Consumption Behaviour Under Institutional Transitions in China

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Abstract
The study on Chinese consumption behaviour under institutional transitions is significant from a theoretical as well as a policy perspective. Ignoring heterogeneity in consumption behaviour across regions may lead to a bias in estimation results when modelling a consumption function. This paper attempts to provide an alternative empirical study on Chinese consumption behaviour where panel data estimation approaches are employed to capture heterogeneities across regions. Our findings suggest that there are significant changes in both urban and rural households’ consumption behaviour during 1990s and rural households’ consumption is more volatile and sensitive to the changes in economic variables than their counterparts in China.

Introduction
China has never attracted so much attention until impressive economic performance records achieved through taking economic reforms and open door policy. From 1978 to 2001, China maintained an annual average GDP growth rate of 9.5 percent, higher than those of any other country in the world during the same period. Between 1992 and 1996, the annual average growth rate of GDP even reached 11.5 percent. As a result of rapid economic growth, the income and consumption level of Chinese people also increased significantly. From 1978 to 1996, the real income of urban residents grew at an annual average rate of 6.3 percent and that of rural residents at an annual average rate of 8.3 percent, it still maintained an annual average rate of 6.7 percent and 3.8 percent for urban and rural residents respectively during 1997 and 2001. The per capita consumption of urban residents grew at an annual average rate of 6.2 percent, and that of rural residents at an annual average rate of 7.2 percent from 1978 to 1996. However, after the achievement of the economy’s soft-landing in 1996, the aggregate demand shrank substantially with a successive decline in consumer price level for more than thirty months resulting in the downslide of GDP (see the graph 1). The sluggish domestic demand results from the decrease in growth rate both of investment and the

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consumption. The annual growth rate of investment decreased dramatically from 8.3 percent in 1996 to 0.7 percent in 2001. The annual growth rate of consumption also declined to 5.4 percent in 2001 from 9.1 percent in 1996. Meanwhile, external demand for China’s products reduced dramatically from the other Asian countries due to the widespread recession resulted from Asian financial crisis in 1997. In 1998, China’s exports grew by only 0.5 percent, compared with a 21 percent increase in 1997. To respond to these pressures, the Chinese government took a series of unprecedented fiscal and monetary policies to expand aggregate demand to realize sustainable and stable development in economy, including re-introducing certain tax incentives for exports and foreign investment, increasing investment in infrastructure projects, raising wages of employees financed by government budget at all levels and lowering interest rate (there are seven consecutive interest rate cuts from May 1996 to June 1999), etc. But the economy didn’t recover as quickly as expected. It still remained a weak upward tendency. So, both from a theoretical as well as a policy perspective, the study on consumption behaviour during institution transiting period is significant since the consumer demand is an ultimate determinant of the sustaining growth of the whole economy.

Graph 1. The annual growth rate of GDP, consumption, investment, exports and CPI (China, 1985-2001)

After the introduction of open-door policy in China and entry into the WTO, China has also been deeply involved in the integration with the global economy. Over past two decades, China’s exports increased at an annual rate of 17 percent from US$13.7 billion in 1979 to US$250 billion in 2000. China has now become the world’s seventh largest exporting economy. Mainly because of the huge market and relatively stable political environment, China has become one of the more attractive countries for foreign investors. From 1988 to 2000, China’s actual or utilized foreign direct investments (FDI) increased at an annual rate of 23 percent to reach a cumulative total of US$339 billion, the second largest in the world next to U.S. Therefore, the study on consumption behaviour in China is also important for foreign investors and the global economy.
Economic reforms and household consumption

Since 1978, a series of reforms have been carrying out in China. After almost 30 years of experience in a centrally planned economic system, its shortcomings were generally recognised. A more efficient economic system was called for urgently in China. Economic reform of turning away from the planned economy and moving toward a more market-oriented economy therefore initiated in 1978. In order to transform the economic system to a more efficient, market-oriented one while minimizing the social, political and economic costs, China’s economic reform proceeded in a step-by-step, evolutionary manner which has been characterized as “gradualism”, in contrast with the top-down, revolutionary fashion adopted by some eastern European countries which has been known as “shock therapy”. The process of the economic reform in China can be divided roughly into three stages. The first stage was from 1978 to 1984 called rural economic reform. Reform during this period primarily aimed at improving farmers’ incentives and raising income for rural population through the introduction of household production responsibility system and the decentralization of property rights as well as the upward adjustment of agricultural purchase prices. The rural economic reform played an important role in pushing economic development forward in rural areas and providing physical base to the rapid development of TVEs in the next stage.

