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Income Diversification and Rural Consumption—Evidence from Chinese Provincial Panel Data

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Abstract: In China, income diversification has become a useful method for the rural households to smooth their income and maintain a sustainable mode of consumption. Additionally, income diversification affects rural consumption differently in regions with different income levels. In this paper, I have analyzed the impacts of income diversification on the peasants' consumption in the Chinese rural areas with the provincial level panel data from 1998 to 2015. The findings indicate that income diversification can increase the Chinese peasants' consumption, but the consumption of the peasants from the low- and the high- income subsamples of provinces are more sensitive to income diversification while the peasants from the middle-income provinces are not so sensitive to income diversification. Moreover, there is a significant ratchet effect and demonstration effect in the peasants' consumption, as is stated by the traditional literature. This paper contributes to the research by testing the impact of peasants' income sources diversification on the rural consumption and investigating its mechanism against the changing social background in China with the latest panel data.

Keywords: income diversification; consumption; rural China; income group

1. Introduction

How can income diversification affect the rural consumption in developing countries with striking regional differences, such as China? It has been concluded that income diversification is now an effective way to increase the households' well-being in developing countries [1]. A vast amount of literature has focused on the determinants of income diversification in rural areas [2,3], but there are a relatively smaller number of studies on the effect of income diversification in China. Some researchers have mentioned the “push” and “pull” factors of income diversification for rural households [2,4], but the empirical study has seldom shed light on the relationship between income diversification and the rural consumption. The possible reason is that it is considered that income diversification can increase peasants' income, so it is adequate just to study the impact of income increase on rural consumption. However, sometimes, income diversification can influence the consumption without changing income greatly. Then, income increase may not be the sole channel for the income diversification to influence the peasants' consumption. There must be more mechanisms through which income diversification can change consumption. Thus, it is necessary to test whether the rural consumption mode is influenced by income diversification with income level being controlled.

Based on the consumption theories and the risk theories, income diversification can affect consumption in two ways. Firstly, diversification can increase the peasants' income, and then encourage them to consume more. For rural households, income diversification means they can gain access to more income sources than farming, and the aggregate income may be enhanced more or less. Empirically, there is also a consensus on the potential positive role of income diversification

in increasing the rural households' income [2,4,5]. Secondly, income diversification can mitigate the rural households' income risk, and stabilize their expectation and promote their consumption [6]. Theoretical research concludes that diversified income sources can effectively protect the peasants from being negatively influenced by income shocks, which has virtually performed the function of risk management with portfolio of occupations [6]. The empirical evidence has also been found that income diversification can complement the peasants' income and, hence, mitigate income risk [7–9].

On the other hand, the consumption theories state that the households' risk attitudes are related to their income [10]. The households with higher income will definitely have greater abilities to deal with risk from those with lower income [11]. Thus, the role of income diversification in consumption depends on the households' income, as well.

Since China adopted the open-door and reform policy in the late 1970s, the Chinese peasants have been diversifying their income both to increase their income and to manage income risk. Demurger et al. [12] have studied the income diversification behavior of a Northern Chinese town, but the effect of income diversification on the peasants' consumption still needs further discussion. Li and Li [13] have studied the impact of income on consumption structure in Sichuan province of China, but the role of income diversification has not been discussed.

In this paper, I have tested the role of income diversification in the consumption in rural China with the provincial data. A sample of 31 Chinese provincial units from 1998 to 2015 has been tested to capture the regional difference. I calculate the Gibbs-Martin's diversification index with four income sources to measure income diversification, and estimate the impact of the income diversification on the consumption in rural China. The evidence has been found that peasants' income diversification can lead to more consumption. A further test with the subsamples in which 31 provinces have been categorized into high, middle and low-income groups according to the Chinese government categorization reveals that the income diversification has significant influence on the consumption in all groups of provinces, especially in the provinces with the high- and the low-income groups, but the influence varies across subsamples.

The paper contributes to the research in several aspects. First, this paper tries to employ the Gibbs-Martins index to measure the diversification of the income structure with the latest provincial data in the rural areas of China. It is among the first efforts to measure the income diversification with provincial data of income sources in rural China. Second, three subsamples of provinces have been further tested to reveal whether the influence of income diversification on the peasants' consumption depends on the income level. This can not only provide robustness test, but also reveal the conditional impact of the income structure on peasants' consumption in China.

The remaining of this paper is organized as follows: Section 2 provides a brief introduction of income diversification in rural China; Section 3 explains the methodology; Section 4 describes the data for the empirical research; Section 5 includes the results of the empirical study; and Section 6 concludes the paper.

2. Background of Income Diversification in Rural China

In rural China, peasants began to earn extra income from sources besides farming since the government adopted the reform and open-door policy in 1978. Due to the harsh natural conditions and low crop prices, Chinese peasants can earn little from farming, which is barely enough to feed their family [14]. Thus, the motive to earn extra money was very strong even before 1978. However, during that time, there were no more sources available for the peasants to earn more money in the central planning economy [15]. Moreover, it was not allowed to do any business other than farming under the strict government control. Since 1978, owing to the reform policy, the peasants have been provided a lot of opportunities to increase their income from sources besides farming [16]. Until now, for many Chinese peasants, farming is no longer the most important income source. They have to depend on other sources of income, which can bring them some extra money. Thus, the importance of farming has decreased greatly.

There are two determinants for income diversification, i.e., the “push factors” and the “pull factors” [2,17–19]. The push factors refer to such motives as risk diversification, including limited fields, diminishing agricultural returns to labor, inadequate financial support, etc. These factors would force the rural households to find various means of living besides traditional farming, which has contributed to a high level of income diversification. The pull factors refer to the opportunities for income diversification, including the regulatory adjustment, technological improvement, etc. In the past thirty years, both the push factors and the pull factors have grown significantly in China.

