour commute is about half of the hourly wage, and the commute distance increases by 1 km, leading to a 0.15% increase in wages three years after the relocation [7], with an hour-long daily commute associated with 7–9% higher wages [5]. The labor economics theory tries to explain the above empirical results and mainly focuses on the wage bargaining hypothesis. The hypothesis holds that the longer the commute, the higher the compensation in theory. Higher wages are the motivation to accept longer commutes, or because the possibility of accepting longer commutes increases the possibility of finding an ideal job [14–17].

However, the above positive impact of commuting time on income has not been verified in China. At present, Chinese scholars mainly discuss how income affects commuting time [3,18,19]. For example, some scholars have found that income has a "U-shaped" influence on commuting time by using the data of the China Labor Dynamics Survey in 2016. With the increase in employees' income, commuting time shows a trend of first decreasing and then increasing [19]. Some scholars also found that with the increase in income, commuting time and commuting distance of employees showed an upward trend by using the data of the Beijing Transportation Development Research Center [18]. Most of these studies focus on how income affects the commuting time of residents but lack empirical analysis on the impact of increased commuting on individual income. This is not conducive to our understanding of the policy implications of increased commuting time in the Chinese urbanization process. If the positive impact of commuting time on individual income is established in China, does it imply that reducing commuting time will not necessarily improve the economic efficiency of cities and the operating efficiency of enterprises? In contrast, is a long commuting time required to improve urban efficiency in the process of urbanization in China? This aspect will be analyzed in the Discussion section.

To verify whether commuting time has a positive impact on income, this paper builds a theoretical model that considers the impact of commuting time on income from the perspective of long-term equilibrium dynamics. In the short term, an increase in commuting time will inevitably limit sleep time and leisure time [20,21], while a decrease in leisure time may reduce the job satisfaction and social capital accumulation of employees [22], and then inhibit the work performance and income of employees [23]. However, this view is based on the static decision-making of the company's employees, and it does not further discuss the balance and stability of the long-term dynamic decision-making of individuals, so it cannot reflect the long-term results of the commuting time effect. This paper will explore the long-term impact of commuting on income by examining the equilibrium results of employees' long-term dynamic decisions. When commuting time increases and leisure time decreases, their coping strategies at work are either hard-work strategies or slack strategies. However, the impact of commuting on the work of different employees is asymmetric [13], that is, the increase of commuting time will make the utility loss of slackers greater, and then in the future, the unemployment probability of slackers will be correspondingly increased [24]. Thus, if the individual chooses the effort strategy, the utility loss caused by leisure reduction is relatively small, while the utility loss caused by the slacking strategy is relatively large. Therefore, from the perspective of long-term equilibrium, the effort strategy is a rational choice for individuals, that is, in the long run, the increase in commuting time will eventually lead to individuals working harder, thus increasing their income. In a word, the main objective of this paper is to build a long-term dynamic equilibrium theoretical model to explore the impact of commuting time on income, and then use the survey data of Beijing residents' time allocation in 2011, 2016, and 2021 to verify that the positive impact of commuting time on employee income is established in China.

There are three main contributions in this paper. One is to innovatively introduce the long-term dynamic decision-making game into the personal choice model and reveal

the long-term impact of commuting on income by examining the equilibrium results of long-term dynamic decision-making. The relevant existing literature mainly focuses on empirical analysis and rarely reveals the internal mechanism of commuting time on individual income through model construction. This paper finds that effort strategy is a rational choice of individuals in the long run. Eventually, the increase in commuting time will lead to individuals working harder, thereby increasing a balanced income. Second, this paper is, to the best of our knowledge, the first to verify whether the positive impact of commuting time on income is established in China. There is a substantial empirical body of evidence on the positive impact of commuting time on income in Western Europe and the United States, but the topic is understudied in China. This paper represents a contribution to this issue by introducing the personal choice model and using the survey data of Beijing residents' lifetime allocation in 2011, 2016, and 2021 for empirical testing, and verifies that this positive impact is established in China. Third, we discuss the policy implications of increased commuting time in China's urbanization process. The increase in commuting time is not a "bad" thing, and a long commuting time helps to improve urban operation efficiency. There are several practical implications of our study findings. First, these results might help researchers understand the impact of commuting time on income from the perspective of long-term dynamic equilibrium. Second, it is helpful for the government and enterprises to understand the positive significance of long commuting time for China's urbanization process, such as reminding the government to reasonably plan the urban functional structure and enterprises to explore the staggered commuting system. Third, employees can perhaps use these findings to negotiate flexible work arrangements with the enterprise in lieu of long commutes.

The rest of this paper is organized as follows. Section 2 briefly reviews the relevant literature. Section 3 constructs a long-term dynamic equilibrium model of commuting time to income and suggests research assumptions. Section 4 describes the methodology and data sources. Section 5 introduces the empirical results and conducts a robustness test and a heterogeneity test. Finally, Section 6 summarizes and discusses some policy implications.

2. Literature Review

2.1. Commuting Time

With the increase of the urban population and the expansion of urban spatial structure, the distance between the workplace and the residence is becoming greater and greater, and commuting time is also increasing accordingly [25–27]. Evidence from Europe and the United States also shows that commuting time increases with the size of cities [28–31]. For example, Giménez-Nadal et al. (2022) used data from the European Working Conditions Survey(EWCS) for the years 1995, 2000, 2005, 2010, and 2015, which found increasing trends in commuting in Germany during the 1991–2001 period and the Netherlands between 1993 and 2005 [30]. Gordon et al. (2004) found the nationwide average rose to 25.5 min in 2000 from 22.4 min in 1990, a 14.1% increase in the USA, which was related to larger population and higher average incomes that resulted in more travel and higher vehicle ownership rates [32].

Generally speaking, the factors that affect commuting time include gender, age, education level, marital status, employment status, and job–housing imbalance. The gender difference in commuting has been confirmed by much of the literature, which found that women have less commuting time than men because they undertake more housework [33,34]. Well-educated people are more likely to commute longer distances because education levels are positively correlated with the skills of workers, and high-skilled jobs are more geographically dispersed, thus requiring longer commutes and correspondingly higher wages [9,35]. Age also mediates the relationship between earnings at work and commuting time, since age may be a proxy for experience and skills [36]. Compared to the unmarried group, the married group has a shorter commute time to allow for care of their families, while married men have a longer commute time than married women [37,38]. The relationship between earnings and commuting may be influenced by the respondent's

occupation. For example, individuals may have to accept longer commutes to work in jobs that offer higher pay but where jobs are scarce [12,39]. In terms of the relationship between the jobs–housing imbalance and commuting time, many studies proved that the jobs–housing imbalance influenced individual commuting behavior [3,40,41]. Therefore, gender, age, education level, marital status, occupational status, and the jobs–housing imbalance would be selected as control variables in Section 4.

2.2. Impact of Commuting Time on Income

A number of studies explained the positive relationship between commuting time and income from the perspective of theoretical research and empirical research. Labor economics explains the positive relationship from four aspects. One is to obtain wage compensation. Companies far away from workers' homes tend to compensate employees for commuting costs, so increasing commuting time will increase employees' wage compensation [8,11,42]. Second, employees will generally not accept a job far from home unless the monetary gain to the employee is sufficient to compensate for the monetary expense of commuting and the associated loss of time [5]. Third, employees facing high commuting costs tend to bargain with their employers for higher compensation [8]. Fourth, in a highly competitive labor market, although individuals want short commuting times and high wages, the labor market is competitive and uncertain, so they are willing to exchange longer commuting times for higher wages [7]. The theory of urban economics also provides a related view that individuals with higher income need a higher quality of life, so they are more likely to have better housing quality in safe neighborhoods with lower crime rates [43]. These characteristics are more likely to occur in areas far from urbanization and employment centers.