After 1984, economic reform in China shifted from rural to urban areas and has entered into the second stage. The fundamental objective of the reform at this stage was to “build a socialist economic structure with Chinese characteristics that is full of vitality so as to promote the growth of the social forces of production”. A package of reform measures were carried out to achieve this goal, including the invigoration of enterprises by strengthening autonomy and the establishment of various forms of economic responsibility systems within individual enterprises; the foster and development of individual and collective enterprises as supplements to state enterprises; the reduction in the scope of central planning and development a macroeconomic control mechanism through taxes, interests rate, and monetary policies; the creation of production and factor markets; the liberalization of product and factor prices; the encouragement of foreign trade and investment. Under the encouraging policies, non-state sectors were more dynamic and expanding than state sectors. TVEs, the main part of the non-state sector, achieved significantly in terms of productivity growth and employment, emerging as the fastest growing sector in the economy. Its average growth rate of output reached 23 percent during 1981-1992. About 48.5 percent industrial workers were employed in the TVEs sectors, which was more than in the state sectors in 1992. With the wages reform initiated by abandoning the central wage fixed system and strengthening the link between income and performance to improve productivity which implemented widely in SOEs as well as in TVEs, worker’s wage income including basic wage, task-specific supplement, and bonuses determined by working efficiency grew rapidly and steadily. With the rapid increase in income, households’ demand for consumer goods expanded dramatically.

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2 The household production responsibility system has the characteristics of private economy in a market economy. It was officially adopted by the Forth Planum of the Eleventh Central Committee of the Communist Party in September 1979.
3 There are four types of enterprises in China: state-owned enterprises (SOEs), collective-owned enterprises, individual-owned enterprises and overseas-funded enterprises. TVEs (Township and Village Enterprises) are the main parts of the collective-owned enterprises among rural areas.
Some durables like colour TV sets, refrigerators, and air-conditioners became very popular necessity for urban families, and some others like black TV sets, washing machines, and fans entered into some rural families among coastal areas as basic household appliances. The second consumption structure upgrading had been in progress for urban families by the early of 1990s, while, most rural households began to improve consumption structure after meeting the basic demand for food and clothing.

The pace of the reform accelerated dramatically after the 14th Communist Party Congress proclaimed the establishment of a socialist market economic system in China as the country’s reform objective. The economic reform entered the third stage in 1993. In China, while almost all other aspects of economic reform including price management, commodity and factor markets, taxation, investment financing, trade regime, foreign exchange system, etc. have achieved significant progress over the past 14 years, the reform of the SOEs remains the government’s increasing challenge. The importance of SOEs in economy has declined steadily since the early 1980s, its share in total industrial output was 78, 65, 52, 27, 24 percent in 1978, 1985, 1992, 1997 and 2000 respectively. Moreover, the financial performance of SOEs’ declined increasingly, in 1985, 10.7 percent of SOEs were operating at a loss, 23.4 percent in 1992, 46 percent in 1997 (Ma, 2000). The number of employees in these enterprises accounted for 41 percent of total SOEs employees,(State Statistical Bureau, 1997b).

The effect of the performance of the SOEs on the growth of entire economy is less important than before. To the government and to the economy, however, the SOEs are still a big burden. They require government subsidies; the entitlement of staff and worker is a drain on the government budget and economic resources, which includes the entire support system more than their wages like healthcare for their families and retirement benefits, is very costly. The further reform of SOEs is main part of economic reform at this stage. The government is now pursuing a strategy of establishing a “modern enterprise system” through restructuring large SOEs and selling off shares of small and medium SOEs to make them financially independent, efficient, and profitable while most of them remain solely owned by the state, and that many small and medium SOEs will be revitalized by introducing the shareholding system. With the reform of SOEs accelerated and deepened, the problem of unemployment and laid-off workers is increasing seriously. The urban registered unemployment rate rose from 2.3 percent in 1992 to 3.1 percent in 1997 and 3.6 percent in 2001 (China Labour Statistical Yearbook, 2003). Meanwhile, the laid-off workers from the SOEs were 8.14, 6.34, 6.18, 6.52, 6.57, 5.15 million in 1996, 1997, 1998, 1999, 2000, 2001 respectively (Ministry of Labour and Social Security of China). Besides the unemployment of laid-off workers problem, some employees of SOEs faced their wages reduced possibly by 50 percent or more, some even did not receive their regular salaries (Chow, 2002). At this circumstance, along with the macroeconomic fluctuation the growth rate of income slowed down as well as income expectation decreased as a result.

