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The Impact of China's Urban Per Capita Disposable Income on Education, Culture and Entertainment Services

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Abstract: This study is from the perspective of China's cultural consumption, to study the impact of China's urban per capita disposable income on education, culture and entertainment service expenditure, with local financial budget revenue, consumer price index, regional GDP as control variables, so as to more accurate China's urban per capita disposable income on education, culture and entertainment service expenditure, Then explore how to expand China's cultural consumption in order to enhance the country's soft power. In this paper, the multiple regression model of economic variables and expenditure on education, culture and entertainment services is established, and the data of each year are found to form time series data, called panel data, and the necessary tests are carried out to obtain a more suitable and reliable model and the final regression results, which can provide direction for the government's economic policy.

Keywords: Disposable income per capita, Expenditure on education, Culture and recreation services, Time series.

1. Introduction

Since the reform and opening up, with the rapid growth of China's economy, the living standards of urban and rural residents have been continuously improved. According to the report of the National Bureau of Statistics, the living standards of urban and rural residents in China have been from basically eliminating poverty, to solving the problem of food and clothing, to realizing the overall well-off society, and are moving forward to the goal of building a well-off society in an all-round way. The income of Chinese urban and rural residents has increased significantly. The per capita net income of rural residents increased from 133.6 yuan in 1978 to 9892 yuan in 2014, with an average annual growth rate of 7. 1%. The per capita disposable income of urban residents increased from 343.4 yuan to 28,844 yuan, with an average annual growth rate of 7.2 percent in real terms. The consumption level of urban and rural residents has increased significantly, and the consumption structure of urban and rural residents has improved significantly. The Engel coefficient (the proportion of food expenditure in total consumption) has decreased significantly, and the proportion of development and enjoyment consumption has been increasing. The Engel's coefficient for rural households dropped from 67.7% in 1978 to 43.3% in 2014, and for urban households from 57.5% to 38.6%. People's living standards have improved significantly. As the problem of food and clothing has been solved, the proportion of development and enjoyment consumption in urban and rural residents' living consumption has increased. The per capita expenditure on cultural, educational and recreational goods and services of rural households rose from 5.1% in 1980 to 9.5% in 2014. The per capita expenditure on educational, cultural and recreational services of urban households also rose from 8.4% to 13.3% in consumption. The consumption market of education, culture and entertainment of urban residents has shown a trend of rapid development, which has become a new bright spot in stimulating household consumption and expanding domestic demand.

The per capita disposable income of urban residents refers to the part of income that reflects the total cash income of a household that can be used to arrange the daily life of the household. Expenditure on education, culture and entertainment services consists of three major parts: cultural and entertainment articles, cultural and entertainment services and education expenditure. Expanding cultural consumption is an important measure to expand domestic demand, raise people's consumption level, promote the development of the cultural industry and enhance the country's soft power. Among them, increasing the expenditure on cultural, educational and entertainment services is of great significance in expanding cultural consumption.

2. Theoretical Analysis

The explained variable is the per capita consumption expenditure of culture, education and entertainment services, which can directly reflect the changes in the industry of education, culture and entertainment services.

The explanatory variable is selected as China's urban per capita disposable income, which is increasing year by year.

One of the control variables is the local financial budget income. The higher the local financial budget income is, the higher the government's investment in cultural, educational and entertainment service consumer goods will be. The more and more perfect the types of consumer goods are, the higher the per capita expenditure on cultural, educational and entertainment service consumption will be. The second control variable is the consumer price index, which reflects the change in the price level of consumer goods. The higher the price of consumer goods of cultural, educational and entertainment services is, the lower the per capita consumption of cultural, educational and entertainment services will be. The third control variable is the regional GDP, which can directly reflect the local economic development. The higher the regional GDP is, the more perfect the regional consumption level of cultural, educational and entertainment

services will be.

Where variable subscripts i and t represent the data of the ith individual in the TTH year respectively, is the intercept term to be estimated, is the marginal value, is the coefficient corresponding to the explanatory variable to be estimated, and is the random error term. Where, ln represents the data after logarithmic transformation. In order to make the linear trend of the data more significant and reduce the heteroscedasticity and collinearity of the model, the natural logarithm of the data is processed, where expand represents the per capita consumption expenditure of cultural, educational and entertainment services, income represents the per capita disposable income of urban China, fiscal represents the local fiscal budget revenue, and cpi stands for consumer price index, gdp stands for gross regional product, as shown in Table 1.