There is extensive empirical evidence indicating the positive impact of commuting on income in the United States and other developed countries. Zax (1991) used the annual wages record data of 1971, 1972, and 1973 published by a CBD company in Detroit, Michigan, to estimates the impact of commuting time and housing characteristics on the income of white men, white women, and black women in this company. The results show that the income of these three groups of employees increased directly with commuting time [44]. Darren and William (2001) investigated the wages of workers in different employment areas by using the micro-data of the 1990 census of two major metropolitan areas in the United States, and found that the wages difference was significantly correlated with the average commuting time of workers [11]. Morris and Zhou (2018) used the data from the American time allocation survey and built an OLS model to verify that workers receive compensation for longer commutes. The results showed that increasing commute time by 60 min a day would bring about a 7.5% increase in wages [10]. French et al. (2020) used data from Add Health to examine the relationship between commuting time and income among young adults. The results showed that an additional 10 min of one-way commuting time was related to an increase of 2.9% (2.8%) in the annual income of young adult men (women) [9].

However, evidence on the relationship between wages and commuting time is much more limited in Chinese contexts. For instance, Zheng et al. (2009) used the large-scale worker survey and work density data in Beijing, which found that nearby locations with higher work density often require longer commuting time. Private enterprises pay wage premiums in these locations, with the wage premium more significant for skill-intensive enterprises [45]. Zhao et al. (2020) used Beijing mobile phone data to find that a trade-off between housing costs saving, commuting time, and wage gain is one major reason why people commute for a lengthy time [46]. These studies do not directly discuss the relationship between commuting time and income, which is not conducive to understanding whether the positive impact of commuting time on income is established in China. The following sections of this article will compensate for the above-stated lack of evidence.

3. Theoretical Framework

Assume a linear urban environment, that is, between the employment area and the living area, the workers live in equal density, the residential area is unitized to 1, and the total population is normalized to 1. The effort that an employee endogenously decides to put into work is defined as s and the commuting time is defined as t. The overall unemployment rate is defined as α and the employment rate is $1-\alpha$. Wages is defined as $w = w(\alpha)$ and is monotonically decreasing with respect to the unemployment rate, that is, $\frac{dw}{d\alpha}\left\langle 0, \frac{d^2w}{d^2\alpha}\right\rangle 0$. The unemployment benefit is defined as β.

For employed individuals i in the economy, their utility function is defined as follows:

$$U_i(z, l, s) = z_i + F_i(l, s) \tag{1}$$

where z_i is the consumption of the employed and $F_i(l, s)$ is the utility brought by the employed through leisure time l and work effort s. Among them, leisure time has a positive effect on utility and work effort has a negative effect on utility, and they both have a marginal decreasing effect on utility, that is $\frac{\partial F}{\partial l} > 0$, $\frac{\partial^2 F}{\partial^2 l} < 0$, $\frac{\partial F}{\partial s} < 0$, and $\frac{\partial^2 F}{\partial^2 s} < 0$. In general, active leisure leads to a positive mental state and makes individuals happy in their work [47]. Thus, leisure and work effort have complementary effects, that is, $\frac{\partial^2 F_i}{\partial l \partial s} > 0$.

The product market is assumed to be perfectly competitive, so the price of a consumer good z_i is exogenous and is normalized to 1. The budget constraint faced by employee i is then:

$$wT = z_i + H(t) + \delta t \tag{2}$$

where T is the working time, which is assumed to be an exogenously given constant, so the time constraint can be simplified as $T + t + l = 1$. $H(t)$ is the housing rent or housing price of the employed, which is related to the commuting time. It is assumed that $\frac{dH}{dt} < 0$, that is, the longer the commuting time, the cheaper the rent or housing price. δ is the cost of commuting.

According to Equations (1) and (2), the utility function of the employed individual i is:

$$U_i = (wT - H(t) - \delta t) + F_i(1 - T - t, s) \tag{3}$$

The budget constraint of unemployed individual j is:

$$z_i + H(t) + \delta t = 0 \tag{4}$$

Therefore, the utility function of unemployed individual j is:

$$U_j = z_j + F_j = -H(t) - \delta t + F_j \tag{5}$$

The expected utility of employees is then:

$$U = (1-u)U_i + uU_j = (1-u)(wT + F_i(1 - T - t, s)) - H(t) - \delta t + uF_j \tag{6}$$

According to the information structure assumption, the transition probability of unemployment is different when workers work hard and when workers do not work hard, so the unemployment probability α is also different. The probability of unemployment when a given individual is not working hard is u_1, while the probability of unemployment when an individual is working hard is u_2. The individual's effort level when he is not working hard is s_1. When the individual works hard, the effort level is s_2, which satisfies $s_1 < s_2$. Thus, the expected utility of workers who do not work hard is:

$$U_1 = (1-u_1)(wT + F_i(1 - T - t, s_1)) - H(t) - \delta t + u_1 F_j \tag{7}$$

In addition, the expected utility of hard work is:

$$U_2 = (1-u_2)(wT + F_i(1-T-t, s_2)) - H(t) - \delta t + u_2 F_j \tag{8}$$

In the employee–firm game equilibrium, the equilibrium solution t^* will equalize the expected expectation of effort and no effort and equal a constant equilibrium value, that is:

$$\begin{aligned} U_1 &= (1-u_1)(wT + F_i(1-T-t^*, s_1)) - H(t^*) - \delta t^* + u_1 F_j = U_2 \\ &= (1-u_2)(wT + F_i(1-T-t^*, s_2)) - H(t^*) - \delta t^* + u_1 F_j \end{aligned} \tag{9}$$

Further,

$$-\left.\frac{\partial U_1}{\partial t}\right|_{t=t^*} = \frac{\partial H}{\partial t^*} + \delta + (1-u_1)\frac{\partial F_i(s_1)}{\partial l^*} \tag{10}$$

$$-\left.\frac{\partial U_2}{\partial t}\right|_{t=t^*} = \frac{\partial H}{\partial t^*} + \delta + (1-u_2)\frac{\partial F_i(s_2)}{\partial l^*} \tag{11}$$

Therefore,

$$\left(-\left.\frac{\partial U_1}{\partial t}\right|_{t=t^*}\right) - \left(-\left.\frac{\partial U_2}{\partial t}\right|_{t=t^*}\right) = (1-u_1)\frac{\partial F_i(s_1)}{\partial l^*} - (1-u_2)\frac{\partial F_i(s_2)}{\partial l^*} \tag{12}$$

When leisure and hard work are complementary, there is $\frac{\partial^2 F_i}{\partial l \partial s} > 0$. Since the probability of unemployment of an individual who works hard is less than the probability of unemployment of an individual who does not work hard, $u_1 > u_2$.

Therefore, Equation (12) satisfies Equation (13).

$$\left(-\left.\frac{\partial U_1}{\partial t}\right|_{t=t^*}\right) - \left(-\left.\frac{\partial U_2}{\partial t}\right|_{t=t^*}\right) < 0 \tag{13}$$

Equation (13) shows that the increase of commuting time will bring greater utility loss to workers who do not work hard. As a result, when commuting time increases, the rational choice of employees is to increase the effort level s, and the unemployment probability u is a monotonically decreasing function of s. Wages is a monotonically decreasing function of the probability of unemployment.

