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# Impact of Digital Financial Inclusion on Residents' Income and Income Structure

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**Abstract:** Digital financial inclusion (DFI) plays an increasingly important role in raising residents' income levels and optimizing income structures. Using data from the 2015–2019 China Household Finance Survey (CHFS), this paper examines the impact of DFI on residents' income and income structure from a microeconomic perspective using OLS fixed effects models and panel Tobit models. It was found that (1) DFI significantly raises residents' income, increasing their total annual per capita household income by CNY4200, and increasing their annual per capita household wage income, business income and property income by CNY2430, CNY1030, and CNY450, respectively. In terms of different functions of DFI, the use of digital payment, digital lending and digital financing can raise the annual per capita household income of residents by CNY4250, CNY10,360 and CNY3050, respectively. (2) DFI increases wage income by enhancing residents' household employment level, increases business income by promoting residents' entrepreneurship, and increases property income by improving the financial market participation. (3) DFI has a more significant effect on increasing income for higher income groups as well as rural residents. The findings of this paper provide theoretical and practical support for optimizing the design of financial inclusion policies and exploring new drivers of income growth for residents.

**Keywords:** digital financial inclusion; financial market participation; residents' income; income structure; China



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## 1. Introduction

At present, China is in an important period of economic transformation and upgrading, and actively promoting the growth of residents' income is of great significance for achieving common prosperity and high-quality economic growth and sustainable development. Access to adequate and effective financial services is an important way to raise the income level of residents. Financial development helps to enhance the efficiency of capital allocation and promote economic growth [1,2]. From the perspective of the breadth of financial development, financial development can help expand the scope of financial services, so that more people, especially low-income groups, have access to financial services, thereby promoting income growth [3]. From the perspective of depth, financial development may cause "elite capture", but instead crowd out the financial resources of low-income groups, which is not conducive to meeting the financial needs of low-income groups [4]. As the main way to solve the "last mile" of financial services, financial inclusion provides appropriate and effective financial services to all social strata and groups in need at an affordable cost, playing a key role in poverty reduction and income growth [5]. In 2013, China included "financial inclusion" in the resolution of the Central Committee of the Communist Party of China (CPC), further strengthening the effective coverage of financial services for small and micro enterprises, farmers and low-income urban populations. However, due to the shortcomings in the development of China's traditional financial services, the widespread problem of financial exclusion has seriously hindered the effect of financial services on increasing income. With the continuous breakthroughs in internet

technology and information technology, digital technology has been widely used in the field of financial services, promoting innovation in financial services, improving the efficiency of financial resource allocation, and increasingly becoming a key force in promoting economic and social transformation [6]. In 2016, the concept of DFI was formally proposed at the G20 Summit held in 2016. The Global Partnership for Financial Inclusion (GPFI) outlines the definition of DFI as "refers broadly to the use of digital financial services to advance financial inclusion" [7]. "Digital Financial Services" covers the whole set of financial products and services, including payments, remittances, transfers, savings, credit, insurance, securities, financial planning and account statements. As a product of the high integration of digital technology and financial services, DFI has greatly improved the efficiency of financial services and reduced the cost of infrastructure, which is conducive to solving the situation of the high cost of services, insufficient supply, and difficulty in balancing efficiency and equity that traditional financial inclusion has long faced. It has had a disruptive impact on the existing financial model [8], especially improving the availability of financial services to those disadvantaged groups who are excluded by traditional financial institutions [9]. In addition, in the context of the digital economy, as DFI continues to expand into the financial market, it has changed the traditional ways of information access, information dissemination and investment and consumption concepts of the residents, which may have an important impact on their income. Based on this, the main questions of concern in this paper are: does DFI help increase residents' income, and what are the differences in the effects on different income types? What are the mechanisms of its impact?

Based on this, this paper uses the 2015–2019 China Household Finance Survey (CHFS) data to examine the impact and mechanism of DFI on residents' income at the micro level, and analyzes the heterogeneous impact from different income groups and urban–rural perspectives. This study is intended to be a useful supplement to the existing studies, and the findings are important references for poverty reduction and improvement of people's well-being in developing countries. Our study makes three main contributions to the literature: First, unlike international studies that focus on the impact of financial inclusion development on economic growth, poverty reduction, and sustainability in G20 countries [10], African countries [11], India [12], Pakistan [13], Turkey [14] and other countries and regions, this paper focuses on the impact of DFI on residents' income in China from a micro perspective, and constructs a "DFI" variable for households, which helps to more accurately assess the actual impact of DFI on residents' income. Second, we attempt to explore the micro-level mechanisms of the impact of DFI on residents' income from the perspective of different income sources in detail, and clarify the mechanisms underlying the income effects of DFI. Our findings deepen the understanding of the relationship between DFI and residents' income growth. Third, we further explore the heterogeneous impact of DFI on the total income and income structure of different income groups and urban and rural residents, with a view to providing a reference for China and other countries in the world to propose policy solutions for DFI to effectively promote sustainable growth of residents' income.

The rest of the paper is organized as follows: Section 2 reviews the relevant literature; Section 3 theoretically analyzes the impact of DFI on residents' income and the impact mechanism, and proposes hypotheses; Section 4 introduces the empirical model and data description; Section 5 conducts the analysis of model results, including the baseline results, tests of the impact mechanism, heterogeneity analysis and discussion on endogeneity; Section 6 discusses the research results; Section 7 concludes the full paper and proposes corresponding policy recommendations.

## 2. Literature Review

The relationship between financial development and economic growth and residents' income has been studied for a long time [15,16]. A general conclusion is that financial development contributes to economic growth [1,17] and poverty reduction [18,19]. How-

ever, Wen et al. [20] argue that the positive relationship between financial development and economic growth cannot be used as a direct substitute for the relationship between financial development and farmers' income growth, which has a significant negative effect on farmers' income growth in China. Different functions of financial development do not affect income growth in the same direction [21], and financial volatility can offset the poverty-reducing effects of financial development [22].

Financial exclusion is an important cause of the inability of vulnerable groups to escape poverty [23], and the poor are often unable to meet the credit thresholds of financial institutions [24,25]. Financial inclusion development can help alleviate their credit constraints and increase income [26]. Looking at different dimensions of financial inclusion, geographical penetration and product exposure of financial inclusion helps promote higher farm household income, while usage utility is negatively related to farm household income [27]. In addition, the application of insurance products helps to improve the resilience to "poverty due to illness" [28]. Although financial inclusion has a role in reducing poverty and increasing the income of disadvantaged groups, its development is still limited by many obstacles such as high costs and inefficiencies that make it difficult to match supply and demand, and commercial unsustainability [29].