Table 1. Variable selection and expected symbols

Properties of indicators	Variable symbol	Variable name	Expected symbol
Explained variable	lnexpand	Log of per capita consumption expenditure on cultural, educational and entertainment services	
Explanatory variables	lnincome	Logarithm of per capita disposable income in urban China	+
Control variables	lnfiscal	Log of local fiscal budget revenue	+
	lncpi	Log of the consumer Price index	-
	lngdp	Log of gross regional product	+

3. Data Description

(1) Data collection and sorting

Cross-section data intelligently analyzes the changes of a certain year, while time series data is easy to cause collinearity of variables and cannot accurately analyze the characteristics of data. Therefore, Therefore, this group downloaded the average consumption expenditure of cultural, educational and entertainment services, China's urban per capita disposable income, local fiscal budget income and consumer price index of 10 cities including Beijing, Tianjin and Guangdong in four years from 2009 to 2012 in 16 quarters from Zhonghong Statistical database of China Macro Economic Network. gdp represents the time series data of the five indicators of regional gross domestic product (GDP), which is integrated into panel data.

(2) Descriptive statistics of the data

Scatter plot was presented to preliminarily understand the relationship between explanatory variables and explained variables Figure 1:

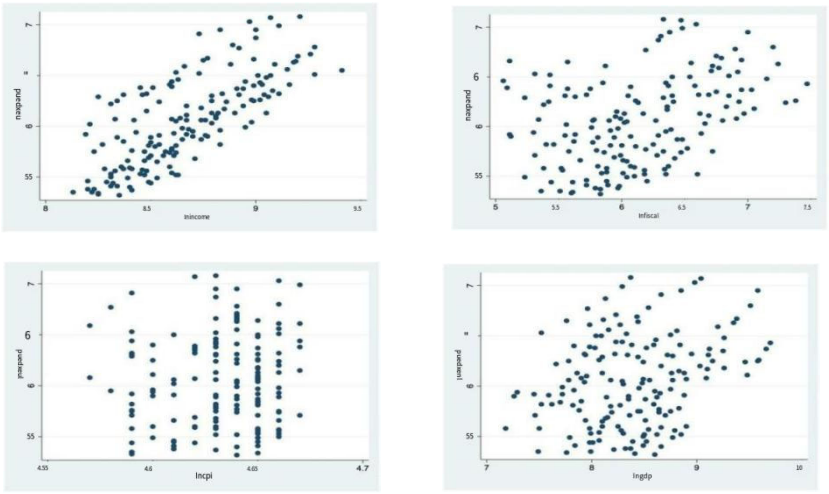

Figure 1. Scatter plot

It can be seen that all explanatory variables and control variables have a positive linear trend with the explained variables, except that the scatter plots of lncpi and lnexpand are scattered, and the linear trend is not obvious.

After the original data were log-transformed, descriptive statistics were performed on the original data and the log-transformed data, including the number of observations, mean, standard deviation, minimum value, maximum value, skewness and kurtosis, as shown in Table 2.

It can be seen that due to the large size of the original sample data, the standard deviation of the data is reduced after the logarithmic processing of the original data, which reduces the heteroscedasticity generated by the model. However, considering that the data used in this group is panel data, the time and individual differences of panel data are large, so the preliminary judgment of this group needs to use the standard deviation of the robust form of heteroscedasticity for estimation.

Table 2. Descriptive statistics

stats	N	mean	sd	min	max	skewness	kurtosis
expand	160	469.632	221.078	203.590	1191.880	1.159	4.074
income	160	6053.841	1819.134	3379.410	12151.700	0.829	3.086
fiscal	160	529.126	306.113	157.500	1748.390	1.404	5.070
cpi	160	102.716	2.474	96.570	106.670	0.59	2.408
gdp	160	5129.955	3042.257	1309.210	16382.200	1.625	5.632
lnexpand	160	6.052	0.441	5.320	7.080	0.268	2.261
lnincome	160	8.666	0.287	8.130	9.410	0.312	2.243
lnfiscal	160	6.125	0.538	5.060	7.470	0.198	2.424
lncpi	160	4.632	0.024	4.570	4.670	0.607	2.450
lngdp	160	8.397	0.531	7.180	9.700	0.261	2.796