Therefore, Equation (13) indicates that at the long-run equilibrium, the increase in commuting time of individuals will encourage them to improve their work effort level, which in turn will increase the long-run wage level. It can be concluded that individuals make dynamic decisions on work effort level according to the future unemployment probability, and when leisure and work are complementary, the commuting time of individuals will force them to improve their work effort level, and thus increase their long-term income.

In order to investigate what will happen to the utility loss caused by non-hardworking workers expressed in Equation (13) when leisure time increases, the derivative of Equation (12) with respect to leisure time is taken, then:

$$\left(-\left.\frac{\partial^2 U_1}{\partial l \partial t}\right|_{t=t^*}\right) - \left(-\left.\frac{\partial^2 U_2}{\partial l \partial t}\right|_{t=t^*}\right) = (1-u_1)\frac{\partial^2 F_i(s_1)}{\partial l^{*2}} - (1-u_2)\frac{\partial^2 F_i(s_2)}{\partial l^{*2}} \tag{14}$$

As leisure time increases, the complementary effect of leisure and hard work declines, i.e., $\frac{\partial^3 F_i}{\partial l^2 \partial s} < 0$, so $\frac{\partial^2 F_i(s_2)}{\partial l^{*2}} - \frac{\partial^2 F_i(s_1)}{\partial l^{*2}} < 0$.

Therefore, Equation (13) satisfies $\left(-\left.\frac{\partial^2 U_1}{\partial l \partial t}\right|_{t=t^*}\right) - \left(-\left.\frac{\partial^2 U_2}{\partial l \partial t}\right|_{t=t^*}\right) > 0$.

When leisure time increases, the difference in utility loss between non-hardworking workers and hardworking workers decreases, and the degree to which increasing commuting time forces individuals to improve their work effort level will decrease. On the contrary, when leisure time decreases, the utility loss of non-hardworking workers and hardworking

workers increases, and the degree to which increasing commuting time forces individuals to improve their work effort level increases.

Based on the above theoretical model, the following assumptions are made.

Hypothesis 1. *Commuting time has a positive effect on employee earnings.*

Hypothesis 2. *The interaction term of commuting time and leisure time has a negative impact on employee earnings. When leisure time is at a low level, the positive impact of commuting time on income increases. On the contrary, when leisure time is at a high level, the positive impact of commuting time on income is weakened.*

4. Data and Methods

4.1. Sample

Beijing, as the capital of China and leading city in China's urbanization process, faces serious traffic congestion. The Chinese Academy of Urban Planning and Design released the Monitoring Report on Commuters in Major Chinese Cities in 2022, which shows that the average one-way time consumed by commuters in major Chinese cities is 36 min. Among them, Beijing is the only one of China's 36 major cities with an average one-way commute time exceeding 45 min. The average commuting distance is 11.3 km, the average one-way commuting time is 48 min, and 30% of the commuting time exceeds 60 min, indicating that Beijing employees have the characteristic of long commuting times [48]. Therefore, taking Beijing as an example to study the impact of commuting time on income can better highlight the relationship between commuting and income in the process of urbanization.

We use data from the Beijing Residents' Time Allocation Survey, conducted by the Center for Leisure Economics Research at Renmin University of China, which has been undertaken every five years since 1996 using a multistage random sampling method. Because the questionnaires used in 1996 and 2001 were inconsistent, the data from 2011, 2016, and 2021 were selected for analysis, with the number of valid questionnaires 1106, 830, and 1597, respectively. The questionnaire surveyed the daily time allocation of Beijing residents. Every 10 min was a recording unit, for a total of 144 units. According to the four-part method of living time, residents' living time was composed of four major categories of time, including work (study) time, necessary time, housework time, and leisure time. Commuting time is included in the work (study) time category. In addition, the questionnaire also surveyed basic personal information such as gender, age, marital status, income, education level, and employment. This paper selected groups with occupations for analysis, with the sample sizes 876, 632, and 1273, respectively.

4.2. Variables

Dependent variable. The dependent variable is the annual income of employees. The income variable is a grouping variable whose value ranges from 0 to 4. The value 0 indicates less than 30,000 CNY, the value 1 indicates 30,000 to 50,000 CNY, the value 2 indicates 50,000 to 100,000 CNY, the value 3 indicates 100,000 to 200,000 CNY, and the value 4 indicates more than 200,000 CNY.

Independent variables. Commuting time is the amount of time employees spend in their daily lives commuting to and from work. This index was measured by calculating the total amount of time the respondents spent commuting to and from work in the time allocation record form.

Leisure time refers to the time in daily life that employees spend freely except for work (study) time, housework time, and necessary time. This index is measured by calculating the total time of 15 leisure activities recorded by the respondents in the time allocation record form. The 15 leisure activities included learning cultural and scientific knowledge, reading newspapers, reading books and periodicals, watching television, listening to the radio, watching film and drama performances, watching exhibitions, walking, other

entertainment, physical exercise, rest, educating children, public welfare activities, visiting relatives and friends, and other personal time.

Moderator variable. To measure the impact of commuting time on the dependent variable due to the impact of other nonworking time (leisure time), this paper selects the interaction term of commuting time and leisure time as the moderator variable.

Control variables. To separate the relationship between commuting time and income from the effect of other confounders, a set of control variables is introduced. According to the literature review, gender, age, education level, marital status, and occupational status are selected as control variables.

4.3. Empirical Approach

Since the income data are grouped data, that is, the dependent variable is the ordered multi-classification survey data, when the influencing factors are analyzed, it is not suitable to use multiple linear regression; instead, the ordered multi-classification Oprobit model should be used for analysis. The model specification is as follows:

$$Y_i = \Phi(\alpha + \beta X_i + \gamma M_i + \lambda Z_i) + \mu_i \quad (15)$$

where Y_i represents the income of the i-th individual, $\Phi(i)$ is the standard normal distribution function, X_i is the average commuting time of the i-th individual on weekdays, M_i is the control variable of the individual i, and Z_i is the control variable of the individual i. α, β, γ, and λ are the estimated coefficients of the variables. The coefficient value of the Oprobit model does not have practical significance, but the direction of influence of the independent variable on the dependent variable can be judged according to positive and negative coefficients. If the coefficient value is greater than 0, it means that the greater the value of the independent variable is, the greater the response probability of the dependent variable is, whereas if the coefficient value is less than 0, the smaller the response probability is.

5. Results

5.1. Descriptive Statistics

According to Table 1, by calculating the average value of grouped data, the average income of employees in 2021, 2016, and 2011 was 170,000 CNY, 128,000 CNY, and 89,000 CNY, respectively, which verifies that the average income of employees has increased significantly, and this result is close to the average wage of employees published by the Beijing Municipal Bureau of Statistics [49]. The average commuting time in 2021 was 97.2 min, which is close to the 48 min average one-way commuting time of Beijing employees in 2021 published by the China Academy of Urban Planning and Design [50]. The average commuting time in 2021 was 3.3 min higher than that in 2016 but only 0.8 min higher than that in 2011. This is related to the implementation of the tail number restriction policy in Beijing in 2013 [51], which temporarily alleviated traffic congestion. Therefore, the average commuting time in 2016 was lower than that in 2011. However, with the urbanization of Beijing and urban layout planning, the separation between the work and residence of employees is becoming increasingly serious, which makes commuting time increase significantly [3]. Figure 1 shows the density function of commuting time in 2011, 2016, and 2021. As is common in many time-use distributions, the commuting time is skewed to the right. Most commuting time is relatively moderate, and a few people who commute for longer have a higher time on the right. The peak value in 2021 was higher than that in 2011 and 2016, indicating that the commuting time of employees was more concentrated in 2021. The average leisure time of employees in Beijing showed a downward trend, from 159.2 min in 2011 to 134.8 min in 2021. From the perspective of population variables, the proportion of female employees in Beijing is higher than that of male employees. The average age is concentrated at 35 years old. The proportion of married employees is higher than that of unmarried employees. The proportion of those with more than 12 years of education is more than 70%. Beijing employees are mainly professional technicians or general employees.