2.1. Push Factors of Income Diversification

The Chinese peasants have enough reasons to diversify their income by increasing their non-farm income. Firstly, farming income is very unstable given the frequent natural disasters in China [20]. Farming is easy to be affected by natural disasters and drastic climatic changes. The southern part of China is usually affected by excessive rainfall and typhoons in the summer period, while the northern part is usually threatened by lingering droughts. Consequently, farming income is difficult to guarantee, which forces the Chinese peasants to seek other sources of income and to diversify their income. Secondly, lack of social security in rural China is another reason for the Chinese peasants to diversify their income. The social security system developed very poorly in most rural regions in China [21]. Actually, most peasants have not been adequately covered by the social security system at all. They have a poor ability to cover the income risk. Though commercial insurance is accessible to the peasants, because of low income and long-existing prejudice toward insurance in rural China, most peasants are reluctant to spend money on insurance to mitigate their income risk. In this case, the Chinese peasants are apt to resort to income diversification for risk mitigation. Thirdly, the rural households' expected expenditure has increased by a large amount in the process of drastic social and policy changes. With the economic transition and urbanization in China, the expenditure for education, medical care and even daily living expenses have been increasing significantly [22]. The increasing expenditure forces the peasants to come up with new income sources to increase their income, which has contributed to a greater degree of income structure diversity.

2.2. Pull Factors of Income Diversification

The economic reform beginning in 1978 has freed the Chinese peasants from the fields, and peasants can get access to more income sources [23]. Firstly, as early as the late 1970s, some Chinese peasants began to migrate to cities to work in construction sites, find jobs in restaurants, or work as baby-sitters, etc. They can earn wages with these jobs. Secondly, the development of the Chinese security market and the real estate market has made it possible for the Chinese peasants to make money through asset investment. Some peasants have earned a lot from security investment and later from real estate investment. Thirdly, to overcome the problem of income discrepancy between the urban and the rural areas, the Chinese government has paid more money to the peasants as government transfer.

The rural households' income has been categorized by the Chinese government [24] as the following:

- (1) Income from wages and salaries: income earned by the members of rural households employed by other units or individuals.
- (2) Income from household operations: income earned by the rural households as units of production and operation. Operations by rural households are classified according to their economic activities, such as agriculture, forestry, animal husbandry, fishery, manufacturing, construction, transportation, post and telecommunications, wholesale, retail and catering, social service, culture, education, health, and other household operations.
- (3) Income from properties: the income received as returns by owners of financial assets or tangible non-productive assets through providing capitals or tangible non-productive assets to other institutional units.

- (4) Income from transfers: the receipt by rural households and their members of goods, services, capital or rights of assets without repaying, excluding capital provided to them for the formation of fixed assets. In general, it refers to all income received by rural households through government transfer.

Obviously, these income sources have different characteristics [25]. For example, family operation income is likely to be affected by climate; wages are easily affected by the macroeconomic situation; asset investment income can be affected by asset market volatility and government policies, while transfer income is only provided by the government to maintain the minimum living standard. Income diversification can smooth these income volatility of each individual income source and, hence, influence the rural consumption. In the following part, I attempt to develop an empirical method to study the impact of income diversification on the Chinese peasants' consumption.

3. Methodology

As it is mentioned above, income diversification may encourage consumption through income smoothing. This section will develop an empirically testable method.

3.1. Income Diversification and Consumption

Suppose there is a representative peasant. He arranges his consumption according to his income. Without any ex ante expectation about the future income shocks, his expected income of the next period is the same as his permanent income, which is quite stable. This relationship can be expressed as:

$$E(Y) = Y_p, \quad (1)$$

where Y and Y_p are income and permanent income, $E(\cdot)$ is the peasant's expectation function. Y can be flexible, while Y_p is stable at least in a short period. So, a transitory fluctuation of Y cannot change the permanent income.

We then assume there are two peasants, one with a sole source of income while the other with more income sources. They both have the same consumption function: $C(Y)$. According to the consumption theories, more income can encourage consumption, so $C'(Y) > 0$; on the other hand, according to the law of diminishing propensity to consume, we also have $C''(Y) < 0$. This means that the peasants would increase their consumption if their income grows, but the marginal consumption decreases as their income continues to grow.

With the application of the Taylor' expansion, consumption of the peasant with a sole source of income can be written as:

$$C(Y) = C(Y_p) + C'(Y) \cdot (Y - Y_p) + \frac{C''(Y)}{2} \cdot (Y - Y_p)^2 + (Y), \quad (2)$$

where (Y) refers to the higher order differentials of Y . We ignore (Y) in our following study. Then we apply the expectation function for both sides of Equation (2). If we assume $C'(Y)$ and $C''(Y)$ stable, together with Equation (1) and the definition of variance, we can get:

$$\begin{aligned} E[C(Y)] &= C(Y_p) + C'(Y) \cdot E[(Y - Y_p)] + \frac{C''(Y)}{2} \cdot E[(Y - Y_p)^2] \\ &= C(Y_p) + \frac{C''(Y)}{2} \cdot \text{var}(Y) \end{aligned} \quad (3)$$

Equation (3) indicates that a peasant with a sole income source will determine his consumption according to his permanent income and the volatility of his transitory income. In Equation (3), because $C''(Y) < 0$, a more volatile transitory income (Y) will make the peasant reduce his consumption.