4. Model Setting and Empirical Analysis

(1) Selection of functional forms

In the above selection of data forms, this paper chooses to process the natural logarithm of the data, and then verify the interaction terms and polynomials of the data to see whether there are interaction terms and polynomials in the data, as shown in Table 3:

Table 3. Various forms of regression analysis

VARIABLES	log lnexpand	square lnexpand	interact lnexpand
lnincome	1.382 * * *	0.126	1.204
	(0.092)	(4.552)	(1.332)
lnincome2		0.087	
		(0.261)	
lnfiscal	0.312 * * *	0.315 * * *	0.332 * * *
	(0.062)	(0.063)	(0.065)
lncpi	1.328	1.282	0.978
	(1.041)	(1.070)	(1.105)
lngdp	0.243 * * *	0.246 * * *	2.468 *
	(0.056)	(0.058)	(1.401)
c.lnincome#c.lngdp			0.312 *
			(0.162)
Constant	0.100	6.435	21.066 *
	(4.747)	(19.328)	(11.190)
Observations	160	160	160
R-squared	0.598	0.598	0.607
r2_a	0.588	0.585	0.594
F	69.63	54.75	54.47

Note: *** p<0.01, ** p<0.05, * p<0.1

Since the quadratic term is prone to collinearity, the coefficient of the quadratic term is completely different from that of the linear term, and the interaction term is not the research purpose of this paper. Therefore, the immediate interaction term is significant, so this paper does not include the interaction term analysis, and this paper still chooses the logarithmic model.

(2) The mixed cross section analysis method is used to analyze the data

Next, this paper uses the method of mixed OLS estimation to estimate the data, which is not used as panel data, but as mixed data. The standard deviation in the form of heteroscedasticity file is also used to estimate the mixed OLS, as shown in Table 4:

Table 4. Mixed cross section regression

lnexpand	Coef.	Robust Sts.Err	t	P>|t|	[95% Conf.	Interval
lnincome	1.3833	0.0919	15.05	0.000	1.2017	1.5649
lnfiscal	0.3132	0.0622	5.04	0.000	0.4360	0.1904
lncpi	1.3231	1.0352	1.28	0.203	3.3681	0.7219
lngdp	0.2436	0.0568	4.29	0.000	0.1314	0.3557
_cons	0.0650	4.7017	0.01	0.989	9.2226	9.3527
R-squared	0.5980					
F (4155).	69.17					
Prob>F	0.0000					

Note: *** p<0.01, ** p<0.05, * p<0.1

Through the estimation of regression results, the R-squared is 0.5980, the goodness of fit of the model is 59.80%, the F value is 69.17, and the corresponding p value is 0.0000, which is less than 0.01. Therefore, the effects of explanatory variables and control variables on the explained variables are jointly significant. The influence coefficient of lnincome is 1.3833, which has a significant positive effect. Every 1% increase in income will cause the explained variable per capita consumption expenditure of cultural, educational and entertainment services to increase by 1.3833% on average.

3) Panel regression analysis

In this paper, the individual fixed effect model, time fixed effect model and individual time point fixed effect model are analyzed respectively, and the following results are obtained, as shown in Table 5:

Table 5. Fixed effects model

	Individual fixed effects	Time fixed effects	Two-way fixed effects
VARIABLES	getiguding	lnexpand	lnexpand
lnincome	0.906 * * *	1.146 * * *	0.507 * * *
	(0.135)	(0.058)	(0.147)
lnfiscal	0.561 * * *	0.178 * * *	0.023
	(0.063)	(0.052)	(0.070)
lncpi	0.855	1.247	0.260
	(1.033)	(1.572)	(1.331)
lngdp	0.392 * * *	0.085 *	0.043
	(0.074)	(0.044)	(0.104)
20092.season		0.003	0.099 *
		(0.060)	(0.053)
20093.season		0.599 * * *	0.506 * * *
		(0.071)	(0068).
20094.season		0.088	0.092
		(0.061)	(0.090)
20101.season		0.169 * *	0.028
		(0.073)	(0.067)
20102.season		0.112	0.022
		(0.108)	(0.102)
20103.season		0.515 * * *	0.581 * * *
		(0.091)	(0.095)
20104.season		0.175 *	0.029
		(0.105)	(0.116)
20111.season		0.240 * *	0.054
		(0.116)	(0.105)
20112.season		0.177	0.045
		(0.112)	(0.128)
20113.season		0.395 * * *	0.620 * * *
		(0.127)	(0.138)
20114.season		0.199 *	0.044
		(0.106)	(0.130)
20121.season		0.291 * * *	0.090
		(0.094)	(0.101)
20122.season		0.198 * *	0.074
		(0.082)	(0.117)
20123.season		0.473 * * *	0.635 * * *
		(0.083)	(0.103)
20124.season		0.256 * * *	0.086
		(0.085)	(0.127)
2.code	0.524 * * *		0.353 * * *
	(0.088)		(0.069)
3.code	0.925 * * *		0.703 * * *
	(0.117)		(0.100)
4.code	0.595 * * *		0.571 * * *
	(0.109)		(0.096)
5.code	0.454 * * *		0.313 * * *
	(0.098)		(0.073)
6.code	0.471 * * *		0.427 * * *
	(0.100)		(0.093)
7.code	0.333 * * *		0.125
	(0.098)		(0.077)
8.code	0.776 * * *		0.509 * * *
	(0.122)		(0.089)
9.code	0.173		0.075
	(0.114)		(0.144)
10.code	0.633 * * *		0.527 * * *
	(0.112)		(0.093)
Constant	5.125	10.036	3.281
	(4.509)	(7.310)	(6.266)
Observations	160	160	160
R-squared	0.733	0.914	0.959
r2_a	0.710	0.902	0.950
F	46.66	102.3	114.3
Number of sode			

Note: *** p<0.01, ** p<0.05, * p<0.1

It can be seen that most of the dummy variables of the individual fixed effect are significant, and the dummy variable of the time fixed effect is also significant, but it is not so significant compared with the individual fixed effect.

In order to test whether there is individual fixed effect, the individual fixed effect model is tested by F test:

F test that all u_i=0: F(13, 146) = 47.18Prob > F = 0.0000

Through the self-provided F test, the statistic of F test is 47.18, and the corresponding p value is 0.0000, indicating that the individual fixed effect exists.

In order to test the existence of time fixed effect, wald test is used to test the time fixed effect model:

(1) 20092.season = 0; (2) 20093.season = 0; (3) 20094.season = 0; (4) 20101.season = 0; (5) 20102.season = 0; (6) 20103.season = 0; (7) 20104.season = 0; (8) 20111.season = 0; (9) 20112.season = 0; (10) 20113.season = 0; (11) 20114.season = 0; (12) 20121.season = 0; (13) 20122.season = 0; (14) 20123.season = 0; (15) 20124.season = 0

$$F(15, 140) = 32.72$$

$$Prob > F = 0.0000$$

It can be seen that the F-value is 32.72 and the corresponding p-value is 0.0000, indicating that time fixed effects exist.

The fixed effect model is directly regression through the panel data estimation command in stata, as shown in Table 6:

Table 6. Fixed effects model

VARIABLES	Fixed effects model lnexpand
lnincome	0.906 * * *
	(0.084)
lnfiscal	0.561 * * *
	(0.080)
lncpi	0.855 *
	(0.382)
lngdp	0.392 * * *
	(0.093)
Cnstant	5.163 * * *
	(1.468)
Obeservation	160
R-aquared	0.358
r2_a	0.314
F	135.3
Number of code	10

Note: *** p<0.01, ** p<0.05, * p<0.1

5. Model Selection and Evaluation

(1) Summary of research results, as shown in Table 7

(2) Model selection and research results

After the previous test, both the individual fixed effect and the time fixed effect exist, and according to the table data, the significance of the dummy variable under the individual fixed effect model is higher. This group also noticed that the dummy variable in the two-way fixed effect model was not significant, which was probably because time diluted the significance of the individual. Therefore, the individual fixed effects model is the most suitable for this study.