The innovation and application of digital technology bring new opportunities for the development of financial inclusion, and DFI has become a hot spot for academic research. Research on DFI has focused on the following aspects. First, the measurement of DFI. International organizations such as the Alliance for Financial Inclusion (AFI), the Global Partnership for Financial Inclusion (GPFI), and the World Bank (WB) have given guidance on how to measure financial inclusion. Academic studies measure the development of financial inclusion according to different situations [30–32]. Digital technology has promoted the development of financial inclusion, and the measurement of DFI has become a hot spot for academic research [33–35]. Second, the impact of DFI on economic development has been studied, including on inclusive economic growth [36,37], sustainable development [38], enterprise innovation and quality development [39,40], and green low-carbon development [41–43]. Third, researchers have investigated the impact of DFI on households. This mainly includes promoting household entrepreneurship [44], increasing residents' consumption [45–47], and the relationship between DFI and residents' income, which is closely related to this paper. Most scholars believe that the development of DFI has an important role in promoting residents' income level [48,49]. DFI breaks through the geographical boundaries of traditional financial services to a certain extent, shortens the distance between financial supply and financial demand in time and space [50], improves the uneven allocation of financial resources [51], and has a positive spillover effect on raising the income of rural residents [52,53], where the breadth of coverage of digital finance is the main driver of the income-increasing effect. However, different scholars disagree about the extent to which this income-increasing effect acts on different groups. Some scholars believe that urban residents and high-income people are the main beneficiary groups [54]. The digital technology barrier and the lack of financial literacy will lead to a "digital divide" for low-income people, making it difficult for them to use core digital financial services such as online finance and online lending to increase their income [55]. Some scholars hold the opposite view, arguing that DFI has a more significant income-generating effect on rural low-income groups, thereby reducing the urban–rural income gap [56] and promoting inclusive growth in China [1]. However, some scholars argue that the impact of DFI on income is not linear due to the existence of the "digital divide" [57], and that a certain threshold needs to be crossed in order to bring into play the income-increasing effect of DFI [58]. In addition, DFI development also has spatial spillover effects [59].

The existing literature has the following deficiencies: First, most studies [60,61] have adopted the macro index of DFI development to measure DFI development. It is difficult to determine from the macro index whether resident households actually participate in the DFI market; when matching with micro data, there is data matching bias, which affects the reliability of research findings. Second, the existing literature on the micro

mechanism and channel of the income effect of DFI is still insufficient, especially on the impact mechanism for different income structures. It is difficult to comprehensively grasp the intrinsic mechanisms and pathways of the impact of DFI on income. Third, the existing literature [62,63] mainly focuses on rural residents, with insufficient research on urban residents and all residents. Moreover, the data are mostly macro data such as provinces, cities and counties, with few studies exploring the impact of DFI on residents' income based on the micro resident-household level. Fourth, the existing literature [64,65] mostly uses propensity score matching (PSM) methods to measure the socioeconomic effects of DFI. However, PSM cannot address the endogeneity problem caused by omitted variables, which may lead to biased research findings. Based on these concerns, this paper constructs resident DFI variables at the micro level to explore the impact of DFI on the income and income structure of Chinese residents, and explores the specific impact mechanisms. This has important theoretical and practical significance for improving residents' income, achieving common prosperity and sustainable national economic development.

## 3. Theoretical Analysis and Research Hypotheses

Theoretically, whether to use DFI is a rational decision for residents to maximize the total household welfare effect. First, at the supply level, DFI can lower the financial threshold and expand financial coverage. On the one hand, DFI promotes the development of financial inclusion through digital financial services, which helps financial products and services reach customers widely and quickly, increase the breadth of financial inclusion services, and expand the scope of DFI. On the other hand, formal financial institutions often face adverse selection and moral hazard problems caused by information asymmetry when providing financial products and services to borrowers [66], which restricts some residents from accessing financial services in a timely and effective manner. DFI acquires and analyzes user information through digital technologies such as big data, cloud computing and artificial intelligence to establish intelligent risk control models and reduce information asymmetry. DFI can enable the disadvantaged groups who are originally excluded from the formal financial system to access financial services, thus promoting the supply capacity of credit, savings and insurance business as well as the distribution and transfer of financial credit, and accelerating the development of less developed regions [67] while promoting the increase of residents' income. Second, at the demand level, DFI is more likely to meet residents' financial needs conveniently and quickly. DFI replaces intermediaries such as physical and service outlets of traditional financial services [68]. It helps to reduce the cost of reaching transactions and expand the availability, accessibility and ease of payment of financial services, which in turn improves the efficiency of resource allocation and residents' access to higher income opportunities [30]. Third, DFI can broaden access to information and alleviate residents' information constraints. DFI provides residents with many platforms for knowledge sharing, investment and finance. The use of DFI helps residents to obtain financial information and financial services from these platforms in a timely manner. It will help residents to choose different financial services to support their own production and development according to their financial needs in different scenarios, thus increasing their total household income. Accordingly, the following hypothesis is proposed.

**Hypothesis 1:** *DFI can increase the total household income of residents.*

Next is the logic of the impact of DFI on the different income structures of residents. DFI is the use of digital technology to realize payment, investment, financing and other new financial business models [6], which changes the traditional production and lifestyle of resident households and helps to promote the diversification of residents' income sources. Firstly, DFI promotes the increase of residents' wage income by increasing their employment levels. Generally speaking, the level of employment of residents depends on the number of jobs in the labor market. The development and application of DFI can

broaden financing channels for enterprises, optimize their financing environment, and especially ease credit constraints for small and medium-sized enterprises (SMEs) [63], which helps enterprises expand their operations and release more jobs, thus increasing residents' access to employment. DFI can alleviate the financial constraints of residents' employment transfer, such as transportation costs and accommodation and food costs, which in turn enhances the employment level of resident households. The increase in employment opportunities and employment levels of residents can effectively enhance the increase in wage income of residents. Secondly, DFI promotes higher business income for resident households by increasing their active entrepreneurship. Most existing studies have found that the development of DFI can significantly increase the probability of resident entrepreneurship [69]. Since entrepreneurs have limited initial assets to meet their entrepreneurial capital needs [9], financial support is thus an important factor influencing residents' entrepreneurial behavior [70]. DFI as an important means of financial support for residents helps to reduce financing costs and alleviate their credit constraints, which in turn promotes their entrepreneurial choices and entrepreneurial performance and directly increases their business income. Thirdly, DFI increases residents' property income by increasing their financial market participation. Compared with developed countries, the lack of investment channels is the main factor limiting the growth of property income of Chinese residents. By providing financial products such as online wealth management, DFI enriches residents' financial channels, enabling them to access financial products, increasing residents' financial market participation, and thus increasing their property income. Based on this, the following research hypotheses are proposed.