In the process of reforming and downsizing the SOEs, the government tried to establish a more perfect social security system to improve or at least maintain the welfare of employees while dividing the burden of social welfare costs among government, enterprises and individuals. Before reform, pensions for government

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employees were paid from government budget. Pensions for SOEs’ retirees were paid from their enterprises based on the firm’s own revenue. Individuals did not make any pensions contributions and they could receive pensions calculated at between 75 and 100 percent of their last wage after they retired. The objective of pension reform was to establish a multi-pillar pension system involving funds contributed by state, employers, and individuals. Under the new pension scheme, 10 to 20 percent of the employees’ total wage should be funded as the basic pension and fully funded pension which consists of contribution from employees (about 2-5 percent and rising by one percentage point every two years after 1998 until contributions reach 8 percent) and enterprises (8-15 percent). The amount of pension payments to retirees depends on the contributions they have made. Without obligatory regulations of the reformed pension system on non-state sectors, despite efforts to expand pensions coverage, a significant number of employees especially in private, overseas-funded, and collective enterprises are still not covered at all, resulting in many of them may face more potential risk of either without any retirement pensions or not receiving enough to maintain a basic standard living in the future. Like the reform of pension system, the purpose of medical care insurance reform was to make the part of medical costs paid by individuals, while the total costs were paid by working units before the reform. Under this new medical care system, employees should contribute 2 percent of their total annual wage income to their individual account. Their medical expenses are first paid from the individual accounts and then by themselves, most part of these expenses is paid from the social fund only after self-paid expenses exceed 5 percent annual wage income. Similar to pension reform, many non-state enterprises are unwilling to participate this new system as well as to pay the medical expenses for their employees without compulsory regulations. Meanwhile, with the increasing reduction of government subsidies to health providers (such as hospitals), health providers are encouraged in financial accountability and efficiency improvement, as a result, medical treatment is becoming more expensive than before. Medical care becomes one of the main factors should be considered when households make a plan for the long-term expenditure.

The objective of the housing reform started in 1994 is to make housing “privatised” and “commercialised”, which means making house a commodity subject to the laws of demand and supply. In the pre-reform era, urban housing in China was essentially supplied by the working unit for the staffs and workers and their families according to their rank and seniority at very low rents (about 6 percent of their average monthly wage). The housing reform took a two-step process. Before the second half of 1998, urban residents may buy their houses presently staying in at lower than market prices and subsidized mortgaged payments at low interest rates under a government subsidy plan. After that, the physical housing allocation was stopped, and residents should buy their housing at market prices using housing provident fund, (is a mandatory saving scheme with contributions by both employers and employees.) personal savings and housing loan or pay much more on rent than before. With the increase persistence in

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7 For detailed reference document, see ‘Decisions of the State Council on Establishing the Basic Medical Care Insurance for Urban Employees’, the State Council, 1998.
housing prices, people should pay more for their housing in the housing market after 1998.\(^8\)

In additional to the reform of the SOEs and social security system, a series of other reforms were carried out successively to establish the social market economy. The high education system reform proceeded through giving the university administrators more autonomy and flexibility in decisions regarding student enrolment, tuition, and staff salaries and introducing market mechanism into high education management. The annual growth rate of tuition was more than 20 percent during 1990 and 1997, while that of per capita income was less than 6 percent during this period. Even after 1997, the tuition increased at 30-50 percent per year. The average tuition were RMB 5000 per year in 2000 which was just RMB 200 in 1989 and RMB 2000 in 1996, with the per capita income in urban was RMB 5854 and RMB 2210 in rural (Economy Guide, 2003). The tuition increased at relatively higher speed to capita income at the same time period inducing households to save more for education.\(^9\)

Along with China has gone through significant and persistent changes in economic and social stratum since these institutional transitions were implemented, a number of empirical studies on the response of Chinese consumption behaviour to the reforms have been carried out. Following Chow’s (1985) pioneering work in modelling Chinese aggregate consumption function in favour of the permanent income hypothesis (PIH), some others have made substantial contributions to this area. These include Qian (1988); Song, Liu and Romily (1996, 2000); Zhang and Wan (2002) and Zhang (2003) found that Chinese households’ consumption behaviour have changed in the postreform period. Qin (1991, 2003) reported that there was a constant long-run relationship between consumption and income in China based on an error –correct model (ECM). Chow (2002) declared that the consumption behaviour was relatively stable when he studied the relationship between total consumption expenditure instead of income and expenditures on four major consumption categories using cross-section data for Chinese rural households in 1981 and 1998. Also, Feltenstein, et al (1990) reported that the real interest rate had negative and significant impact on China’s aggregate consumption if the virtual price was employed. Zhang and Wan (2002) suggested that there was a weak substituitional effect of interest rate on Chinese households’ consumption and pointed that the inflation rate rather than the interest rate entered households’ decision –making process. Qin (2003) revealed that Chinese households were irresponsive to the interest rate shocks when a significant income uncertainty effect was found in the consumption models.