The goodness of fit of the model was 71%, indicating a high goodness of fit. Among them, in addition to the negative change of local budget revenue and per capita consumption expenditure of cultural, educational and entertainment services, the per capita disposable income, consumer price index and GDP of China's urban areas all show positive change with per capita consumption expenditure of cultural, educational and entertainment services. For every 1 unit increase in urban per capita disposable income, the per capita consumption expenditure of cultural, educational and entertainment services in China will increase by 0.906 units. The influence coefficients of the control variables of local budget revenue, consumer price index and GDP are -0.561, 0.855 and 0.392 respectively.

6. Conclusion

In this paper, the time series data are integrated into panel data, descriptive statistics are carried out after the logarithmic processing of the data, the data are analyzed by the mixed cross section analysis method, and three models of individual fixed effect, time fixed effect and two-way fixed effect model are estimated. Various tests are carried out to select the appropriate model, and the final results are relatively reliable. It has certain academic value, and more comprehensive research can be carried out in the future, such as adding control variables, selecting more provinces and time points, etc.

Table 7. Comprehensive model selection

	Mixed Cross section OLS	Fixed effects model	Individual fixed effects model	Time fixed effects model	Two-way fixed effects model
VARIABLES	lnexpand	lnexpand	lnexpand	lnexpand	lnexpand
lnincome	1.382 * * *	0.906 * * *	0.906 * * *	1.146 * * *	0.507 * * *
	(0.092)	(0.084)	(0.135)	(0.058)	(0.147)
lnfiscal	0.312	0.561 * * *	0.561 * * *	0.178 * * *	0.023
	(0.062)	(0.080)	(0.063)	(0.052)	(0.070)
lncpi	1.328	0.855 *	0.855	1.247	0.260
	(1.041)	(0.382)	(1.033)	(1.572)	(1.331)
lngdp	0.243 * * *	0.392 * * *	0.392 * * *	0.085 *	0.043
	(0.056)	(0.093)	(0.074)	(0.044)	(0.104)
20092.season				0.003	0.099 *
				(0.060)	(0.053)
20093.season				0.599 * * *	0.506 * * *
				(0.071)	(0.068)
20094.season				0.088	0.092
				(0.061)	(0.090)
20101.season				0.160 * * *	0.028
				(0.073)	(0.067)
20102.season				0.112	0.022
				(0.108)	(0.102)
20103.season				0.515 * * *	0.581 * * *
				(0.091)	(0.095)
20104.season				0.175 *	0.029
				(0.105)	(0.116)
20111.season				0.240 * *	0.054
				(0.116)	(0.105)
20112.season				0.177	0.045
				(0.112)	(0.128)
20113.season				0.395 * * *	0.620 * * *
				(0.127)	(0.138)
20114.season				0.199 *	0.044
				(0.106)	(0.130)
20121.season				0.291 * * *	0.090
				(0.094)	(0.101)
20122.season				0.198 * * *	0.074
				(0.082)	(0.117)
20123.season				0.473 * * *	0.635 * * *
				(0.083)	(0.103)
20124.season				0.256 * * *	0.086
				(0.085)	(0.127)
2.code			0.524 * * *		0.353 * * *
			(0.088)		(0.069)
3.code			0.925 * * *		0.703 * * *
			(0.117)		(0.100)
4.code			0.595 * * *		0.571 * * *
			(0.109)		(0.096)
5.code			0.454 * * *		0.313 * * *
			(0.098)		(0.073)
6.code			0.471 * * *		0.427 * * *
			(0.100)		(0.093)
7.code			0.333 * * *		0.125
			(0.098)		(0.077)
8.code			0.776 * * *		0.509 * * *
			(0.122)		(0.089)
9.code			0.173		0.075
			(0.114)		(0.144)
10.code			0.633 * * *		0.527 * * *
			(0.112)		(0.093)
Constant	0.100	5.613 * * *	5.125	10.036	3.281
	(4.747)	(1.468)	(4.509)	(7.310)	(6.266)
Observations	160	160	160	160	160
R-squared	0.598	0.358	0.733	0.914	0.959
r2_a	0.588	0.341	0.710	0.909	0.950
F	69.63	135.3	46.66	102.3	114.3

Note: *** p<0.01, ** p<0.05, * p<0.1

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