**Hypothesis 2:** *DFI raises the wage income of residents by increasing their employment levels.*

**Hypothesis 3:** *DFI raises the business income of residents by promoting their entrepreneurship.*

**Hypothesis 4:** *DFI increases the property income of residents by increasing their financial market participation.*

## 4. Empirical Model and Data Description

### *4.1. Data Sources and Processing*

This study uses data from a large nationwide micro household survey (China Household Finance Survey, or CHFS) conducted by the China Household Finance Survey and Research Center of the Southwest University of Finance and Economics in 2015, 2017 and 2019. The database sample covers 29 provinces (autonomous regions and municipalities directly under the central government) in China, aiming to reflect China's social changes and economic development by tracking and collecting data at the individual, household and community levels, and providing important data support for academic research and national macroeconomic and financial formulation policies. The survey data provide effective data support for this paper to study DFI and residents' income. Since resident household income is affected by macroeconomic development, this paper also controls for the development level of county GDP per capita, which is obtained from the website of the National Bureau of Statistics. This study obtained a total of 24,195 households' balanced panel data across three periods.

### *4.2. Variable Selection and Descriptive Statistics*

#### 4.2.1. Dependent Variables

In this paper, residents' income and income structure are selected as the dependent variables. Their income levels are measured in terms of total income per capita. Considering that the impact of DFI on various types of income differs, in order to further explore this difference, this paper divides residents' income into three parts according to the source of income: per capita wage income, per capita business income, and per capita property income. Wage income is the income from employers, business income is the income

from agricultural business and industrial and commercial business, and property income includes the income from financial property such as stocks, funds, financial products, financial derivatives, and insurance dividends, as well as income from housing and store rentals. Considering that transfer income accounts for a relatively small proportion of residents' income and that the relationship between DFI and residents' transfer income is weak, this paper does not examine its impact on residents' transfer income for the time being.

#### 4.2.2. Independent Variables

The independent variables in this paper relate to DFI. This paper explores the impact of DFI on residents' income and income structure from a micro household perspective. To accurately estimate the income effect of DFI at the household level, we take into account DFI to test the heterogeneous impact of DFI on residents' income and income structure. DFI contains three dimensions: whether digital financial services are used, functions of digital financial services use and degree of use.

If a household has used any of the three categories of digital payment, digital lending and digital financing, it is considered to have used DFI and takes the value of 1, and the opposite is 0.

Functions of DFI are studied, namely, digital payment, digital lending and digital financing, respectively.

The degree of the use of DFI is measured by the number of different product types of DFI used by residential households (Zhang et al. [71]).

Specifically, CHFS collects information on households' use of DFI services such as mobile banking, online banking, mobile payment, online wealth management and online loans. Related questions include: (1) Which payment method does your household generally use for online shopping (relevant options include online banking, Alipay, etc.); (2) Which forms of banking services does your household mainly use (relevant options include online banking, mobile banking, etc.); (3) Whether you hold internet financial products (such as BalancePay, WeChat Wealth Management, Jingdong Small Vault, etc.); (4) Which of the following activities do you usually use your mobile phone for (relevant options include online shopping, mobile banking, etc.). Respondents were considered to use DFI if they selected any of the options listed in parentheses when answering the above questions. We define the use of DFI in households as 1, otherwise it is defined as 0. The use of a digital payment function is examined based on whether the respondent's household "uses third-party mobile payment such as Alipay, WeChat Pay, Jingdong NetBank Money, Baidu Wallet, mobile banking, Apple pay or other third-party payment services" (residents use of digital payment function = 1, not using digital payment function = 0). The use of a digital borrowing function by the sample residents was investigated by asking the respondents whether they "borrowed money from online lending platforms such as P2P platform, Ant Financial (debit and flower chanting), WeChat platform (microfinance), Jingdong Finance, Baidu Finance or internet bank (WeiZhong Bank)" (residents use digital borrowing function = 1, not using digital borrowing function = 0). Respondents were asked, "Do you hold any of these internet financial products, such as YueBao, WeChat Wealth Management, Jingdong Small Vault, Baidu Billion, and Shopkeeper's Wallet?", checking residents' use of digital wealth management functions (residents use digital wealth management functions = 1, not using digital wealth management functions = 0).

#### 4.2.3. Mediating Mechanism Variables

The mediating variables in this paper include the proportion of employed persons in the household, entrepreneurial decisions and financial market participation. In particular, the proportion of employed persons in the household is expressed by the ratio of the number of residents with a wage income to the total number of people in the household; and uses the answer "Are you currently engaged in commercial and industrial production and operation projects, including self-employed small craft business and business operation?

If residents answer "yes", they are considered to have chosen to start a business and are assigned a value of 1. If they answer "no", they are considered to have chosen not to start a business and are assigned a value of 0. Whether residents hold financial products is used as a proxy variable for financial market participation, and is assigned a value of 1 if they hold financial products and 0 otherwise.

#### 4.2.4. Control Variables

We explore the impact of DFI on residents' income and should control the impact of other factors on residents' income. In this paper, we mainly control for the variables from the following aspects: first, we include householder's characteristic variables, including gender, age, education level, marital status and health status. Observations of householder's gender and education are almost constant over time, so the coefficients of these variables are difficult to estimate. Besides, the householder's age [72], marital status [73], and health status [74] may have an impact on residents' income, so we control these variables. Second, we include household characteristic variables. Referring to Zhang et al. (2019) [36], we control for the total number of household members, the proportion of children in the household, and the proportion of elderly in the household. We control for household participation in insurance, where household participation in insurance may enhance the residents' income [75,76], including the proportion of households participating in social pension insurance, the proportion of households participating in residents' medical insurance, and the proportion of households participating in commercial insurance. In addition, we also control for household financial characteristics, including total assets and total liabilities, which may significantly affect household income. Third, we control for regional variables including whether they are rural residents [77], and county GDP per capita [78].

The descriptive statistics for each variable are shown in Table 1.