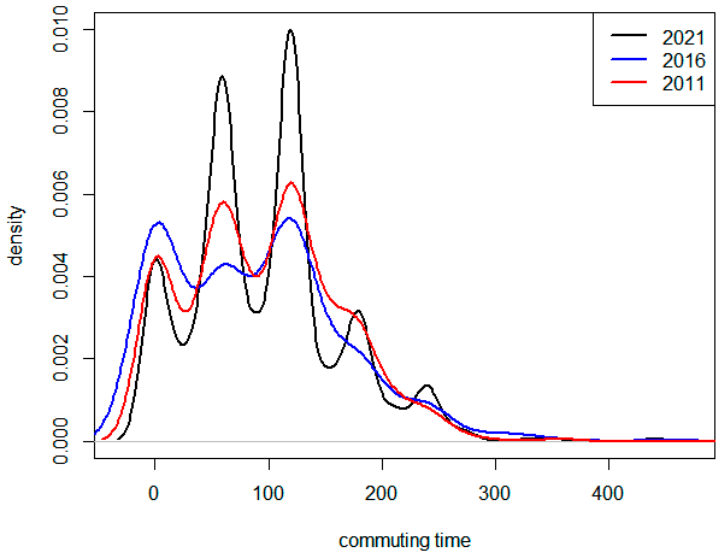

Figure 1. Density function of commuting time.

Table 1. Sample means and proportions.

Variables	2011 (n = 876)	2016 (n = 632)	2021 (n = 1273)
Income (10,000 CNY)			
0–3 (%)	21.6	8.9	1.6
3–5 (%)	14.3	7.3	2.1
5–10 (%)	30.6	29.3	17.9
10–20 (%)	26.5	34.7	40.5
>20 (%)	7.0	19.8	37.9
Commuting time (minutes)	96.4 (70.4)	93.9 (91.6)	97.2 (65.4)
Leisure time (minutes)	159.2 (112.0)	146.8 (137.0)	134.8 (105.2)
Gender			
Male (%)	46.5	48.6	56.1
Female (%)	53.5	51.4	43.9
Age (years)	34.9 (11.5)	35.4 (12.0)	34.0 (11.4)
Marital status			
Single (%)	40.8	39.7	46.8
Married (%)	59.2	60.3	53.2
Years of education			
More than 12 years of education (%)	28.9	32.0	20.8
Less than 12 years of education (%)	71.1	68.0	79.2
Occupation			
Agriculture, forestry, animal husbandry, and fisheries (%)	0.5	0.6	0.1
Industrial and commercial services (%)	9.6	12.8	10.9
Professional technicians (%)	22.6	21.8	46.2
Worker or general staff (%)	41.1	34.3	22.2
Manager (%)	16.3	15.7	8.5
Literary artist (%)	0.2	0.3	0.7
Personal occupation (%)	2.9	5.6	3.4
Other (%)	6.8	8.9	8.0

5.2. Oprobit Model Results

Table 2 shows the regression results of the Oprobit model. The results show that the corresponding probability value of the Z value estimator of the commuting time parameter of the core variable in this paper is 0.001, less than 0.05, indicating that the effect of commuting time on income is statistically significant. The coefficient value is 0.004 and the sign is positive, indicating that the greater the commuting time value, the greater the probability of an income level increase, which conforms to the assumption of Hypothesis 1 and is consistent with previous research [5–12]. The Z value of leisure time, another core variable, corresponds to a probability value of 0.000, which is less than 0.05, indicating that the role of leisure time on income level is statistically significant. The coefficient value is 0.001 and the sign is positive, indicating that leisure time is conducive to an improvement in income, which is consistent with previous research [52]. The interaction items of commuting time, leisure time, and virtual variables in 2011 and 2016 are negative, indicating that the positive impact of commuting time and leisure time on income decreases with time.

The interaction between commuting time and leisure time is significantly negative, indicating that when leisure time increases, the positive impact of commuting time on income decreases. In other words, when leisure time decreases, the positive impact of commuting time on income increases. The coefficient value of the interaction term between the regulatory variable and the annual dummy variable is significantly positive, indicating that the interaction between commuting time and leisure time gradually strengthens its impact on income. The empirical results are consistent with the research assumptions. The coefficient value of the interaction term between the regulatory variable and the year dummy variable is significantly positive, indicating that the interaction between commuting time and leisure time has longitudinally enhanced its impact on income.

For the control variable, the coefficient of the gender variable is significantly negative at the 0.1 significance level, indicating that the average income of women is significantly lower than that of men, which is consistent with previous research [12]. The coefficient value of the age variable is significantly positive and the coefficient value of the age quadratic term is significantly negative, indicating that age has an inverted U-shaped impact on income, which supports previous findings [53,54]. The income of the married group was significantly higher than that of the unmarried group. The income of the group with a higher education level is significantly higher than that of the group with a lower education level, which corresponds to previous research [9,12]. For the variable of job type, the income of professional technicians, workers or staff members, literary artists, and personal occupation is significantly higher than that of the agricultural, forestry, animal husbandry, and fishery groups. This result is supported by the fact that compared with other industries, the average wage of the agricultural, forestry, animal husbandry, and fishery groups is relatively low, which comes from the annual average wage data of employees in different industries in 2021 released by the National Bureau of Statistics of China [55].

Table 2. Oprobit model results.

Explanatory Variables	Coefficient	Standard Error
Commuting time	0.004 ***	0.001
2016 × commuting time	−0.003 **	0.001
2021 × commuting time	−0.004 ***	0.001
Leisure time	0.001 ***	0.000
2016 × leisure time	−0.002 ***	0.000
2021 × leisure time	−0.001 **	0.001
Commuting time × leisure time	-1.110×10^{-5} ***	0.000
2016 × commuting time × leisure time	1.210×10^{-5} **	0.000
2021 × commuting time × leisure time	1.120×10^{-5} *	0.000
2016 dummy variable	2.378 ***	0.904

Table 2. *Cont.*

Explanatory Variables	Coefficient	Standard Error
2021 × leisure time	−0.001 **	0.001
Commuting time × leisure time	-1.110×10^{-5} ***	0.000
2016 × commuting time × leisure time	1.210×10^{-5} **	0.000
2021 × commuting time × leisure time	1.120×10^{-5} *	0.000
2016 dummy variable	2.378 ***	0.904
2021 dummy variable	3.813	349.602
Gender	−0.066	0.078
Age	0.060 ***	0.017
Age square	−0.001 ***	0.000
Married	0.388 ***	0.101
More than 12 years of education	0.543 ***	0.093
Industrial and commercial services	1.196 *	0.667
Professional technicians	1.539 **	0.663
Worker or general staff	1.191 *	0.660
Manager	1.840 ***	0.665
Literary artist	2.683 **	1.035
Personal occupation	1.419 **	0.692
Other	1.216 *	0.672
2016 × age	0.017 ***	0.006
2021 × age	0.001	0.007
2016 × gender	−0.121	0.118
2021 × gender	−0.096	0.119
2016 × more than 12 years of education	−0.171	0.136
2021 × more than 12 years of education	0.048	0.155
2016 × married	−0.393 ***	0.148
2021 × married	−0.010	0.154
2016 × industrial and commercial services	−1.185	0.876
2021 × industrial and commercial services	5.353	349.602
2016 × professional technicians	−1.704 *	0.868
2021 × professional technicians	5.244	349.602
2016 × worker or general staff	−1.609 *	0.866
2021 × worker or general staff	5.815	349.602
2016 × manager	−1.676 *	0.872
2021 × manager	6.088	349.602
2016 × literary artist	−2.925 **	1.397
2021 × literary artist	4.446	349.603
2016 × personal occupation	−1.599 *	0.904
2021 × personal occupation	5.423	349.602
2016 × other	−1.634 *	0.883
2021 × other	5.586	349.602
Cut1	2.557	0.749
Cut2	2.992	0.750
Cut3	3.924	0.751
Cut4	5.088	0.752
Pseudo R2 = 0.1313		