According to consumer behavioural theories, consumption behaviour is mainly affected by those observable factors including income, price level and interest rate etc. Besides, some others which are unobservable like habit persistence or consumer preference can also be the more important factors causing heterogeneity in consumption behaviour to some extent. Therefore, not controlling for these unobserved effects may lead to bias in the resulting estimates (Hsiao (1986) and Baltagi (2001)) when modelling consumption function. This may be the one of


reasons why these empirical results are far from reaching consensus which is based on either the time series or the cross-section data sets, as both pure time series and pure cross-section data sets have some drawbacks in identifying and estimating unobserved individual specific effects. Based on the fact that China is a multi-nationalities and extensive-territory country, there is no reason to assume commonality in consumption habits or consumption preference across regions. Therefore, the assumption of homogeneity in consumption behaviour across regions may call for question. The objective of this paper is to provide an alternative empirical study on the nature of the Chinese consumption behaviour while the heterogeneity in consumption behaviour across regions is considered.

Panel data estimation approaches have increasingly been applied to behaviour models in recent years due to its better properties in controlling for individual heterogeneity and studying complex issues of dynamic behaviour. Following Hsiao’s (1986) emphasis of the benefits from the pooled estimators of a panel data, Baltagi and Griffin (1997) investigated the gasoline demand model using a panel data set for 18 OECD countries over the period 1960-1990 and argued for pooling the data as the best approach for obtaining reliable price and income elasticities. Baltagi, Griffin and Xiong (2000) studied a dynamic cigarettes demand model utilizing pooling estimators based a panel data set from 46 American states over the period 1963 to 1992. Furthermore, Baltiga, Bresson, Griffin and Pirotte (2003) used a French panel data set on gasoline demand across 21 regions over the period 1973-1998 to confirm again the value of panel data sets and the emphasis of pooled estimators based on predictive performance. On the other hand, several authors argue in favour of heterogenous estimates when both N (the number of groups) and T (the number of time periods) get large. Pesaran and Smith (1995) illustrated that the mean group (MG) estimators could produce consistent estimates by UK labour demand functions for 38 industries over 30 years. Maddala, Trost, Li and Joutz (1997) estimated short-run and long-run elasticities of residential demand for electricity and natural gas from the panel data set of United States using shrinkage estimators., Shin and Smith (1999) proposed the pooled mean group (PMG) estimator to study the aggregate consumption functions for 24 OECD countries and energy demand functions for 10 Asian developing economies. Carruth, Gibson and Tsakalotos (1999) utilized the panel data of 15 EU countries based on the DHSY model to prove that the aggregate consumption behaviour for these countries is different and argued that problems could arise when common European stabilization policies implemented in the case of symmetric shocks but different propagation mechanisms. Barrell, Byrne and Dury (2003) applied panel data estimation approaches to test for the diversity in European economic structures in terms of consumption behaviour and its impact on the conduct of various monetary policies in Europe.

This paper attempts to apply panel data estimation approaches to investigate the consumption behaviour under institutional transitions in China. Given the series of further and deepen reforms which would have more direct and significant impact on household’s income realization and consumption expenditure as well as the expected ones were implemented in 1990s, this study focus on examining whether there are changes in consumption behaviour and how Chinese households respond to these profound transitions in consumption decision-making process in the 1990s.

The rest of this paper is set out as follows: Section 3 reviews household consumption theory, describes the econometric model and data issues. Estimation approach is also
reviewed in this section. Estimating results and further discussions are presented in
Section 4.