**Table 1.** Description of Variables and Descriptive Statistics.

| Variables | Variable Definition | Average | Standard Deviation |
|---|---|---|---|
| **Dependent Variables** | | | |
| Total income | Total annual income/number of family members (10,000 CNY/person) | 2.415 | 4.596 |
| Wage income | Annual wage income/number of family members (10,000 CNY/person) | 0.912 | 1.755 |
| Business income | Annual business income/number of family members (10,000 CNY/person) | 0.356 | 2.068 |
| Property income | Annual property-based income/number of family members (10,000 CNY/person) | 0.096 | 0.853 |
| Other income | Annual other income/number of family members (10,000 CNY/person) | 1.051 | 2.800 |
| **Independent Variables** | | | |
| DFI use | Does the household use DFI (yes = 1; no = 0) | 0.346 | 0.476 |
| Digital payment function | Does the household use DFI payment function (yes = 1; no = 0) | 0.344 | 0.475 |
| Digital financing function | Does the household use DFI financing function (yes = 1; no = 0) | 0.047 | 0.212 |
| Digital lending function | Does the household use DFI lending function (yes = 1; no = 0) | 0.001 | 0.034 |
| Degree of DFI use | Number of different product types used by residential households for DFI | 0.397 | 0.578 |

**Table 1.** *Cont.*

| Variables | Variable Definition | Average | Standard Deviation |
|---|---|---|---|
| **Intermediate Variables** | | | |
| Proportion of employed persons in households | Ratio of employed persons in the household to the number of family members (%) | 0.238 | 0.282 |
| Entrepreneurial decision making | Whether to choose to start a business (yes = 1; no = 0) | 0.121 | 0.326 |
| Financial market participation | Whether financial products are purchased (yes = 1; no = 0) | 0.044 | 0.205 |
| **Householder Characteristics** | | | |
| Gender of householder | Gender of householder (male = 1; female = 0) | 0.786 | 0.410 |
| Age of householder | Actual age of head of household (years) | 56.838 | 13.126 |
| Education level of householder | Actual years of education of the head of household (years) | 8.655 | 3.938 |
| Marital status of householder | Whether the head of the household is married (yes = 1; no = 0) | 0.863 | 0.344 |
| Self-assessed health status of householder | Self-assessed health status of the head of household (on a scale of 1–5) | 2.732 | 0.999 |
| **Household Characteristics Variables** | | | |
| Household size | Number of persons in the household (persons) | 3.349 | 1.643 |
| Proportion of children in households | Ratio of children under 16 years old to the number of family members (%) | 0.111 | 0.161 |
| Proportion of elderly in households | Ratio of persons over 65 years old to the number of family members (%) | 0.264 | 0.373 |
| Proportion of households covered by social pension insurance | Ratio of the number of persons in households covered by social pension insurance to the number of persons in the household (%) | 0.804 | 0.293 |
| Proportion of families enrolled in residential health insurance | Ratio of the number of people in the household with health insurance to the number of people in the household (%) | 0.921 | 0.214 |
| Proportion of families covered by commercial health insurance | Ratio of the number of persons in households with commercial health insurance to the number of persons in the household (%) | 0.060 | 0.191 |
| Total household assets | Total household assets (CNY, in logarithms) | 11.415 | 1.705 |
| Total household liabilities | Total household liabilities (CNY, in logarithms) | 2.858 | 4.382 |
| **Regional variables** | | | |
| Rural residents or not | Rural residents = 1; urban residents = 0 | 0.425 | 0.494 |
| Area | East = 1; Central = 2; West = 3 | 1.873 | 0.830 |
| County GDP per capita | County GDP per capita (CNY/person, in logarithms) | 10.356 | 0.663 |

### *4.3. Model Setting*

#### 4.3.1. Fixed Effects Model

This paper focuses on the impact of DFI on the total income and income structure of residents and constructs the following general panel data analysis model.

$$Income_{it} = \alpha_{it} + \alpha_1 DFI_{it} + \sum_2^j \alpha_j Control_{it} + \varepsilon_{it} \quad (1)$$

In Equation (1), $Income_{it}$ denotes the total income of the residents, $DFI_{it}$ is DFI, $\alpha_1$ is the coefficient corresponding to the independent variables, and $Control_{it}$ represents the control variables, $\alpha_{it}$ denotes the constant term, $\alpha_j$ is the coefficient of the control variable, $i$ denotes individual residents, $t$ denotes year and $\varepsilon_{it}$ denotes random variables. In order to eliminate the effect of outliers, the continuous variables such as residents' income and income structure are shrunken at the 1% level in this paper.

Since the total income is a continuous variable, this paper uses a fixed effects model of ordinary least squares (OLS) to estimate. However, there are a large number of zero values for residents' wage income, business income and property income, and the situation is

often considered as data interception, therefore, a panel Tobit model is used for empirical analysis.

It is considered that there is an interaction between DFI and the income of residents, leading to a possible endogeneity of the model. In this paper, the instrumental variable approach is selected to address the possible endogeneity of the model. Referring to the research ideas of He and Li [9], this paper finally selects the average level of DFI as an instrumental variable based on several attempts using different instrumental variables. DFI is highly correlated with residents' location and residents' age, and residents' digital financial services use level is affected by the average level of digital financial services use in the same age group; however, the average level tends not to directly affect residents' household income. In this paper, the sample of residents is divided into five sub-samples according to age groups based on the respondents' age variable. The age groups to which the residents of each sub-sample belong are 18–30, 30–40, 40–50, 50–60 and 60+, respectively, and the average level of digital financial services use of the sample of residents of the same age group in the same county is selected as the instrumental variable.

#### 4.3.2. Tobit Model

This paper uses a panel Tobit model to analyze the impact of DFI on the income structure of the population and the model is set up as follows:

$$IncomeSt_{it} = \alpha_{it} + \alpha_1 DFI_{it} + \sum_2^j \alpha_j Control_{it} + \varepsilon_{it} \quad (2)$$

In Equation (2), $IncomeSt_{it}$ denotes the residents' wage income, business income and property income, respectively, and the other variables have the same meaning as in Equation (1). Considering the possible endogeneity problem, the same instrumental variables as before are also selected for the endogeneity problem.