Next, let us consider the scenario of the other representative peasant with two income sources, that is, Y_1 and Y_2 . Assume this peasant has an expected income equal to that of the first peasant. So, we have:

$$Y_D = Y_1 + Y_2, E(Y_D) = E(Y_1) + E(Y_2) = Y_P$$

The only difference between the first peasant and the second peasant is that the second peasant's income is composed of two different parts, so his income volatility is different from that of the first peasant. For the second peasant, we can apply the above method to solve for his expected consumption:

$$\begin{aligned} E[C(Y_D)] &= E[C(Y_1 + Y_2)] \\ &= C(Y_P) + \frac{C''(Y_1 + Y_2)}{2} \cdot \text{var}(Y_1 + Y_2) \\ &= C(Y_P) + \frac{C''(Y_D)}{2} \cdot [\text{var}(Y_1) + \text{var}(Y_2) + 2 \cdot \text{cov}(Y_1, Y_2)] \end{aligned} \quad (4)$$

where $\text{cov}(\cdot)$ is the covariance function. If Y_1 and Y_2 are not perfectly correlated, the variance of the sum of Y_1 and Y_2 should be smaller than the variance of Y , that is: $\text{var}(Y_1) + \text{var}(Y_2) + 2 \cdot \text{cov}(Y_1, Y_2) < \text{var}(Y)$. Since $C''(Y) < 0$, the consumption will be larger if the peasants have a diversified income, i.e., $E[C(Y_D)] > E[C(Y)]$.

Since these two peasants' expected income is the same ($E(Y) = Y_D$), the first peasant's propensity to consume could be calculated with $E[C(Y)]/Y$, while the second peasant's propensity to consume is $E[C(Y_D)]/Y$. Obviously, the second peasant's propensity to consume is larger than the first peasant's. If we relax the assumption of stable $C'(Y)$ and $C''(Y)$, since both $C'(Y_P)$ and $C''(Y_P)$ depends on the income level [26], the impact of income diversification on the consumption would also depend on the income level.

With the assumption of homogenous consumption habits in the same region, all the peasants' consumption function can be summed up to form an aggregate consumption. Hence, the aggregate data can be used for empirical analysis.

3.2. Income Diversification Index

Empirically, there are several ways to measure the income diversification, including the number of income sources [7], Herfindahl index [7], the share of non-farm income in total household income [27,28], Gibbs and Martin's index, etc. Among them, Herfindahl index measures diversification with the square of the weights of income from each source. A smaller Herfindahl index indicates a larger degree of diversification. Comparatively, Gibbs and Martin's index is an adjustment of Herfindahl index and can then indicate a larger degree of diversification with a higher value of the index [29]. Thus, Gibbs and Martin's index is more straightforward than Herfindahl index. This paper will adopt the Gibbs and Martin's index to measure the peasants' income diversification:

$$ID = 1 - \sum_{m=1}^N p_m^2 \quad (5)$$

where p is the proportion of income from an individual source in the aggregate income, and N is the number of the total income sources. A high value of this index indicates a higher level of income diversification.

3.3. Empirical Model

The vector error correction model (VECM) is the commonly used method to study the long-term relationship between the economic variables. However, the conventional VECM based on the Engel-Granger co-integration requires the variables to be integrated at the same order [30]. Additionally, VECM requires data with long time series; otherwise the results may not be consistent.

Thus, I have used the quasi-maximum likelihood (QML) estimation of linear dynamic panel data models proposed by Sargan and AlokB. [31] and Kripfganz [32]. Compared with the conventional VECM, QML is robust to panel data with large cross-section and short time span. Even if the data are not integrated with the same order, QML can still generate consistent results.

There should be several endogenous variables in the QML estimator. The consumption expenditure per capita and the income diversification index have been the two key endogenous variables. I have chosen the other endogenous variables according to the traditional consumption theories and the features of the Chinese peasants' consumption. Firstly, we use the peasant's lagged real consumption as one control variable to capture the "ratchet effect" in the consumption [33]. With a strong ratchet effect in consumption, the peasant would be reluctant to change his consumption radically after he has formed his consumption habit. Thus, their consumption in the present period will follow the trend of the lagged consumption. Secondly, we have introduced the urban resident's average consumption into the explanatory variables to capture Duesenberry's demonstration effect. If an agent's consumption is influenced by the consumption of the persons he knows, he would have an incentive to "keeping up with the Jones". The proxy used in this paper differs from the other researches on Duesenberry's demonstration effect simply because of the particular consumption status in China. In China, since many peasants begin to work as migrant workers in cities and hence change the rural lifestyle [34], the urban residents usually lead the trend of consumption and set a model for the rural households. Thus, we use the urban residents' consumption expenditure as another endogenous variable to capture the impact of demonstration effect. This method has also been employed in existent literature on the rural consumption in China [35]. Hence, there are a total of four endogenous variables.

The panel data model takes the following form:

$$C_{i,t} = a_0 + a_1 \cdot ID_{i,t} + a_2 \cdot C_{i,t-1} + a_3 \cdot C_{i,t}^U + a_4 \cdot Y_{i,t} + \varepsilon_{i,t}, \quad (6)$$

where $C_{i,t}$ is the real rural consumption of province i in year t . ID is the real income diversification index, C^U is the real consumption in the urban region of the same province. Y_t is the real income of that province. a_k ($k = 0, 1, \dots, 4$) is the k -th coefficient. The lower-case i refers to the i -th provincial unit. t refers to the time. $\varepsilon_{i,t}$ is the error term for the i -th province in the time t . The specification of Equation (6) is also similar to that in other research [35].

4. Data

4.1. Data Description

Data of the different provinces have been used to construct a panel data model in this paper. China is a large country with unbalanced regional development. To generate robust results, both the random effect and the fixed effect have been employed to estimate the full sample panel data model. While for the subsamples with different income categories, only the results of the random effect estimation have been reported. According to Wooldridge [36], the random effect specification can include more information and, in this paper, the results of the fixed effect are virtually very similar for those equations. The variables include the data of the Chinese rural households' consumption, income from four sources, the Chinese urban residents' consumption, and the consumer's price index (CPI) of 31 provincial units. Since Chongqing City became a provincial unit since 1998, our sample period extends from 1998 to 2015. The consumptions and income are in 100 million yuan RMB. All of our data are from the National Bureau of Statistics of China.