Model specification and Estimation approach

Model specification

Given China was subject to frequent and extensive changes in economic and social
security system during the reform period, it seems more reasonable for consumers in
China to determine their consumption expenditure based on permanent income rather
than the current income (Chow (1986); Song, Liu and Romily (1996, 2000); Qin
(1991, 2003)). The theoretical basis of this research is Friedman’s (1957) permanent
income hypothesis (PIH). PIH assumed that current consumption is determined by
permanent income which is determined by the expected or anticipated income over a
long period of lifetime. In Friedman’ words, permanent income is “to be interpreted
as the mean income regarded as permanent by the consumer unit in question, which in
turn depends on his horizon and farsightedness”. The average lifetime income is on
the basis of total wealth, human and nonhuman. For some people, the wages and
salaries from human capital make up almost all of their income; for some others there
is rental, interest, and dividend income derived from nonhuman wealth in form of real
property and financial assets. From one year to the next, a person’s permanent income
will change in his “horizon and farsightedness” and his evaluation of the future flows
from human and nonhuman capital based on the information of current income
realization and future stability which might be affected by the whole economic
situation and some institutional changes.

PIH defined the long run relationship between current consumption and permanent
income as:

\[ C = kY_p \] (1)

i.e. current consumption is some proportion of permanent income. The coefficient \( k \)
represents the marginal propensity to consume (MPC) and average propensity to
consume (APC) out of permanent income.

Since \( Y_p \) is unobservable, equation (1) must be transformed into an estimable
specification. Permanent income can be expressed by a function of current income
and lagged consumption based on an adaptive expectations process. It can be defined
as follows:

\[ Y_{p,t} - Y_{p,t-1} = \lambda (Y_t - Y_{p,t-1}) \quad 0 < \lambda < 1 \] (2)
\[ Y_{p,t} = Y_{p,t-1} + \lambda (Y_{t-1} - Y_{p,t-1}) \] (3)
\[ C_t = kY_t + (1 - \lambda) C_{t-1} + \varepsilon_t \]
\[ = b_1 Y_t + b_2 C_{t-1} + \varepsilon_t \] (4)

where \( b_1 = k\lambda \), is the short-run MPC and \( k = b_1 / (1-b_2) \) is the long-run MPC (or APC).

\( \lambda \) is the adjustment coefficient. The higher its value, the more rapidly does permanent
income change in response to the discrepancy between actual and expected income.

Additional the main factor, income, we include some other factors influencing
consumption like the interest rate and price level into the equation to test the
respondence of consumers to the changes in these factors. There is no unvarying
relationship between a change in consumer price level and consumption expenditure.
Generally, consumers are willing to increase the current consumption expenditure.
when the consumer prices are lower. But, a rise in consumer prices may lead to an increase in current consumption expenditure if consumers believe their current income has not risen proportionally due to a “money illusion”, and vice versa. Additionally, price expectations may affect consumption. Consumers may increase consumption “today” in expectation of still higher prices “tomorrow”. Conversely, expectations of a lower price level in the future can lead to a postponement of consumption. Consumption is also influenced to some extent by general expectations on the performance of business activities. Any expectation on higher income, shortage goods and higher prices, in turn will increase consumption in the current period.

Consumers’ response on a change in the interest rate may go in either direction. Because the interest rate is the relative price of present consumption in terms of future consumption, changes in interest rates will make income reallocation through both substitution and income effects. Whether an individual with a given current income will save more on balance at a higher interest rate then depends on the relative strength of the substitution effect and the income effect. For those lower-income individuals who will save only a relatively small part of their income even at high interest rates, the substitution effect will outweigh the income effect; their savings will vary directly with the rate of interest. For individuals with large incomes who tend to save relatively large part of their incomes, the income effect may outweigh the substitution effect; higher interest rates may increase the amount of current consumption.

Meanwhile, a time dummy variable is introduced in order to test whether there is a structural change in consumption behaviour before and after the further and deep-going institutional transitions. We choose 1997 is the break point in coincidence with the beginning of most reforms implemented extensively. Adding the region and time subscripts, then we define the consumption function as follow:

\[ CN_{i,t} = b_0 + b_1 Y_{i,t} + b_2 CN_{i,t-1} + b_3 P_{i,t} + b_4 D * Y_{i,t} + b_5 D * CN_{i,t-1} + b_6 D * P_{i,t} + b_7 D * I_{i,t} + b_8 D * Y_{i,t} + u_{i,t} \]  

(5)

Where \( CN \) is the logarithm of per capita consumption; \( Y \) is the logarithm of per capita income; \( P \) is the logarithm of price level; \( I \) is the interest rate; and \( D \) is the time dummy variable. \( D=0 \), when time \( t \) are 1990,1991,1992,1993,1994,1995,1996, otherwise \( D=1 \).

The disturbances are assumed to follow one-way error component model:

\[ u_{i,t} = a_i + v_{i,t}, \quad i = 1, 2, \ldots, N, \quad t = 1, 2, \ldots, T \]

where \( a_i \) are unobserved time-invariant regional effects which could be either fixed or random and \( v_{i,t} \) is white noise.