#### 4.3.3. Mediated Effects Model

In order to analyze the impact path of DFI on residents' income. This paper draws on Wen et al. [78] and uses a sequential test to construct the following mediating effects model:

$$T_i = cU_i + \alpha X_i + \varepsilon_{i1} \quad (3)$$

$$M_i = aU_i + \beta X_i + \varepsilon_{i2} \quad (4)$$

$$T_i = c'U_i + bM_i + \gamma X_i + \varepsilon_{i3} \quad (5)$$

In Equations (3)–(5), where $T_i$ denotes residents' of wage income, business income and property income. $U_i$ denotes residents' DFI, $X_i$ denotes control variables, $M_i$ denotes the proportion of employed persons in the households, entrepreneurial decisions and financial market participation. a, b, c, c' are parameters to be estimated, and $\varepsilon_{i1}$, $\varepsilon_{i2}$, $\varepsilon_{i3}$ are random disturbance terms. $\alpha$, $\beta$, $\gamma$ are the estimated coefficients of the control variables. Referring to Kinnon et al. [79], if the coefficients a, b, c and c' are significant, it indicates that the proportion of employed persons in the household, entrepreneurial decisions and the financial market participation partially mediate the relationship between DFI and the impact on the income of the population; if a, b and c' have opposite signs and $|c| < |c'|$, then the mediating effect is manifested as a masking effect.

## 5. Analysis of Model Results

### *5.1. Baseline Results*

#### 5.1.1. Impact of the Use or Non-Use of Digital Financial Services on the Income and Income Structure of Residents

In this paper, the Hausman test is used to determine whether to build a fixed effect model or a random effect model when processing panel data. The Hausman test results in columns (1)–(4) in Table 2 show that the chi2 values are 280.70, 613.32, 120.33, and 39.26,

respectively, all of which are significant at the 1% statistical level, indicating that the original hypothesis is strongly rejected and therefore the fixed-effects model should be used.

**Table 2.** The Marginal Effect Results of the Impact of DFI on the Income and Income Structure of Residents.

| Variables | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | Total Income | Wage Income | Business Income | Property Income |
| | Fixed Effect | Panel Tobit | Panel Tobit | Panel Tobit |
| DFI use | 0.420 *** | 0.243 *** | 0.103 *** | 0.045 *** |
| | (0.040) | (0.012) | (0.007) | (0.002) |
| Gender of householder | 0.078 | 0.003 | 0.103 *** | 0.011 *** |
| | (0.050) | (0.015) | (0.008) | (0.002) |
| Age of householder | 0.002 | −0.007 *** | −0.001 *** | 0.001 *** |
| | (0.002) | (0.001) | (0.000) | (0.000) |
| Education level of householder | 0.025 *** | 0.027 *** | −0.013 *** | 0.002 *** |
| | (0.008) | (0.002) | (0.001) | (0.000) |
| Marital status of householder | −0.069 | −0.076 *** | 0.064 *** | 0.002 |
| | (0.069) | (0.020) | (0.010) | (0.003) |
| Self-assessed health status of householder | −0.024 | −0.042 *** | −0.013 *** | −0.001 |
| | (0.019) | (0.006) | (0.003) | (0.001) |
| Household size | −0.067 *** | 0.083 *** | −0.019 *** | −0.005 *** |
| | (0.016) | (0.005) | (0.002) | (0.001) |
| Proportion of children in households | −0.680 *** | −0.576 *** | 0.091 *** | 0.012 * |
| | (0.171) | (0.046) | (0.023) | (0.006) |
| Proportion of elderly in households | 0.043 | −0.878 *** | −0.055 *** | 0.016 *** |
| | (0.083) | (0.026) | (0.011) | (0.003) |
| Proportion of households covered by social pension insurance | 0.273 *** | −0.015 | −0.052 *** | −0.002 |
| | (0.062) | (0.021) | (0.010) | (0.003) |
| Proportion of families enrolled in residential health insurance | 0.300 *** | −0.003 | 0.051 *** | 0.012 *** |
| | (0.074) | (0.026) | (0.013) | (0.004) |
| Proportion of families covered by commercial health insurance | 1.017 *** | 0.405 *** | 0.188 *** | 0.064 *** |
| | (0.087) | (0.027) | (0.014) | (0.004) |
| Total household assets | 0.218 *** | 0.056 *** | 0.023 *** | 0.020 *** |
| | (0.014) | (0.005) | (0.002) | (0.001) |
| Total household liabilities | 0.021 *** | 0.004 *** | 0.007 *** | −0.001 *** |
| | (0.004) | (0.001) | (0.001) | (0.000) |
| Rural residents or not | 0.023 | −0.104 *** | 0.301 *** | 0.001 |
| | (0.168) | (0.016) | (0.008) | (0.002) |
| Area | −0.071 | −0.036 *** | 0.034 *** | −0.001 |
| | (0.067) | (0.009) | (0.004) | (0.001) |
| County GDP per capita | 0.935 *** | 0.110 *** | 0.035 *** | 0.010 *** |
| | (0.086) | (0.011) | (0.005) | (0.001) |
| N | 24,195 | 24,195 | 24,195 | 24,195 |
| Hausman test | 280.70 *** | 613.32 *** | 120.33 *** | 39.26 *** |

Note: ***, * indicate significant at the 1% and 10% levels, respectively; standard errors are in parentheses.

Table 2 reports the results of estimating the marginal effects of the impact of DFI on residents' income and income structure, where column (1) shows the estimated results of the impact of DFI on residents' total income. From the estimation results, DFI positively affects residents' total household income at the 1% significance level, i.e., DFI significantly contributes to an increase in residents' total income compared to those who do not use DFI. The results of the marginal effects reveal that DFI helps to raise the income level of residents, increasing their total annual per capita household income by an average of CNY4200. This shows that DFI has expanded the coverage and penetration rate of financial inclusion with

the help of digital technology, improved the quality and efficiency of financial services, provided residents with financial products and services such as digital payment, digital credit and digital finance. It becomes an important driving force to promote the growth of residents' income.

To further analyze the differences in the impact of DFI on residents' income sources, this paper divides residents' income into wage income, business income and property income, and estimates the impact of DFI on residents' different income structures separately. From the estimated results in columns (2), (3) and (4) of Table 2, the use of digital financial services can increase their annual per capita household wage income, annual per capita household business income and annual per capita household property income by CNY2430, CNY1030, and CNY450, respectively, compared to residents who do not use digital financial services. In comparison, the marginal impact effects of financial digital inclusion on different income structures are, in descending order, wage income, business income and property income. This indicates that financial digital inclusion can increase residents' income by increasing the above three income types and has the largest impact effect on wage income. As stated in the theoretical analysis, DFI helps to meet various financial needs required by residents for employment, entrepreneurship, and financial market participation, thus fulfilling the multiple financial functions of DFI and promoting the increase of residents' wage income, business income, and property income.