Notes: *** Statistically significant, $p \leq 0.01$; ** Statistically significant, $p \leq 0.05$; * Statistically significant, $p \leq 0.1$.

5.3. Robustness Test

To test the robustness of the results of the Oprobit model, the income variables were reclassified. The data below the median annual income were recoded as 0 and the data above the median were recoded as 1. Thus, the new income variable is a binary variable. According to Table 3, the direction of each variable parameter has not changed. The impact of commuting time and leisure time on annual income is also significantly positive. The interaction effect of commuting time and leisure time is significantly negative, and the change in parameter value is small, indicating that the impact of commuting time on annual income is stable.

Table 3. Robustness test.

Explanatory Variables	Coefficient	Standard Error
Commuting time	0.004 ***	0.001
2016 × commuting time	−0.003	0.002
2021 × commuting time	−0.005 ***	0.002
Leisure time	0.001 ***	0.001
2016 × leisure time	−0.002 ***	0.001
2021 × leisure time	−0.002 ***	0.001
Commuting time × leisure time	-1.520×10^{-5} ***	0.000
2016 × commuting time × leisure time	1.280×10^{-5} **	0.000
2021 × commuting time × leisure time	1.650×10^{-5} **	0.000
Pseudo R2 = 0.2007		

Note: To save space, this table only reports the regression results of core variables. *** Statistically significant, $p \leq 0.01$; ** Statistically significant, $p \leq 0.05$.

5.4. Heterogeneity Analysis

The heterogeneity analysis of the model was conducted because the separation of job and residence and the difference in the means of transportation used to travel to work might affect the commuting time of employees [56,57]. However, since only the data for 2021 include the variables "whether there is separation between job and residence" and "what means are mainly used for work", this data will be used to analyze the heterogeneity of these two conditions. Among them, 60% of workers reported separation between work and residence. In terms of the types of transportation, 10.3% of employees choose to walk, 5.27% choose to ride private bicycles, 7.55% choose to share bikes, 59.04% choose the bus or subway, 9.28% choose motorcycles, 4.25% choose online ride-hailing, and 18.63% choose private cars.

The results show that for the groups with separation of work and residence, both commuting time and leisure time have a significant positive impact on annual income, and the interaction of commuting and leisure has a significant negative impact on annual income. However, the core variables of the group without separation of work and residence have no significant impact on annual income. According to the classification of the vehicles used to travel to work, both commuting time and leisure time have a positive impact on income, and the interaction between commuting time and leisure time has a negative impact. However, only those who choose the "bus and subway" commuting mode have significant coefficients at the 0.01 significance level, while those who choose the "walking" commuting mode have significant coefficients at the 0.1 significance level. The core variable coefficients of the population with other occurrence modes were not significant.

According to the results of the heterogeneity analysis in Table 4, the more separation there is between work and residence, the more significant the positive impact of commuting time on income. Compared with other transportation modes, the commuting time of groups using buses or subways has a more significant positive impact on income. According to the statistical description, the average commuting time of the group with separation of work and residence is 131 min and the average leisure time is 129 min, while the average commuting time of the group without separation of work and residence is 75 min and the average leisure time is 147 min. The average commuting time of the groups who choose to walk, share bicycles, private cars, and buses and subways is 62 min, 84 min, 94 min, and 115 min, respectively, among which the working class who choose to travel by bus and subway has the longest commuting time. The average leisure time of groups who choose to walk, share bicycles, private cars, and bus and subway travel is 168 min, 155 min, 140 min, and 136 min, respectively, of which the group who choose bus and subway travel has the shortest leisure time. It can be seen that the positive impact of commuting time on income is more significant for groups with longer commuting time and shorter leisure time. This is consistent with the analysis of the theoretical model. When an individual's commuting time is long and his leisure time is short, his short-term decision is more inclined to choose the laziness strategy to compensate for the leisure loss. However, in the long run, the choice

of laziness will increase the loss of individual utility, which will force the individual to reduce laziness and improve the level of work effort, thereby increasing income.

Table 4. Heterogeneity test.

Explanatory Variables	Jobs–Housing Imbalance	Jobs–Housing Balance	Walking
Commuting time	0.006 ***	6.160×10^{-6}	0.009 *
Leisure time	0.002 *	1.251×10^{-4}	0.002
Commuting time × leisure time	-1.57×10^{-5} **	-1.00×10^{-5}	-4.74×10^{-5} *
Gender	−0.297 ***	−0.056	−0.261
Age	0.035	0.079 **	0.087
Age square	-4.069×10^{-4}	−0.001 **	−0.001
Married	0.478 ***	0.240 **	0.080
More than 12 years of education	0.516 ***	0.686 ***	0.718 ***
Industrial and commercial services	−0.392	0.452	1.595 *
Professional technicians	−0.395 *	0.511	1.758 **
Worker or general staff	−0.101	0.666	1.701 *
Manager	0.462	1.563 ***	3.217 ***
Literary artist	−0.583	0.921	6.407
Personal occupation	0.162	0.831	1.825 *
Other	——	0.454	1.723 *
Explanatory Variables	Private bikes	Shared bikes	Bus or metro
Commuting time	0.006	0.008	0.003 **
Leisure time	0.002	0.002	0.002 **
Commuting time × leisure time	-5.25×10^{-5}	-3.18×10^{-5}	-1.50×10^{-5} ***
Gender	0.393	−0.096	−0.260 ***
Age	−0.040	0.173	0.048
Age square	1.945×10^{-4}	−0.002	−0.001
Married	0.886	0.207	0.443 ***
More than 12 years of education	−0.004	0.943	0.764 ***
Industrial and commercial services	−6.057	−1.149	−0.242
Professional technicians	−6.459	−0.807	−0.123
Worker or general staff	−5.387	−0.939	0.173
Manager	−5.078	4.670	0.831
Literary artist	——	——	−0.187
Personal occupation	−6.374	−0.914	0.164
Other	−5.553	——	0.027
Explanatory Variables	Motorcycle	Ride-hailing	Private car
Commuting time	0.005	0.008	3.324×10^{-4}
Leisure time	0.003 *	0.006 *	3.167×10^{-4}
Commuting time × leisure time	-3.05×10^{-5}	-9.96×10^{-5} ***	-1.44×10^{-6}
Gender	0.171	0.262	−0.108
Age	0.174 *	0.707 **	0.066
Age square	−0.002	−0.011 ***	−0.001
Married	−0.104	0.139	0.022
More than 12 years of education	0.557 *	−0.143	0.151
Industrial and commercial services	0.274	−3.211 ***	0.435
Professional technicians	0.240	−0.659	0.267
Worker or general staff	0.207	−0.521	0.532
Manager	0.600	2.519	1.086 ***
Literary artist	——	——	0.000 ***
Personal occupation	0.647	−3.109 **	0.452
Other	——	——	——

Notes: *** Statistically significant, $p \leq 0.01$; ** Statistically significant, $p \leq 0.05$; * Statistically significant, $p \leq 0.1$.