Due to the historical and regional policy reasons, increasing economic and social disparities emerged among different regions in China. The rural-urban disparity is the major source of regional disparities in China (Lin, Cai, and Li, 1999). Rural and urban areas have developed as two very different social groups in China. Graph 2 reveals a great gap of income as well as consumption between the rural and urban levels, indicating that there may be significant difference in consumption decision-making between the two groups. Graph 3 shows an obvious change track of propensities to consume of urban and rural groups. There is little possibility to assume that the consumption behaviour should be the same for these two groups. Moreover, as some current economic reforms are implemented just involving urban areas, the extent to
the impact of the economic reforms on consumption may be different between urban and rural households. Two consumption models are therefore built separately and two data sets are collected correspondingly. One data set is for urban households and the other one is for rural households. Each consists of a panel of 29 Chinese administrative regions covering the period 1990-2001. All data sources are from various issues of China Statistical Yearbook. The variables are defined specifically as follows: Per capita consumption is defined as per capita expenditure on consumer goods including durables and nondurables by urban or rural households; Per capita income is defined as the per capita disposable income by urban households and the per capita net income by rural households. Both income and consumption are deflated; Price level is defined as the consumer price index for urban or rural areas; the interest rates are defined as the nominal current deposit interest rates.

Graph 2. Per capita income and consumption
(China, 1985-2001)

-- rural consumption
--- urban consumption

--- rural income
--- urban income

These include 26 provinces and 3 direct municipalities, i.e., Beijing, Tianjin and Shanghai. Chongqing, a direct municipality designated recently, is considered as part of Sichuan province, Tibet autonomous region is excluded due to the lack of data before 1999.
Estimation approach

A wide choice of theoretically acceptable estimators can be applied in the analysis of a panel data set, but, clearly, the traditional homogeneous panel estimators (pooled estimators) would appear the only viable alternative to a panel data set with T up to 10 (Baltagi, Bresson, Griffin, and Pirotte, 2003). We estimate the pooled consumption model assuming commonalities in slope coefficients are statistically justified and use ESS (the sum of squares of the residuals) as criteria for estimator comparison. Two types of pooled homogeneous estimators can be derived from the panels. One is the standard pooled estimators, assuming the exogeneity of all regressors. These estimators include:

1. POLS estimator which ignores the regional effects;
2. Within estimator which allows the regional effects to be a factor affecting consumption, assuming they are fixed and may be correlated with the observed explanatory variables and estimates the model by time-demeaning to remove the region-specific effects;
3. FEGLS estimator which assumes the regional effects are fixed and the residuals are cross-region heteroskedastic and contemporaneously uncorrelated;
4. REGLS estimators which assumes the regional effects are random and are uncorrelated with the observed explanatory variables;

The other is 2SLS (two-stage least squares) estimators assuming the lagged consumption endogenous. Since the lagged dependent variable is not exogenous in the dynamic consumption models, even if the disturbances are not autocorrelated, the presence of the correlation between the lagged dependent variable and the disturbance can lead to inconsistent least squares estimates. 2SLS is therefore employed using the exogenous variables and their lagged values as instruments. In particular, we choose four alternative 2SLS pooled estimators.

5. 2SLS estimator which makes no attempt to improve efficiency by taking into account the regional effects. It is consistent but not efficient;
6. WSLS (weighted two-stage least squares) estimator which just focus on the improvement of the efficiency, still ignoring the regional effects;

7. Within 2SLS estimator which transforms the data by time-demeaning means and thereby eliminate any regional fixed effect;

8. FD2SLS (first-difference 2SLS) which transforms the data by first differencing to eliminate the fixed or random regional effects and then applies 2SLS to the transformed equations.