4.2. Summary Statistics

Table 1 has reported the summary statistics of rural households' consumption, aggregate income, and the four income components.

Table 1. Summary Statistics.

	Consumption	Income	Wage	Operation	Property	Transfer
Mean	3997.129	5477.149	2223.825	2386.024	178.8111	505.3277
Median	3003.905	4051.455	1447.19	1991.33	107.27	239.75
Std. Dev.	2926.673	5951.963	2454.319	1257.213	239.9746	691.0544
Maximum	16,152.3	113,095.2	17,482.5	7878.1	2023.511	4846.781
Minimum	710.26	1231.5	52.65	589.74	0.39	2.77
Observations	558	558	558	558	558	558

The sample covers 31 provincial units of China from 1998 to 2015. The four components of the Chinese peasants' income have been listed together with their aggregate income and consumption. All these data are nominal value and reported in 100 million yuan RMB.

Table 1 indicates that the average operation income has taken up the highest part of the aggregate income, while the wage ranks the second. Because the profits of the family enterprises in rural China have been included together with farming income in the operation income, the average amount of the operation income is the largest among the four income sources. On the other hand, the average wage income is the second highest among all the four income sources, which indicates that a lot of the peasants have depended largely on jobs as their income sources of their family. Finally, the standard deviation of wage is the highest, indicating that the peasants' wages vary a lot.

5. Empirical Results

5.1. Income Diversification Measurement

We have measured the peasants' income diversification with Gibbs and Martin's [29] diversification index according to Equation (5). The Gibbs-Martin's diversification index of income is reported in Table 2. The Gibbs-Martin's diversification index of income indicates that, in most provinces, the peasants' income has an increasing trend. Zhejiang province has the highest level of income diversification, while Xinjiang has the lowest. The median, the standard deviation (std), the minimum (min) and the maximum (max) have all provided the evidence that the provinces vary a lot in peasants' income diversification. Additionally, our further study finds that there is a positive correlation between the diversification index and the aggregate income. The correlation coefficient is 0.2695. This result is in line with that in Africa [37]: the higher income, the more diversified.

Table 2. Summary statistics of Gibbs-Martin's diversification index of income by province.

Provinces	Average	Median	std	Min	Max
Beijing	0.5339	0.5346	0.0242	0.4067	0.5820
Tianjin	0.5572	0.5518	0.0185	0.5319	0.5844
Hebei	0.5498	0.5407	0.0298	0.4927	0.6126
Shanxi	0.5568	0.5513	0.0426	0.4806	0.6169
Inner Mongolia	0.4215	0.4436	0.1067	0.2365	0.5817
Liaoning	0.5519	0.5689	0.0406	0.4644	0.6130
Jilin	0.4203	0.4501	0.1021	0.2457	0.5276
Heilongjiang	0.4399	0.4563	0.0996	0.2491	0.5486
Shanghai	0.4334	0.4377	0.0562	0.3559	0.5403
Jiangsu	0.5658	0.5592	0.0151	0.5407	0.6328
Zhejiang	0.5769	0.5813	0.0087	0.5530	0.5863
Anhui	0.5383	0.5423	0.0477	0.4423	0.6593
Fujian	0.5762	0.5814	0.0148	0.5351	0.6197
Jiangxi	0.5344	0.5350	0.0346	0.4455	0.6475
Shandong	0.5441	0.5471	0.0307	0.4846	0.6183
Henan	0.4916	0.4828	0.0557	0.3687	0.6561
Hubei	0.4939	0.5007	0.0564	0.3854	0.6447
Hunan	0.5462	0.5503	0.0358	0.4622	0.6573

Table 2. Cont.

Provinces	Average	Median	std	Min	Max
Guangdong	0.5575	0.5616	0.0215	0.5086	0.6297
Guangxi	0.5113	0.5100	0.0510	0.3869	0.6446
Hainan	0.4001	0.3845	0.1065	0.2157	0.6186
Chongqin	0.5695	0.5674	0.0338	0.5045	0.6800
Sichuan	0.5527	0.5532	0.0485	0.4613	0.6616
Guizhou	0.5248	0.5517	0.0802	0.3712	0.6537
Yunnan	0.4599	0.4319	0.0566	0.3683	0.5838
Tibet	0.5046	0.5332	0.1188	0.2280	0.6033
Shaanxi	0.5708	0.5637	0.0407	0.4802	0.6610
Gansu	0.5229	0.5250	0.0731	0.3622	0.6590
Qinghai	0.5326	0.5723	0.1100	0.2964	0.6774
Ningxia	0.5349	0.5416	0.0536	0.4008	0.6281
Xinjiang	0.3157	0.2693	0.1038	0.1810	0.5736

Furthermore, to test the robustness of this index, we have calculated the standard deviation of the four income components for each province in every year. Table 3 reports the average values of the income diversification index, the standard deviation of income and the average consumption of 31 provincial units from 1998 to 2015. The Gibbs and Martin's diversification index (I.D.) and the income standard deviation (ISTD) have an increasing trend. That is, the peasants' income has been more and more diversified in the sample period. The correlation coefficient between the Gibbs and Martin's index and the standard deviation is as high as 0.9, so Gibbs and Martin's index is a rigorous proxy for peasants' income diversification. The average consumption increases too from 1998 to 2015.

Table 3. Average income diversification and consumption.