#### 5.1.2. Impact of Different Functions of DFI on the Residents' Income

Considering DFI as a new financial pattern, it contains three key financial services that residents need, such as consumer payments, investment and finance, and different service functions may have different impacts on residents' income. In addition, residents' use of different functions of DFI also varies considerably. In the full sample, the percentage of residents using digital financial services is 34.4%, among which, the percentage of those using a digital payment function is 34.4%, the percentage of those using a digital finance function is only 4.7% and the percentage of those using a digital lending function is even lower, only 1%. In view of this, this paper further examines the differential impact of the digital payment function, digital lending function and digital finance function on residents' income based on the different functions of DFI. The estimated results are shown in Table 3.

**Table 3.** Impact Results of Different DFI Functions on the Residents' Income.

| | Sample Group | Total Income | N |
|---|---|---|---|
| DFI function | Digital payment function | 0.425 *** (0.039) | 24,195 |
| | Digital lending function | 1.036 ** (0.425) | 24,195 |
| | Digital financing function | 0.305 *** (0.076) | 24,195 |

Note: ***, ** indicate significant at the 1% and 5% levels, respectively; standard errors are in parentheses.

Table 3 of the estimation results shows that the different functions of DFI have a positive and significant impact on the total income of the residents at the 1% statistical level, and the use of the digital payment function, digital lending function and digital financing function of DFI can raise the annual per capita household income of residents by CNY4250, CNY10,360 and CNY3050, respectively. It can be found that there are large differences in the impact of different DFI functions on residents' income, with the digital lending function has the largest marginal impact on residents' income, followed by digital payments and finally digital financing. The possible reason is that, compared with traditional finance, the digital payment, digital lending and digital financing functions of DFI serve to reduce transaction costs, alleviate information asymmetry, improve resource allocation efficiency and meet residents' financial needs by influencing their payment methods, financing channels and financial investments, which in turn lead to income growth. Among them, compared with

the digital payment and digital financing functions, the digital lending function further alleviates residents' credit constraints by providing them with actual financial support, which helps to improve resource allocation efficiency and achieve Pareto optimality [6]. Thus, the digital lending function has a greater role in raising the income level of residents. However, it should be pointed out that since the percentage of residents using the digital lending function in the survey data is low at 1%, there may be some bias in the effect of the digital lending function on residents' income.

5.1.3. Impact of the Degree of DFI use on the Residents' Income and Income Structure

Residents' proficiency in using multiple digital financial services' products reflects the extent of their DFI, and the greater the extent of DFI, the more it contributes to the impact of the multiple functions of DFI on residents' income. Table 4 reports the results of estimating the marginal effects of the degree of use of DFI on residents' income and income structure, where column (1) shows the estimated results of the impact of the degree of DFI use on residents' total income. From the estimated results, the degree of DFI positively affects the total income at the 1% significance level, indicating that the increased degree of DFI use helps to promote the residents' total income. The results of the marginal effects reveal that each increase in the degree of DFI use increases their total annual household income per capita by an average of CNY3670. The possible reason is that, due to the increased use of digital financial services, residents can flexibly use various functions of DFI to meet different financial needs according to demand scenarios. It will be more conducive to the resource allocation and service functions of DFI, thus increasing the residents' income.

**Table 4.** Impact Results of the Degree of DFI use on the Income and Income Structure.

| Variables | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | **Total Income** | **Wage Income** | **Business Income** | **Property Income** |
| | **Fixed Effect** | **Panel Tobit** | **Panel Tobit** | **Panel Tobit** |
| Degree of DFI use | 0.367 *** | 0.205 *** | 0.081 *** | 0.040 *** |
| | (0.033) | (0.010) | (0.006) | (0.002) |
| Control variables | control | control | control | control |
| N | 24,195 | 24,195 | 24,195 | 24,195 |

Note: *** indicates significant at the 1% level; standard errors are in parentheses.

Further analysis of the differences in the impact of the degree of DFI use on different income types. From the estimation results in columns (2), (3) and (4) of Table 4, it is clear that an increase in the degree of DFI use can increase their annual per capita household wage income, annual per capita household business income and annual per capita household property income by CNY2050, CNY810 and CNY400, respectively. In comparison, the marginal effects of the degree of DFI use on different income structures are, in descending order, wage income, business income and property income. This indicates that the degree of DFI use can increase residents' income by increasing the above three income types, and the impact effect on wage income is the largest.

*5.2. Testing Impact Mechanisms*

The empirical results above show that DFI can significantly increase the residents' income level, but the mechanism of the impact of DFI on the residents' income level needs to be explored in depth. We focus on the impact of using digital inclusive financial products and services on residents' income, so to make the article more concise, we use digital inclusive financial usage variables for all tests below. Referring to the existing literature and combining it with data availability, this section verifies the following impact mechanisms: first, DFI can increase the wage income of households by increasing their employment probability; second, DFI can increase the business income of residents by increasing their entrepreneurial opportunities; third, residents improve their participation in the financial

market by using the financial management function of digital financial services, which in turn increases their property income. Drawing on Wen et al. [78], this paper uses a mediating effects model to verify the mechanism of DFI affecting residents' income.

#### 5.2.1. Employment Mechanism of Residents

The regression results in column (1) of Table 5 show that the effect of DFI on residents' wage income is significantly positive. In column (2), DFI is significantly positively associated with the proportion of employed persons in the household at the 1% level, i.e., DFI significantly increases the probability of household employment compared to residents who do not use digital financial services; i.e., DFI is beneficial in increasing the level of household employment. In column (3), both DFI and the proportion of employed persons in the household variables are significant after adding the variable of proportion of employed persons in the household to the wage income model, which indicates that the mediating variable proportion of employed persons in the household still has a significant contribution to residents' wage income after controlling for the effect of DFI. The above results suggest that there is a partial mediating effect of the proportion of employed persons in a household on the relationship between DFI and residents' income. The reason may be that, on the one hand, DFI helps to overcome the financing constraints of enterprises and expand their business scale, thus increasing employment demand; on the other hand, DFI can alleviate the financial constraints of household employment transfer, thus helping households to seek better employment opportunities, thereby contributing to higher wage income. Thus, Hypothesis 2 holds.