Results and Discussions

The estimation results are presented in Table 1 and Table 2. As shown in the two tables, there are bigger omission biases when the unobserved regional effects are ignored, resulting in substantial changes in the income elasticity, the lagged consumption coefficient and price elasticity in these two consumption models. We therefore prefer those estimators introducing unobserved effects into models which mainly include Within, FEGLS, REGLS, Within2SLS, and FD2SLS estimators, based on the ESS criteria. The results here show vast differences in parameter estimates when applying the fixed effects or random effects approaches respectively to the consumption models. Wooldridge (2002) demonstrates the assumption about whether the unobserved effects are correlated with the other explanatory variables could produce a significant difference between the fixed effects and random effects estimates. The random effects estimates may suffer from the inconsistency if the correlation does exist in the model (Greene, 2003). The Hausman (1978) test for the fixed and random effects regressions is therefore employed. The test statistic is 343.3747 and 110.9733 for urban and rural consumption model respectively. The critical value from the Chi-squared table with eight degrees of freedom is 15.5073, which is far less than the test value. The hypothesis that the unobserved regional effects are uncorrelated with the other explanatory variables in the model can be rejected. The fixed effects model is the better choice for both urban and rural consumption model. We also can draw the conclusion that Within2SLS estimators have better properties in comparison with FD2SLS estimators, as the inefficiency problems may exist due to the introduction of autocorrelation in the disturbance term in FD2SLS estimates proposed by Anderson and Hsiao (1982), consistency is still preserved by the use of predetermined variables as instruments. Nevertheless, 2SLS estimators correcting for possible endogeneity in the lagged dependent variables performed not better than those standard pooled estimators assuming all explanatory variables are exogenous. This may be a matter of the poorer quality of instruments. Thus, the standard fixed effects estimate would have desirable properties in the performance of estimating the consumption models. Particularly, Within estimate is the best for the urban consumption model while FEGLS proposed by Kiefer (1980) is the best for the rural consumption model. The results of tests for variance equality of residuals can prove this conclusion (see Table 3). The test statistics decisively reject the null hypothesis of equal variance of the residuals across regions, providing strong evidence of the presence of groupwise heteroskedasticity among rural areas. So FEGLS estimator is more efficient than Within estimator for the rural consumption model relying on the large-N, fixed-T asymptotics (Wooldridge, 2002).

From the estimation results, we can find significant changes in both urban and rural households’ consumption behaviour responding to the institutional transitions during
Households’ consumption in rural areas is more volatile and sensitive to the changes in economic variables than those in urban areas, indicating different consumption patterns between urban and rural households. There is the similar downward tendency in income elasticity of both urban and rural consumption during 1990s, although it is statistically significant just for rural households. For rural households, after 1997, there is about 40 percent dramatic drop, from 0.615 to 0.372 in the short-run income elasticity whereas 10 percent decrease in the long-run income elasticity, from 0.753 to 0.680, comparing to a slight decrease in both short-run (from 0.685 to 0.636) and long-run (from 0.823 to 0.808) income elasticity for urban households. The assumption that the long-run relation between consumption and income should be relatively stable according to the PIH is thus not supported by the pooled estimation results using Chinese data during economic and social transformation period. Our finding is also in contradiction with the argument that Chinese households have constant long-run income elasticity of consumption (Qin, 2003). The finding is thus coincidental to the standpoint that there is no stable long-run relation between consumption and income based on the study on aggregate consumption of China (Song, Liu and Romilly, 1996, 2000). We also can find different reactions on the changes of price level between urban and rural households. The changes in price level have negative effect on consumption for all households including urban and rural areas. However, the price elasticity of rural consumption is higher than that of urban consumption, indicating that rural households are more sensitive to the price changes in consumption decision-making process.

Various factors could contribute to these changes in consumption behaviour. From the late of 1980s to the early of 1990s, it was the second consumption structure upgrading stage for urban households. With the rapid increase in income and an improvement in wealth, the constrained consume demand which was accumulated at the shortage condition of consumer goods for a long time was released completely. In particularly, the demand of urban households for household appliances expanded dramatically at this stage, causing a higher propensity to consume. In addition, the effect of “keeping up with the Joneses” enforced the quickly expansionary demand so that the higher inflation rate during 1992 to 1994 did not significantly influenced the stronger consume demand of urban households. The main household appliances have been saturated among most urban households by the middle of 1990s. Following the consume development pattern, housing and automobiles are becoming the more popular “must-haves” for urban households. According to experiences from other economic developed countries, it takes about 7 to 10 years to complete the consumption upgrading from the secondary consumption structure centred around household appliances to the third consumption structure which is concentrated on housing and automobiles. Some scholars predicted that China should have entered into the third consumption upgrading around 1997. However, the expected consumption boom derived from consumption upgrading has failed to emerge. Besides the relatively high price threshold of these consumer goods as well as the imperfect credit system, the limited payment ability of most low and middle-income households should be responsible for the recession in consume demand. Although the households’ income has been improved more dramatically than pre-reform, many urban households would use almost all of their savings to buy their housing when