Year	I.D.	ISTD	Consumption
1998	0.41	740.85	1659.27
1999	0.43	735.59	1628.16
2000	0.45	731.40	1750.06
2001	0.46	759.67	1828.85
2002	0.47	791.21	1929.50
2003	0.48	827.51	2058.93
2004	0.48	917.20	2313.30
2005	0.50	990.47	2702.62
2006	0.52	1059.23	2981.61
2007	0.53	1189.54	3376.31
2008	0.55	1318.56	3807.82
2009	0.56	1399.09	4170.34
2010	0.56	1592.04	4581.40
2011	0.57	1863.65	5504.11
2012	0.57	2094.78	6223.29
2013	0.57	2352.89	7065.78
2014	0.60	2460.20	8756.62
2015	0.62	2663.26	9610.34

I.D.: Gibbs and Martin's diversification index; ISTD: standard deviation of four income components; consumption: consumption in 100 million yuan RMB.

5.2. Income Diversification and Consumption: Panel Data Model

Before the regression analysis, the correlation coefficients of the major independent variables have been calculated to control the multi-collinearity problem (see Table 4). The correlation analysis indicates that there is no high correlation between the independent variables, so the regression will not be spoilt by the multi-collinearity problem.

Table 4. Correlation coefficients.

	RIR	RCU	I.D.	RCR
RIR	1.0000			
RCU	0.6476 *	1.0000		
I.D.	0.4134 *	0.4758 *	1.0000	
RCR	0.6767 *	0.9639 *	0.4331 *	1.0000

RIR: real income per capita of rural area; RCU: real consumption per capita of the urban area; I.D.: Gibbs and Martin's diversification index of peasants' income; RCR: real rural consumption. * indicates the correlation coefficient is significant at 1% level.

The QML estimator has been adopted to estimate the long-term relationship between the rural consumption and the dependent variables. The results are reported in Table 5.

Table 5. QML estimation of the full sample.

	Random Effect	Fixed Effect
Log(RCR($t - 1$))	0.761669 ***	0.761668 ***
Log (RIR)	0.041878 ***	0.041878 ***
Log(RCU)	0.260808 ***	0.260808 ***
I.D.	0.403716 ***	0.403717 ***
constant	−0.640283 ***	−0.640281 ***

*** indicates that z statistics is significant at 1% level; Log refers to the logarithm value. RCR($t - 1$) refers to the real consumption of the rural area of the previous year.

The random effect and the fixed effect models have quite similar results, so only the results of random effect will be discussed. The random effect model, i.e., Model 1, indicates that income diversification index (I.D.) is significant at 1% level and has a positive impact on the real consumption. The coefficient is 0.4037159, implying that one unit of increase of the income diversification will lead to 0.4037159 unit of real consumption increase in the rural China. The result indicates that a higher level of the Chinese peasants' income diversification would lead to more rural consumption. It is similar to the findings in the other developing countries [9].

The coefficient of the real income is positive and significant, which indicates that the income increase can encourage the peasants' consumption. The value is below 1, which is consistent with the hypothesis of diminishing propensity to consumption. When there is one unit increase of income, the increase in the consumption will be less than one unit.

The real consumption of the previous year and the urban resident's real consumption are all significant at 1%. Both of these two coefficients are positive. This indicates that there is a strong ratchet effect and a significant demonstration effect. The coefficient of the real consumption of the previous year is positive. The ratchet effect means that the peasant with high consumption in the previous year will consume more this year. When the consumption habit has been formed, it is not easy for the peasants to reduce their consumption. On the other hand, the coefficient of the urban resident's consumption is significant and positive, which means the peasant will follow the urban residents' consumption. In the past decades, because more and more peasants have the opportunities to work in the city as migrant workers, the mainstream city culture has changed the peasants' lifestyle [34]. There is a demonstration effect in the peasant's consumption from the urban residents.

The result of the fixed effect is very similar to that of the random effect, so the impact of the income diversification on the rural consumption is very robust.

5.3. Role of Income Diversification Insubsamples with Different Income

The peasants' consumption is affected by their income, so the impact of the income diversification on the peasants' consumption may also depend on the income level. In this part, I will divide

the thirty-one Chinese provincial units into three subsamples according to the government's regional categorization. This categorization has taken into account of both long-term average income, and other economic and non-economic factors. The provinces in the same categorization usually share a lot in economic, social, and cultural backgrounds. This categorization is of special importance when the governments are making policies. Additionally, this categorization is more stable than that based purely on the income (to test the robustness of this categorization, I have conducted the comparison between this categorization and that based purely on average income. They are generally quite similar). The high income subsample includes 10 eastern provinces with the highest average real income; the low income subsample includes 11 western provinces with the lowest average real income; while the middle income subsample includes the other 10 provinces with the real income in between (the high income subgroup includes Beijing, Tianjin, Liaoning, Hebei, Shandong, Jiangsu, Shanghai, Zhejiang, Fujian, Guangdong, and Hainan; the middle income group includes Heilongjiang, Jilin, Shanxi, Henan, Anhui, Jiangxi, Hubei, and Hunan; the low income group includes Sichuan, Chongqing, Guizhou, Yunnan, Guangxi, Tibet, Qinghai, Shaanxi, Inner Mongolia, Ningxia, Gansu, and Xinjiang. These three subsamples are also called the eastern, the middle, and the western regions in some literature).

Table 6 has compared the four income sources and Gibbs-Martin's index of the full sample and the three income groups. The average total income has shown that the categorization is consistent with the income level, which has been further supported in an alternative categorization according to the average income (the results have not been reported). Wage income is the largest income source only in the high-income group, while the low-income group has the lowest. The operation income is the highest in the low-income group and lowest in the high-income group. This is largely consistent with the income structure difference in the rural China: the farming income is the least important in the regions with high income, which is consistent with the findings of other studies [25]. Additionally, the Gibbs-Martin's index reveals that the high-income group has the highest degree of income diversification.