6. Discussion

We find a strong and robust positive association between income and commuting time after controlling for numerous socio-demographic factors. The results corroborate previous

research [5–12,58], which have solved the second part of the contribution of this article. However, the policy implications of the positive impact of commuting time on income for China's urbanization process have not been discussed. Is long commuting a "bad" thing for China? The policy impact of increased commuting time on China's urbanization process will be discussed below.

First, a long commuting time is needed to improve urban operation efficiency. With the deepening of urbanization and the diversification of urban functions, the polycentric urban layout and separation of work and residence will become the inevitable trend of urban space development and labor distribution under the market economy environment [42,59]. According to the laws of Western developed countries, in order to ensure the efficiency of enterprise agglomeration and the efficient use of space, it is necessary for cities to continue to gather and expand [45], which will inevitably lead to a decline in the rigidity of commuting time. Therefore, with the development of the city, the increase of commuting time has a certain rationality and inevitability, which shows that in order to seek an agglomeration effect and make use of a density economy, the increase of commuting time is likely to be the natural result of maintaining economic efficiency.

Second, long commutes are not always "bad". They are "bad" for individuals, not necessarily for enterprises or cities. In the process of urbanization in developed countries, with an increase in income, people tend to live farther away from urban centers [60,61]. If a long commute is a "bad thing", why do more and more European and American citizens choose to live in the suburbs farther away from their work units? The "trade-off theory" highlights that there is a trade-off between commuting and the living environment. Employees can choose to live in the central city and enjoy lower commuting costs, but the housing cost is higher and the living environment is poor. Alternatively, the employed can choose to live farther away from the city and enjoy a good living environment and low living cost, but the commuting cost is high [62–64]. Furthermore, a longer commute may allow the selection of a more ideal job, which may pay higher wages, have better working hours, or be more satisfying emotionally and psychologically [10]. In other words, one of the alternative benefits of long commutes is a higher quality of life. On this basis, a longer commuting time will also have a "cleansing effect" on inefficient behavior in the enterprise. As the theoretical model has proven, in the long term, the company "washes out" the slackers or forces them to reduce their lazy behavior and work harder.

The concept that we usually think of reducing commuting time to improve the quality of life is not comprehensive. Reducing commuting time will not necessarily improve the economic efficiency of the city and the operating performance of enterprises. In contrast, from working and living together to working and living separately, from short-distance transportation to long-term commuting, there is a need to improve the overall efficiency of the city in the process of urbanization in China [3,65]. On the premise of taking other efficiency into account, if you want to improve traffic quality, the primary means is to not only shorten the commuting time but also to focus on improving the comfort level on the way to work, such as optimizing the quality and environment of public transport infrastructure, improving the quality of service, and reducing congestion and the difficulty of transit of public transport, which can not only inhibit the negative individual effect of commuting on people but also take into account the needs of urbanization and give play to the overall effect of commuting time.

Third, long commuting times also have some positive effects on individuals. The development of interactive mobile terminals such as e-books and smartphones has effectively alleviated the anxiety of individuals. They relax their mood by watching movies and listening to music and other entertainment programs. Commuting time becomes a buffer for individual conversion, which improves the pleasant mood of commuting time [66–68]. The "mobile work" brought about by the information technology revolution can encourage commuters to work normally on the way to work, increasing the economic effectiveness of commuting [69]. A long commute will help to improve the scope of an individual's social network, thereby enhancing their ability to work. The growth of this kind of working

ability benefits from the social capital accumulated by long commutes and more learning opportunities [70]. In addition, long-distance commuters often have cooperative learning attitudes and problem-solving abilities, while this also enhances the adaptability of individuals to work in noisy environments [71].

7. Conclusions and Implications

Many empirical analyses in Western developed countries show that commuting time has a positive impact on income, but this relationship has not been verified in China. To verify this relationship, this paper constructs a long-term dynamic equilibrium model, indicating that the equilibrium result of the long-term game between enterprises and employees is that a longer commuting time is conducive to making slackers reduce their slacking behavior and turn to hard work, thereby increasing the balanced income. The OP model based on the survey data of Beijing residents' lifetime distribution in 2011, 2016, and 2021 also verified the positive effect of extended commuting time on income. According to the heterogeneity analysis, the positive impact of commuting time on income is more significant for groups with longer commuting time and shorter leisure time. The modest contribution of this paper also lies in providing evidence for relevant academic views. Scholars have demonstrated that China needs to build further large cities and increase urban agglomeration from the perspective of an intensive economy and economies of scale [72]. This paper chooses the perspective of traffic agglomeration to explain its long-term impact on urban efficiency to support this view. The research conclusion has certain reference significance for enterprise management and urban management in the process of urbanization in China.

In terms of enterprise management, on the one hand, enterprises should efficiently investigate employees who have been commuting too long, effectively use the resources of the psychological post and service station of workers in the trade union system, and design targeted psychological counseling service projects that make workers feel close and comfortable to relieve psychological pressure. On the other hand, enterprises should strive for qualified units to optimize the commuter bus system or set up commuter buses. On the basis of guiding and promoting the employing units to establish and improve the employee commuting subsidy system, the staggered commuting system is explored according to the nature of the unit and the characteristics of the employees' posts.

In terms of urban management, the government should reasonably adjust the urban functional structure and maintain the diversity of land use in various regions. For regions with concentrated employment, the government can adjust the land supply structure, increase the scale of residential land, and provide sufficient housing for the employed population. For regions with insufficient jobs, more employment opportunities should be provided to guide the balance between residence and employment in urban areas. Second, the planning of the public transport system should be further improved. According to the distribution characteristics of urban residential areas and employment areas, by increasing the investment in public transport infrastructure, especially rapid transport facilities, and using fast public transport to connect urban clusters, the connectivity between residential areas and employment areas is enhanced, and the commuting efficiency of residents is improved. In addition, the government should guide the supply of housing and public service facilities and make use of relevant policies to increase the supply of affordable housing in the central urban area, improve the living environment and public service facilities in the fringe areas, promote the balanced development of housing, education, culture, medical, and other public products, and build a living and working area with complete functional facilities and a comfortable and beautiful environment to reduce residents' commute distance and time, and promote the balance of work and housing.

While this paper verifies that the positive impact of commuting time on income is established in China, some research limitations are present. On the one hand, due to the limitation of analysis technology, we failed to set dynamic path constraint parameters in the theoretical model, which makes it difficult for us to capture the trend of research problems,

although this does not affect the conclusions in this paper. In future research, we will try to expand the nonlinear relationship between commuting time and income, and then explore the extent of the "threshold effect" between them. On the other hand, although our model includes a rich set of control variables, it is still possible that other control variables related to income and commuting time have been ignored. Therefore, a wider set of covariates is needed for further research in the future.