**Table 5.** Results of the Test of the Residents' Employment Mechanism.

| Variables | (1) | (2) | (3) |
|---|---|---|---|
| | Wage Income | Proportion of Employed Persons in Household | Wage Income |
| DFI | 0.259 *** | 0.031 *** | 0.170 *** |
| | (0.026) | (0.004) | (0.024) |
| Proportion of employed persons in households | – | – | 2.855 *** |
| | | | (0.047) |
| Control variables | control | control | control |
| N | 24,195 | 24,195 | 24,195 |

Note: *** indicates significant at the 1% level; standard errors are in parentheses.

#### 5.2.2. Entrepreneurship Mechanism of Residents

The next test is whether entrepreneurial behavior mediates the process of DFI in promoting residents' business income (Table 6). Similarly, the estimated results in column (1) show that DFI helps to raise the level of residents' business income. The results in column (2) show that DFI has a significant positive effect on residents' entrepreneurial behavior; i.e., DFI significantly promotes the probability of residents' entrepreneurship, and the findings are consistent with the results of scholars such as Feng et al. [69]. In column (3), both DFI and entrepreneurial behavior variables are significant, which shows that after controlling for the effect of the DFI, the mediating variable of entrepreneurial behavior still has a significant contribution to residents' business income. Since the parameter estimates in columns (1)–(3) are all significant, based on the judgment method of mediating effect, it can be concluded that residents' entrepreneurial behavior is an important channel for DFI to promote the increase of residents' business income. It indicates that DFI boosts the probability of entrepreneurship and thus residents' business income. This is because DFI can make it easier for residents to access financial services, alleviate their financial constraints, significantly increase the probability of residents' entrepreneurship, and help boost their business income. This confirms Hypothesis 3.

**Table 6.** Results of the Test of Entrepreneurship Mechanism of Residents.

| Variables | (1) | (2) | (3) |
|---|---|---|---|
| | Business Income | Entrepreneurial Behavior | Business Income |
| DFI | 0.121 *** | 0.028 *** | 0.107 *** |
| | (0.014) | (0.005) | (0.013) |
| Entrepreneurial behavior | - | - | 0.508 *** |
| | | | (0.022) |
| Control variables | control | control | control |
| N | 24,195 | 24,195 | 24,195 |

Note: *** indicates significant at the 1% level; standard errors are in parentheses.

#### 5.2.3. Financial Market Participation Mechanisms

Finally, the mediating effect of financial market participation in DFI to promote residents' property income is verified. Columns (1)–(3) of Table 7 report the results of the verification of the mediating effect of financial market participation, and based on the judgment method of the mediating effect model, it is similarly possible to obtain the result that financial market participation plays a partial mediating role in the relationship between DFI and residents' property income. It shows that DFI helps to enrich use of financial products, expand residents' financial investment channels, increase their participation in financial markets, and allocate assets more rationally, thus promoting the increase of residents' property income. Thus, Hypothesis 4 is verified.

**Table 7.** Results of the Test of Financial Market Participation Mechanisms.

| Variables | (1) | (2) | (3) |
|---|---|---|---|
| | Property Income | Financial Market Participation | Property Income |
| DFI | 0.022 *** | 0.017 *** | 0.018 *** |
| | (0.005) | (0.004) | (0.004) |
| Financial market participation | - | - | 0.202 *** |
| | | | (0.010) |
| Control variables | control | control | control |
| N | 24,195 | 24,195 | 24,195 |

Note: *** indicates significant at the 1% level; standard errors are in parentheses.

### *5.3. Heterogeneity Analysis*

#### 5.3.1. Heterogeneous Effects of Different Income Levels

Theoretically, differences in resource endowments and individual capabilities of residents can affect the differences in resource allocation efficiency of DFI, which in turn leads to different economic effects generated by DFI. Classical economics income distribution theory suggests that income is created jointly by the various factors of production involved. Differences in income levels affect residents' access to and ability to use digital inclusive financial services, which in turn affects the economic effects generated by their participation in digital financial markets differently. Thus, there are group differences in the degree of impact of digital financial markets on residents of different income levels. In view of this, the sample is arranged in three equal parts according to the total annual per capita household income level from lowest to highest, and the differences in the income effects of DFI on residents of different income levels are tested separately. The results of heterogeneity analysis by income level are shown in Table 8.

**Table 8.** Results of Heterogeneity Analysis Across Income Levels.

| | Sample Group | Total Income | N |
|---|---|---|---|
| Household income level | Low income | 0.095 *** (0.011) | 8179 |
| | Moderate income | 0.086 *** (0.016) | 8036 |
| | High income | 0.700 ** (0.279) | 7980 |

Note: ***, ** indicate significant at the 1% and 5% levels, respectively; standard errors are in parentheses.

The empirical results show that DFI has the largest income-increasing effect on residents at higher income levels, much higher than for low-income and middle-income households. In particular, the use of digital financial services by residents in the highest one third of income levels increases their total income by CNY7000/year, while residents in the lowest one third of income levels increase their total income by only CNY950/year. Compared to residents at the low-income level, the high-income residents who originally had the advantage in terms of combined ability and other resource endowments were able to obtain higher income by using digital financial services, causing the income gap to widen further. This indicates that residents at the low-income level have benefited less from the development of DFI, i.e., DFI has not achieved the desired effect, and there is a "Matthew effect" instead.

#### 5.3.2. Heterogeneous Effects of Urban and Rural Residence

Considering the large differences in policy support for DFI between urban and rural areas and the acceptance of the digital financial services market by urban and rural residents, this section analyzes the impact of DFI on residents' income from the perspective of urban–rural differences. The estimation results show (Table 9) that DFI raises the total income of rural residents by CNY5820/year compared to residents who do not use digital financial services, which is higher than the CNY4080/year of urban residents. Thus, the income enhancing effect of DFI is more significant for rural residents compared to urban residents. This is probably because DFI improves the accessibility of financial services for rural residents by alleviating their financial disincentives; this in turn has a higher income effect on rural residents, compared to urban residents who otherwise have more extensive financial coverage and use. This will help narrow the income gap between urban and rural areas, promote benign and coordinated economic development, and is of great significance for the coordinated realization of sustainable income growth of urban and rural residents.

**Table 9.** Results of Urban–Rural Heterogeneity Analysis.

| | Sample Group | Total Revenue | N |
|---|---|---|---|
| Subgroups of Urban and Rural Residents | Rural residents | 0.582 *** (0.098) | 13,907 |
| | Urban residents | 0.408 *** (0.063) | 10,288 |

Note: *** indicates significant at the 1% level; standard errors are in parentheses.