Table 6. Income structure and Gibbs-Martin's index of three income groups.

	Total Income	Wage	Property	Operation	Transfer	Gibbs and Martin
Full sample	5477.15	35.8126	2.9901	53.9590	7.0749	0.5186
High income	7684.43	49.5584	3.9228	39.3856	6.6743	0.5458
Middle income	5204.25	29.9601	2.3648	60.0759	6.4610	0.4998
Low income	3570.06	28.5047	2.7450	60.5999	8.1507	0.5120

The total income is measured in yuan. The wage, property, operation, and transfer are all measured in percentage.

To capture the demonstration effect and the ratchet effect for each region, I then construct panel data models for each subsample with the regression equation of Table 5. Since the random effect and the fixed effect have produced the similar results, only the random effect results have been reported. Table 7 has reported the results of these three models.

Table 7. Role of income diversification for different income groups.

	High-Income	Middle Income	Low Income
Log(RCR($t - 1$))	0.6952881 ***	0.6828033 ***	0.5441919 ***
Log (RIR)	0.2472743 ***	0.0199999 ***	0.3183046 ***
Log(RCU)	0.0985079 ***	0.3954719 ***	0.2044637 ***
I.D.	0.3906709 ***	0.1049193 ***	0.4608543 ***
constant	−0.481668 ***	−0.7172769 ***	−0.7070849 ***

*** indicates that z statistics is significant at 1% level; Log refers to the logarithm value. RCR($t - 1$) refers to the real consumption of the rural area of the previous year.

The results have provided evidence that the impact of income diversification on the rural consumption depends on the income level. In all the three subsamples, all the coefficients of the Gibbs and Martin's index are positive and significant, which indicates that in all the three regions, the income diversification can encourage the peasants to consume more. This result is in line with the result in Table 5. However, impacts of income diversification on the rural consumption still vary across the three subsamples. The income diversification can influence the rural consumption in the low-income subsample to a greater degree. While the middle-income subsample is the least influenced. This is similar to the situation in rural Ethiopia [38], where the impact of income diversification differs among regions.

Table 7 also indicates that the ratchet effect is stronger with the high-income subsample. Though the coefficients of the real consumption of the previous year are all positive and significant, that of the high-income subsample is the highest. In the high-income subsample, the peasants have enough income to set aside enough precautionary assets to manage income risks and maintain their consumption [39]. On the other hand, the coefficient of the real consumption of the previous year is the smallest in the low-income subsample. When the peasants have low income, though they would try to maintain their consumption mode, the lower income makes it harder for them to keep enough precautionary assets, so the ratchet effect is the weakest among the three subsamples.

The demonstration effect is significant for all the three subsamples but weakest in the high-income subsample. In the eastern region of China, with high level of urbanization, many peasants have already maintained their consumption at a high level in the same way as the urban citizens do. The peasants in the highest income group are even better off than the urban citizens with average income [24]. Hence, they do not need to follow the urban citizens' consumption style.

6. Discussion and Conclusions

In this paper, I have studied the impact of income diversification on consumption in rural China. The sample includes the panel data of 31 provincial units in China from 1998 to 2015. I have calculated the Gibbs-Martin's diversification index to measure income diversification. Panel data models have been estimated to capture the cross-sectional difference in the peasants' consumption in different regions. The empirical research includes two steps. In the first step, I have tested the impact of income diversification with the full sample. In the second step, I construct three sub-samples according to the regional categorization by the Chinese government, and estimate the impact of income diversification in these regions with three panel data models.

This paper has reached several conclusions. Firstly, the Gibbs and Martin's index indicates that there is significant regional difference in the rural income diversification, and there exists an increasing trend of income diversification from 1998 to 2015.

Secondly, the empirical research indicates that income diversification influences the peasants' consumption significantly. The relevant literature has provided the evidence that the income diversification can significantly reduce the rural households' overdependence on a single income source, and hence greatly increase their welfare by lowering the income risks [40]. This is in line with this paper and many other researches in other developing countries [1,7,9]. Actually, the Chinese peasants became more and more aware of the importance of stabilizing their income with the strategy of income diversification [41]. In the past decades, with the rapid changes of the Chinese social and economic environments, there have been more and more push and pull factors of the income diversification in the Chinese rural area [42]. These factors have enhanced the degree of the income diversification, and on the other hand, made the peasants more conscious of the importance of the income diversification.

Thirdly, the subsample analyses have reached some new conclusions—the impacts of income diversification on the rural consumption depend on the level of the income. While the sub-sample study finds that the income diversification is more significant in the low- and the high-income regions. Obviously, the peasants in the low income subsample would be more easily affected by the income

risks, so income diversification can encourage their consumption by reducing the income volatility. Additionally, the government transfer is the highest for the low-income group (see Table 6). With this transfer as the basic means to manage income risks, the peasants can increase their consumption when their income grows as the result of income diversification. For the high income subsample, high income can provide them with enough precautionary assets [43], so income diversification can also encourage their consumption. However, for the middle income subsample, the peasants have the lowest transfer (see Table 6), and their income cannot provide enough precautionary asset against income risk, so they have to depend on income diversification to accumulate enough precautionary assets in case of future income risk [39]. Hence, the income diversification has the least positive impact on the consumption for them.

Fourthly, this paper has investigated the impact of peasants' real income on their real consumption. The estimated slope, i.e., the marginal propensity to consume, is smaller than those in other studies [44]. The major reason for this difference is that this paper has considered several factors other than the real income, especially the income diversification, while the other studies have mainly focused on the real income. Additionally, in the Chinese rural regions, because of the lack of adequate social security coverage [45], most of the peasants are quite precautionary in arranging their consumption. Thus, it is not surprising that their marginal propensity to consume is lower.