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References

1. Roberts, J.; Hodgson, R.; Dolan, P. "It's driving her mad": Gender differences in the effects of commuting on psychological health. *J. Health Econ.* **2011**, *30*, 1064–1076. [CrossRef] [PubMed]
2. Gimenez-Nadal, J.I.; Molina, J.A. *The gender Gap in Time Allocation in Europe*; Institute of Labor Economics (IZA): Bonn, Germany, 2020.
3. Zhu, Z.; Li, Z.; Liu, Y.; Chen, H.; Zeng, J. The impact of urban characteristics and residents' income on commuting in China. *Transp. Res. Part D Transp. Environ.* **2017**, *57*, 474–483. [CrossRef]
4. Huang, M.; Zhan, M.; Huang, R.; Wu, J. How commuting time influences hedonic consumption: The role of perceived stress. *J. Consum. Behav.* **2022**. [CrossRef]
5. Manning, A. The real thin theory: Monopsony in modern labour markets. *Labour Econ.* **2003**, *10*, 105–131. [CrossRef]
6. Kim, S.; Kim, Y.; Lim, S.S.; Ryoo, J.H.; Yoon, J.H. Long commute time and sleep problems with gender difference in work-life balance: A cross-sectional study of more than 25,000 workers. *Saf. Health Work* **2019**, *10*, 470–475. [CrossRef]
7. Isacsson, G.; Swärdh, J.-E. *An Empirical on-the-Job Search Model with Preferences for Relative Earnings: How High Is the Value of Commuting Time?* Swedish National Road & Transport Research Institute (VTI): Linköping, Sweden, 2007.
8. Mulalic, I.; Van Ommeren, J.N.; Pilegaard, N. Wages and commuting: Quasi-natural experiments' evidence from firms that relocate. *Econ. J.* **2014**, *124*, 1086–1105. [CrossRef]
9. French, M.T.; Popovici, I.; Timming, A.R. Analysing the effect of commuting time on earnings among young adults. *Appl. Econ.* **2020**, *52*, 5282–5297. [CrossRef]
10. Morris, E.A.; Zhou, Y. Are long commutes short on benefits? Commute duration and various manifestations of well-being. *Travel Behav. Soc.* **2018**, *11*, 101–110. [CrossRef]
11. Timothy, D.; Wheaton, W.C. Intra-urban wage variation, employment location, and commuting times. *J. Urban Econ.* **2001**, *50*, 338–366. [CrossRef]
12. Hazans, M. Does commuting reduce wage disparities? *Growth Chang.* **2004**, *35*, 360–390. [CrossRef]

13. Ross, S.; Zenou, Y. *Are shirking and Leisure Substitutable? An Empirical Test of Efficiency Wages Based on Urban Economic Theory*; CEPR Discussion Papers; CEPR: Washington, DC, USA, 2007.
14. Plaut, P.O. The intra-household choices regarding commuting and housing. *Transp. Res. Part A Policy Pract.* **2006**, *40*, 561–571. [CrossRef]
15. Sandow, E. Commuting behaviour in sparsely populated areas: Evidence from northern Sweden. *J. Transp. Geogr.* **2008**, *16*, 14–27. [CrossRef]
16. So, K.S.; Orazem, P.F.; Otto, D.M. The effects of housing prices, wages, and commuting time on joint residential and job location choices. *Am. Agric. Econ. Assoc.* **2001**, *83*, 1036–1048. [CrossRef]
17. Jos van Ommeren, P.R. Compensation for commuting in imperfect urban markets. *Pap. Reg. Sci.* **2006**, *86*, 241–259. [CrossRef]
18. Wei, H.-T.; Zhao, H.; Xiao, T.-C. Analysis of separation of work and residence in Beijing and its influencing factors. *Urban Dev. Res.* **2017**, *24*, 43–51.
19. Cheng, M. The impact of income on employees' commuting time: An empirical analysis based on CLDS 2016 data. *Mark. Wkly. Theor. Res.* **2020**, *33*, 184–186.
20. Newhook, J.T.; Neis, B.; Jackson, L.; Roseman, S.R.; Romanow, P.; Vincent, C. Employment-related mobility and the health of workers, families, and communities: The Canadian Context. *Labour/Le Trav.* **2011**, *67*, 121–156.
21. Giménez-Nadal, J.I.; Molina, J.A.; Velilla, J. Testing urban efficiency wages in France and Spain. *Empir. Econ.* **2021**, *61*, 2205–2236. [CrossRef]
22. Snir, R.; Harpaz, I. Work-leisure relations: Leisure orientation and the meaning of work. *J. Leis. Res.* **2002**, *34*, 178–203. [CrossRef]
23. Somuyiwa, A.O.; Fadare, S.O.; Ayantoyinbo, B.B. Analysis of the cost of traffic congestion on worker's productivity in a mega city of a developing economy. *Int. Rev. Manag. Bus. Res.* **2015**, *4*, 644–656.
24. Burda, M.C.; Genadek, K.; Hamermesh, D. *Not Working at Work: Loafing, Unemployment and Labor Productivity*; NBER Working Papers; NBER: Cambridge, MA, USA, 2016.
25. Lin, D.; Allan, A.; Cui, J. The impact of polycentric urban development on commuting behaviour in urban China: Evidence from four sub-centres of Beijing. *Habitat Int.* **2015**, *50*, 195–205. [CrossRef]
26. Sun, B.; He, Z.; Zhang, T.; Wang, R. Urban spatial structure and commute duration: An empirical study of China. *Int. J. Sustain. Transp.* **2015**, *10*, 638–644. [CrossRef]
27. Ding, C.; Zhao, X. Assessment of urban spatial-growth patterns in China during rapid urbanization. *Chin. Econ.* **2014**, *44*, 46–71. [CrossRef]
28. Schwanen, T. Urban form and commuting behaviour: A cross-European perspective. *Tijdschr. Voor Econ. En Soc. Geogr.* **2002**, *93*, 336–343. [CrossRef]
29. Tim Schwanen, F.M.D.M.D. The impact of metropolitan structure on commute behavior in the Netherlands: A multilevel approach. *Growth Change* **2004**, *35*, 304–333. [CrossRef]
30. Giménez-Nadal, J.I.; Molina, J.A.; Velilla, J. Trends in commuting time of European workers: A cross-country analysis. *Transp. Policy* **2022**, *116*, 327–342. [CrossRef]
31. Lee, B.; Gordon, P.; Richardson, H.W.; Ii, J.E.M. Commuting trends in U.S. Cities in the 1990s. *J. Plan. Educ. Res.* **2009**, *29*, 78–89. [CrossRef]
32. Gordon, P.; Lee, B.; Richardson, H.W. *Travel Trends in U.S. Cities: Explaining the 2000 Census Commuting Results*; USC Lusk Center for Real Estate: Los Angeles, CA, USA, 2004.
33. Neto, R.S.; Duarte, G.; PÃ¡ez, A. Gender and commuting time in SÃ£o Paulo Metropolitan Region. *Urban Stud.* **2015**, *52*, 298–313. [CrossRef]
34. Marcén, M.; Morales, M. *Culture and the Cross-Country Differences in the Gender Commuting Gap: Evidence from Immigrants in the United States*; GLO Discussion Paper Series; Global Labor Organization (GLO): Geneva, Switzerland, 2021.
35. Sandow, E. Til Work Do Us Part: The social fallacy of long-distance commuting. *Urban Stud.* **2013**, *51*, 526–543. [CrossRef]
36. Carvajal, M.J.; Popovici, I. Interaction of gender and age in pharmacists' labour outcomes. *J. Pharm. Health Serv. Res.* **2016**, *7*, 23–29. [CrossRef]
37. Black, D.A.; Kolesnikova, N.; Taylor, L.J. Why do so few women work in New York (and so many in Minneapolis)? Labor supply of married women across US cities. *J. Urban Econ.* **2014**, *79*, 59–71. [CrossRef]
38. Lee, B.S.; McDonald, J.F. Determinants of commuting time and distance for Seoul residents: The impact of family status on the commuting of women. *Urban Stud.* **2016**, *40*, 1283–1302. [CrossRef]
39. Gruber, S. To Migrate or to commute? *Rev. Econ. Anal.* **2010**, *2*, 110–134. [CrossRef]
40. Niedzielski, M.A.; Horner, M.W.; Xiao, N. Analyzing scale independence in jobs-housing and commute efficiency metrics. *Transp. Res. Part A Policy Pract.* **2013**, *58*, 129–143. [CrossRef]
41. Zhou, J.; Long, Y. Jobs-housing balance of bus commuters in Beijing. *Transp. Res. Rec. J. Transp. Res. Board* **2014**, *2418*, 1–10. [CrossRef]
42. Brueckner, J.; Thisse, J.; Zenou, Y. *Why Is Central Paris Rich and Downtown Detroit Poor? An Amenity-Based Theory*; Université catholique de Louvain, Center for Operations Research and Econometrics (CORE): Ottignies-Louvain-la-Neuve, Belgium, 1996.
43. Zenou, Y. *Urban Labor Economics*, 1st ed.; Cambridge University Press: Cambridge, UK, 2009.
44. Zax, J.S. Compensation for commutes in labor and housing markets. *J. Urban Econ.* **1991**, *30*, 192–207. [CrossRef]