### *5.4. Discussion on Endogeneity*

Studying the impact of DFI on residents' income requires addressing endogeneity issues. One issue is the problem of reverse causality, i.e., the increase of residents' income in a region may promote the development of DFI, improve the popularity and utilization rate of DFI; this effect would be the reverse of DFI promoting the increase of residents' income. Second, there is the problem of omitted variables. Even if we increase the impact of control variables on disposable income per resident as much as possible, there are other factors that can lead to changes in residents' income. In this paper, we use the instrumental variables approach to address the possible endogenous-type problem. Referring to the approach

of He and Li [9], the average level of DFI of a sample of farm households of the same age group in the same county is selected as an instrumental variable.

Columns (1)–(4) of Table 10 report the results of the second-stage marginal effect regressions on the impact of DFI on residents' income and income structure estimated using instrumental variables. Using the heteroskedasticity robust DWH test, the results reject the hypothesis that the independent variables are exogenous at the 1% level of significance, except for the business income model; thus the introduction of instrumental variables is considered necessary. From the estimation results, it is clear that DFI has a significant positive impact on income and income structure. This indicates the robustness of the instrumental variables selected in this paper and further validates the robustness of the paper's findings.

**Table 10.** Endogeneity Issues: Instrumental Variables Approach.

| Variabls | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | **Total Income** | **Wage Income** | **Business Income** | **Property Income** |
| DFI | 2.351 *** | 0.162 *** | 0.103 *** | 0.022 *** |
| | (0.174) | (0.057) | (0.007) | (0.007) |
| Control variables | controlled | controlled | controlled | controlled |
| Durbin (score) | 181.441 *** | 256.315 *** | 0.832 | 5.767 ** |
| Wu-Hausman | 182.661 *** | 258.845 *** | 0.831 | 5.764 ** |
| N | 24,195 | 24,195 | 24,195 | 24,195 |

Note: ***, ** indicate significant at the 1% and 5% levels, respectively; standard errors are in parentheses.

## 6. Discussion

Financial inclusion is an important strategy for developing countries to grow their economies and reduce poverty. In recent years, with the help of digital technologies such as 5G, big data, cloud computing and artificial intelligence, DFI have developed rapidly and become a hot spot for international research. Studies have been conducted to explore the development of financial inclusion and its impact on economic growth, poverty reduction, and sustainability in international G20 countries [10], African countries [11], India [12], Pakistan [13], Turkey [14], and other countries and regions. However, each country's financial development is not the same, and China's digital financial development is at a high level. Exploring the impact of China's DFI development on residents' income is an important reference value for countries around the world, especially for developing countries in general, to reduce poverty and enhance people's well-being. In this context the impact of DFI on the economic effects and social welfare of households and individuals is of great interest. Different from existing literature on the use of a DFI development macro index [60,61], this paper innovatively constructs "DFI" indicators from a household's digital financial usage perspective. It helps to avoid differences in digital usage behavior across households in the same region. We explore the impact of DFI on residents' income and income structure through theoretical analysis and empirical tests, and clarify the mechanism of the effect of DFI on residents' income from various sources. The findings indicate that DFI can significantly contribute to the improvement of residents' total income and each income source. The results have important academic significance and policy implications for promoting the achievement of poverty reduction by increasing residents' income and narrowing the income gap, thereby motivating residents to be productive and promoting coordinated and sustainable economic development.

The study also has some limitations. Limited by the availability of data, we were not able to examine the impact of DFI on residents' income by using a quantitative indicator. Moreover, the small percentage of residents using digital lending in the sample data may affect the reliability of the study's findings, making the conclusions on the impact of digital lending on residents' income subject to further testing. Furthermore, DFI includes a wide range of financial products and services, and due to the limited space, the impact of other

DFI services on residents' income is not explored in depth in this paper. These are all directions that need further efforts in the future.

## 7. Research Conclusions and Policy Recommendations

Based on CHFS survey data from 2015–2019, this paper empirically analyzes the impact of DFI on residents' income and income structure, and explores its impact mechanisms and heterogeneous effects. The study finds that DFI can significantly contribute to the growth of residents' total income and income from different sources, and the enhancement effect is more obvious with the increase of the use. As a product of the combination of digital technology and financial inclusion, DFI largely improves the efficiency of financial services and promotes the growth of residents' income. The empirical results shows that DFI can increase the wage income of households by increasing their probability of employment, their business income by increasing their entrepreneurial opportunities and their property income by increasing their financial market participation. The heterogeneity analysis shows that DFI has a greater effect on the income of residents at higher income levels. The "digital usage divide" may exist in lower and middle income groups due to their resource endowment differences compared to higher income groups, which reduces the effect of DFI. In addition, compared with urban residents, DFI plays an increasingly important role in promoting income growth of rural residents. This is because DFI alleviates the financial repression of rural residents to a greater extent, thus promoting higher incomes of rural residents. This finding is important for narrowing the urban-rural income gap and coordinating sustainable urban-rural economic and social development.

The above findings have important policy implications for raising residents' income. First, the government should strengthen the construction of DFI infrastructure and promote DFI development. There should be increased investment in internet infrastructure construction to meet the basic conditions for the development of DFI. Second, policies are needed to encourage digital financial products innovation of commercial banks and internet finance companies. On the one hand, it is important to refine and improve the payment, lending and financial management functions of DFI, enrich the types of financial products and services, broaden the boundaries of financial services, and provide residents with sufficient financial services. It is important likewise to lower the threshold for residents to participate in the digital financial market and thus increase their participation in the financial market, and truly bring into play the income-generating effect of DFI. On the other hand, enhancing DFI's credit and other services for small and medium-sized enterprises (SMEs) will provide more employment opportunities for residents by promoting the development and expansion of 'SME' operations, prompting a sustained increase in residents' wage income. Third, it will be necessary to increase the promotion and popularization of DFI. The government and financial institutions can popularize DFI products and services to the public through Alipay, WeChat and short video official platforms, so that residents can access DFI knowledge through formal channels. They can help residents have a better understanding of DFI products and services, and improve the connection degree with residents and the efficiency of DFI services, so as to increase residents' income. Fourth, it is important to optimize the top-level policy design of DFI to support an increase in residents' income, increasing the policy inclination towards low-income groups and disadvantaged groups of rural residents, and providing them with equal opportunities to participate in digital financial activities. These policies can more fully reflect the inclusive possibilities of digital financial outreach, realize the income increasing effect of all residents and promote the sustainable development of the national economy.

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