Finally, this paper has also discussed some other determinants of the consumption of the Chinese peasants. In the first place, the significant ratchet effect has been found in that the consumption is positively related to that of the previous year. The consumption habit has a very strong impact in the consumption decision process [46]. In the second place, the peasants' consumption has shown a significant demonstration effect, i.e., the peasants may follow the consumption of the urban citizens [35]. This is because, in China, the urban citizen consumption usually leads the consumption style.

Compared with the existent literature, this paper is among the first efforts to test the impact of income diversification on the rural income in China, and to investigate the mechanism of such impact against the unique social background. This paper is of both theoretical significance and important policy implications. Firstly, this paper is among the first studies to investigate the impact of income diversification on consumption in rural China. Few studies have employed the data of income sources of all the Chinese provinces to investigate the role of income diversification in the Chinese rural consumption. Secondly, our findings are important for the Chinese policy-making concerning the rural development. China is trying to encourage the rural consumption in order to develop her rural areas. However, there is no effective policy to create a favorable environment for the peasants to diversify their income. Based on the findings of this paper, the government should quicken the economic reform to provide more income sources for the peasants. Furthermore, the government should improve the social security system in rural China.

For the reason of data accessibility, I have not included other useful variables, such as the family size, the dependence ratio, the education, etc. This can be further studied to find some variables to measure the role of some social factors in Chinese peasants' consumption decision-making process.

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References

1. Sultana, N.; Hossain, M.E.; Islam, M.K. Income diversification and household well-being: A case study in rural areas of Bangladesh. *Int. J. Bus. Econ. Res.* **2015**, *4*, 172–179. [[CrossRef](#)]
2. Barrett, C.B.; Reardon, T.; Webb, P. Nonfarm income diversification and household livelihood strategies in rural Africa: Concepts, dynamics, and policy implications. *Food Policy* **2001**, *26*, 315–331. [[CrossRef](#)]

3. Shorrocks, A.F. The impact of income components on the distribution of family incomes. *Q. J. Econ.* **1983**, *97*, 311–326. [[CrossRef](#)]
4. Malek, M.A.; Usami, K. Determinants of non-farm income diversification in developed villages of Bangladesh. *Am. J. Econ. Bus. Adm.* **2009**, *1*, 141–149. [[CrossRef](#)]
5. Abdulai, A.; CroleRees, A. Determinants of income diversification amongst rural Households in Southern Mali. *Food Policy* **2001**, *26*, 437–452. [[CrossRef](#)]
6. Alderman, H.; Paxson, C.H. *Do the Poor Insure? A Synthesis of the Literature on Risk and Consumption in Developing Countries*; World Bank Policy Research Papers WPS 1008; Palgrave Macmillan: London, UK, 1992.
7. Ersado, L. *Income Diversification in Zimbabwe: Welfare Implications from Urban and Rural Areas*; World Bank Policy Research Working Paper No. 3964; International Food Policy Research Institute: Washington, DC, USA, 2006.
8. Sakho-Jimbira, M.S.; Bignebat, C. Local diversification of income sources versus migration: Complements or substitutes? Evidence from rural families of the Senegalese Groundnut Basin. In Proceedings of the 106th Seminar European Association of Agricultural Economists, Montpellier, France, 25–27 October 2007.
9. Porter, C. Shocks, consumption and income diversification in rural Ethiopia. *J. Dev. Stud.* **2012**, *48*, 1209–1222. [[CrossRef](#)]
10. Dohmen, T.; Falk, A.; Huffman, D.B.; Sunde, U.; Schupp, J.; Wagner, G.G. Individual Risk Attitudes: Measurement, Determinants and Behavioral Consequences. *J. Eur. Econ. Assoc.* **2011**, *9*, 522–550. [[CrossRef](#)]
11. McKenzie, D.J.; Woodruff, C. Do entry costs provide an empirical basis for poverty traps? Evidence from Mexican microenterprises. *Econ. Dev. Cult. Chang.* **2006**, *55*, 3–42. [[CrossRef](#)]
12. Demurger, S.; Fournier, M.; Yang, W. *Rural Households Decisions towards Income Diversification: Evidence from a Township in Northern China*; CNRS Working Papers W.P.09-23; University of Lyon: Gate, France, 2009.
13. Li, T.; Li, D.M. Peasants' income and consumption structure contrasting: A case study on China's Sichuan Province. *Int. J. Econ. Financ.* **2011**, *3*, 242–247. [[CrossRef](#)]
14. Huang, P. *The Household and Rural Development in the Yangtzi Delta, 1350–1988*; Stanford University Press: Stanford, CA, USA, 1990.
15. Ash, R. Squeezing the peasants: Grain extraction, food consumption and rural living standards in Mao's China. *China Q.* **2006**, *188*, 959–998. [[CrossRef](#)]
16. De Brauw, A.; Huang, J.; Rozelle, S.; Zhang, L.; Zhang, Y. The evolution of China's rural labor markets during the reforms. *J. Comp. Econ.* **2002**, *30*, 329–353. [[CrossRef](#)]
17. Goodwin, B.K.; Mishra, A.K. Farming efficiency and the determinants of multiple job holding by farm operators. *Am. J. Agric. Econ.* **2004**, *86*, 722–729. [[CrossRef](#)]
18. Pieniadz, A.; Renner, S.; Rathmann, C.; Glauben, T.; Loy, J.P. Income diversification of farm households: Relevance and determinants in Germany. In Proceedings of the 111th EAAEIAAE Seminar 'Small Farms: Decline or Persistence?' University of Kent, Canterbury, UK, 26–27 June 2009.
19. Mishra, A.K.; Erickson, K.W.; Harris, J.M.; Hallahan, C.B.; Uematsu, H. Determinants of farm household income diversification in the United States: Evidence from farm-level data. In Proceedings of the 14th EAAE Seminar 'Structural Changes in Agriculture', Berlin, Germany, 15–16 April 2010.
20. Quan, Y.X.; Liu, Z.R. An Analysis of Current Problems in China's Agriculture Development: Agriculture, Rural Areas and Farmers. In Proceedings of the Canadian Agricultural Economics Society Annual Conference, Calgary, AB, Canada, 30 May–1 June 2002.
21. Yang, Y.N.; Williamson, J.B.; Shen, C. Social security for China's rural aged: A proposal based on a universal non-contributory pension. *Int. J. Soc. Welf.* **2010**, *19*, 236–245. [[CrossRef](#)]
22. Sicular, T.; Ximing, Y.; Gustafsson, B.; Shi, L. The Urban–rural income gap and inequality in China. *Rev. Income Wealth Ser.* **2007**, *53*, 93–126. [[CrossRef](#)]
23. Lohmar, B.; Rozelle, S.; Zhao, C. The rise of rural-to-rural labor markets in China. *Asian Geogr.* **2001**, *20*, 101–123. [[CrossRef](#)]
24. National Bureau of Statistics. *China Statistical Yearbook 2016*; China Statistics Press: Beijing, China, 2016.
25. Zhao, J.M.; Barry, P.J. Income diversification of rural households in China. *Can. J. Agric. Econ.* **2014**, *62*, 307–324. [[CrossRef](#)]
26. Carroll, C.D.; Slacalek, J.; Tokunaka, K. *The Distribution of Wealth and the Marginal Propensity to Consume*; ECB Working Paper Series No 1655; European Central Bank: Frankfurt, Germany, 2014.