45. Zheng, S.; Peiser, R.B.; Zhang, W. The rise of external economies in Beijing: Evidence from intra-urban wage variation. *Reg. Sci. Urban Econ.* **2009**, *39*, 449–459. [CrossRef]
46. Zhao, P.; Cao, Y. Commuting inequity and its determinants in Shanghai: New findings from big-data analytics. *Transp. Policy* **2020**, *92*, 20–37. [CrossRef]
47. Maguire, J.S. Leisure and the obligation of self-work: An examination of the fitness field. *Leis. Stud.* **2008**, *27*, 59–75. [CrossRef]
48. China Youth Daily. Understand the 2022 Commuter Monitoring Report of Major Cities in China. Available online: https://baijiahao.baidu.com/s?id=1739689088123289774&wfr=spider&for=pc (accessed on 29 June 2022).
49. China National Bureau of Statistics. Annual Statistical Data Release Plan of Beijing Municipal Bureau of Statistics and Beijing Survey Team of the National Bureau of Statistics in 2022. Available online: http://tjj.beijing.gov.cn/tjsj_31433/tjbmfbjh/ndtjzl_31437/2022ndtjzl/202112/t20211231_2580225.html (accessed on 31 December 2021).
50. China Youth Network. Baidu Maps 2021 China Urban Traffic Report: Nearly 70% of the City's Commuter Peak Congestion Will Ease in 2021. Available online: https://baijiahao.baidu.com/s?id=1727527702820288129&wfr=spider&for=pc (accessed on 17 March 2022).
51. Zhang, L.; Long, R.; Chen, H. Do car restriction policies effectively promote the development of public transport? *World Dev.* **2019**, *119*, 100–110. [CrossRef]
52. Saksiriruthai, S.; Pholphirul, P. More wages, more income, more leisure? Evidence from Thailand's time use survey. *J. Hum. Behav. Soc. Environ.* **2018**, *28*, 968–982. [CrossRef]
53. Auten, G.; Carroll, R. The effect of income taxes on household income. *Rev. Econ. Stat.* **1999**, *81*, 681–693. [CrossRef]
54. Matteo, L.D. The income elasticity of health care spending. *Eur. J. Health Econ.* **2003**, *4*, 20–29. [CrossRef]
55. China National Bureau of Statistics. The Average Annual Salary of Urban Private Employees in 2021 Is 62,884 yuan. Available online: http://www.stats.gov.cn/xxgk/sjfb/zxfb2020/202205/t20220520_1857636.html (accessed on 20 May 2022).
56. Sultana, S. Job/housing imbalance and commuting time in the Atlanta metropolitan area: Exploration of causes of longer commuting time. *Urban Geogr.* **2013**, *23*, 728–749. [CrossRef]
57. Zhao, P.; Lü, B.; Roo, G.d. Impact of the jobs-housing balance on urban commuting in Beijing in the transformation era. *J. Transp. Geogr.* **2011**, *19*, 59–69. [CrossRef]
58. Van Ommeren, J.; van den Berg, G.; Gorter, C. Estimating the marginal willingness to pay for commuting. *J. Reg. Sci.* **2000**, *40*, 541–563. [CrossRef]
59. Bleakley, H.; Lin, J. *History and the Sizes of Cities*; Operations Research; American Economic Association: Nashville, TN, USA, 2016.
60. Cervero, R. Jobs-housing balancing and regional mobility. *J. Am. Plan. Assoc.* **1989**, *55*, 136–150. [CrossRef]
61. Lens, M. Employment accessibility among housing subsidy recipients. *Hous. Policy Debate* **2014**, *24*, 671–691. [CrossRef]
62. Lyons, G.; Chatterjee, K. A human perspective on the daily commute: Costs, benefits and trade-offs. *Transp. Rev.* **2008**, *28*, 181–198. [CrossRef]
63. Guidon, S.; Wicki, M.; Bernauer, T.; Axhausen, K. The social aspect of residential location choice: On the trade-off between proximity to social contacts and commuting. *J. Transp. Geogr.* **2019**, *74*, 333–340. [CrossRef]
64. Muth, R.F. *Cities and Housing*; University of Chicago Press: Chicago, IL, USA, 1969.
65. Ta, N.; Chai, Y.; Zhang, Y.; Sun, D. Understanding job-housing relationship and commuting pattern in Chinese cities: Past, present and future. *Transp. Res. Part D Transp. Environ.* **2017**, *52*, 562–573. [CrossRef]
66. Henriques-Neto, D.; Peralta, M.; Garradas, S.; Pelegrini, A.; Pinto, A.A.; Sanchez-Miguel, P.A.; Marques, A. Active commuting and physical fitness: A systematic review. *Int. J. Environ. Res. Public Health* **2020**, *17*, 2721. [CrossRef] [PubMed]
67. Lyons, G.; Jain, J.; Holley, D. The use of travel time by rail passengers in Great Britain. *Transp. Res. Part A Policy Pract.* **2007**, *41*, 107–120. [CrossRef]
68. Ory, D.T.; Mokhtarian, P.L. When is getting there half the fun? Modeling the liking for travel. *Transp. Res. Part A Policy Pract.* **2005**, *39*, 97–123. [CrossRef]
69. Lyons, G.; Urry, J. Travel time use in the information age. *Transp. Res. Part A Policy Pract.* **2005**, *39*, 257–276. [CrossRef]
70. Ryser, L.; Markey, S.; Halseth, G. The workers' perspective: The impacts of long distance labour commuting in a northern Canadian small town. *Extr. Ind. Soc.* **2016**, *3*, 594–605. [CrossRef]
71. Burke, M.J.; Salvador, R.O.; Smith-Crowe, K.; Chan-Serafin, S.; Smith, A.; Sonesh, S. The dread factor: How hazards and safety training influence learning and performance. *J. Appl. Psychol.* **2011**, *96*, 46–70. [CrossRef]
72. Gu, Y.-T.; Ma, S. Comparative study on balanced city size and policy tools under the condition of agglomeration effect—A framework of aggregate production function and its simulation analysis. *Financ. Res.* **2004**, *30*, 94–105.