27. Block, S.; Webb, P. The dynamics of livelihood diversification in post-famine Ethiopia. *Food Policy* **2001**, *26*, 333–350. [[CrossRef](#)]
28. Lanjouw, P.; Quizon, J.; Sparrow, R. Nonagricultural earnings in peri-urban areas of Tanzania: Evidence from household survey data. *Food Policy* **2001**, *26*, 385–403. [[CrossRef](#)]
29. Gibbs, J.P.; Martin, W.T. Urbanization, technology and the division of labor. *Am. Sociol. Rev.* **1962**, *27*, 667–677. [[CrossRef](#)]
30. Engle, R.F.; Granger, C.W.J. Co-integration and error correction: Representation, estimation, and testing. *Econometrica* **1987**, *55*, 251–276. [[CrossRef](#)]
31. Sargan, J.D.; Alok, B. Testing Residuals from Least Squares Regression for Being Generated by the Gaussian Random Walk. *Econometrica* **1983**, *51*, 153–174. [[CrossRef](#)]
32. Kripfganz, S. Quasi-maximum likelihood estimation of linear dynamic short-T panel-data models. *Stata J.* **2016**, *16*, 1013–1038.
33. Brown, T.M. Habit persistence and lags in consumer behavior. *Econometrica* **1952**, *20*, 355–371. [[CrossRef](#)]
34. Wang, L.J. Changes in the lifestyle of Chinese peasants over the past 60 years. *Int. J. Sociol. Anthropol.* **2014**, *6*, 146–153.
35. Zou, X.F. Influence of urbanization on growth of rural residents' consumption in western ethnic minority areas of China. *Asian Agric. Res.* **2015**, *7*, 67–70.
36. Wooldridge, J.M. *Econometric Analysis of Cross Section and Panel Data*; The MIT Press: Cambridge, MA, USA; London, UK, 2001.
37. Ibrahim, H.I.; Onuk, G.E. Analysis of rural non-farm diversification among farming households in Doma area of Nasarawa State, Nigeria. *PAT* **2009**, *5*, 49–54.
38. Aababbo, Y.E.; Sawore, A.M. Assessing determinant factors of income diversification among rural farm households in Ethiopia: The case of Leemo and Anileemo Districts, Hadiya Zone, South Nation Nationalities People Region. *Int. J. Sci. Res.* **2016**, *5*, 100–110.
39. Jalan, J.; Ravallion, M. Behavioral responses to risk in rural China. *J. Dev. Econ.* **2001**, *66*, 23–49. [[CrossRef](#)]
40. Duan, W.; He, C.; Wen, Y.L. Role of income diversification in reducing forest reliance: Evidence from 1838 rural households in China. *J. For. Econ.* **2016**, *22*, 68–79.
41. Wan, J.H.; Li, R.X.; Wang, W.X.; Liu, Z.M.; Chen, B.Z. Income diversification: A strategy for rural region risk management. *Sustainability* **2016**, *8*, 1064. [[CrossRef](#)]
42. Reardon, T.; Berdegue, J.; Barrett, C.B.; Stamoulis, K. Household income diversification into rural nonfarm activities. In *Transforming the Rural Nonfarm Economy*; Johns Hopkins University Press: Baltimore, MD, USA, 2006.
43. Jalan, J.; Ravallion, M. Are the poor less well insured? Evidence on vulnerability to income risk in rural China. *J. Dev. Econ.* **1999**, *58*, 61–81. [[CrossRef](#)]
44. Liu, D. Comparative analysis of urban-rural residents' propensity to consume in China's four regions. *Asian Agric. Res.* **2011**, *3*, 74–80.
45. Lardy, N.R. *China: Toward a Consumption-Driven Growth Path*, Institute for International Economics; Policy Briefs in International Economics Number PB06-6; Peterson Institute for International Economics: Washington, DC, USA, 2006.
46. Li, Z.L.; Li, H. Analysis of the impact of population aging on the household consumption. *Int. J. Bus. Soc. Sci.* **2014**, *5*, 102–107.