\[ \chi^2(4) \text{-value of 20.184 for urban consumption model and } \chi^2(4) \text{-value of 50.971 for rural consumption model, suggesting both of the null hypothesis of coefficient restriction are rejected at the 1\% level.} \]
housing reform implemented widely among urban areas. It is therefore difficult for these households to buy cars or to improve their housing at the short time period. A decrease in income growth after 1996 and an increasing rise in expenditure since a series of social and economic reform were implemented together also may contribute the slow-down wealth accumulation, which can postpone the consumption structure upgrading. At this circumstance, a decrease in consumer price can not affect consumption any further. From the smaller and negative price elasticity we can find the evidence that the price level is not a determinant to consumption decision-making for urban households during 1990s. The bigger adjustment coefficients of urban consumption model indicates that they are more responsive to the uncertainties in expected income and expenditure mainly resulting from the institutional changes since the economic and social reforms have been carried out.

However, as they would face more risks from market fluctuation and natural disaster than their counterparts, the rural households have significant motive to save more against the income uncertainty. Moreover, because a bigger part of their net income would invest in the agricultural reproduction, the income elasticity of consumption for rural households is smaller. We also can find some evidence to prove the increasing decrease in income elasticity. The living standard, especially the housing, has been improved further as the income increased substantially since the rural economic reform and as the TVEs’ significant development. Unlike their counterparts, the rural households consider the housing as the second demand next to the demand for food. They are willing to expand the expenditure on the housing when they are getting better off. The proportion of expenditure devoted to housing kept a high and stable growth from the middle of 1980s to the early of 1990s. The share of total household expenditure on housing reached the peak at this period, it was 18.2 percent in 1985 and 17.3 percent in 1990 respectively (China Information, 26/4/2002). Following the consumption persistence, the rural households maintained a higher income elasticity of consumption during this period. Corresponding to the higher inflation rate, the income elasticity began to fall. The significant and negative price elasticity of consumption can demonstrate that the changes in consumption are more responsive to the fluctuations of price for rural households. However, this status has changed after 1997. Not only did the income elasticity decrease substantially, the changes in price also had insignificant impact on consumption. Given the series of deepen and further reforms were little directed against the benefits of rural households except for the education reform, we argue that the consumption behaviour of rural households is more sensitive to the macroeconomic fluctuations than the institutional changes after 1997. The decrease in income elasticity is coincidence with the recession in the whole economy. The economic depression as well as the successive deflation enforced the growth of income slowed down and income uncertainty increased, which would also deteriorate the income expectation. All of these can cause a drop in short-run income elasticity as well as in long-run income elasticity.

Besides, some rural households are capable to buy some durable consumer goods including household appliances which were popular among urban households during the early of 1990s responding the decrease in the consumer price, but the other factors like basic facilities, transportation, after-sale services and consumer environment may become the main obstacle against the household appliances upgrading among rural households. Meanwhile, as the social welfare reform has implemented very slowly among rural areas, the vast majority of rural dwellers have not been covered by these schemes. The family support structure among rural areas that the elderly people
mainly rely on their families (primarily their sons) for support and care has been weakening by the one-child policy. Many rural dwellers have to rely on their own resources to cover medical costs and provide for the aged. This also can result in a decrease in propensity to consume.

Both urban and rural households have the same response to the changes in nominal interest rate during 1990s, unlike Qin (2003) pointed that just rural households responded to the nominal interest rate changes. Before 1997, the income effect of interest rate outweighed the substitutional effect. Comparing to the investment in stock market which was less developed and the large fluctuation frequently occurred at that moment, households were more likely to deposit their savings to banks as a low-risk and high-return option when the interest rates rose. The higher the interest rate, the more the future income will get. This effect would encourage households to increase their current consumption. The positive and significant coefficient of interest rate can demonstrate this income effect at this stage. After that, with the nominal interest rate decreased successively following the deflation, the substitutional effect outweighed the income effect. A decrease in interest rate induced households to devote a bigger part of disposal income to current consumption. But, because of the weak impact of interest rate on consumption, the changes in interest rate would, ceteris paribus, cause little change in the current level of consumption. This is why the monetary policies were less effective in controlling the excessive expansibility in consumer demand in the early of 1990s and expanding the sluggish consumer demand in the late of 1990s.
Table 1
Pooled estimators of consumption model for urban households

<table>
<thead>
<tr>
<th></th>
<th>POLS</th>
<th>WITHIN</th>
<th>FEGLS</th>
<th>REGLS</th>
<th>FD2SLS</th>
<th>WITHIN 2SLS</th>
<th>WSLS</th>
<th>2SLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>$Y_{it}$</td>
<td>0.776* (0.038)</td>
<td>0.685* (0.045)</td>
<td>0.690* (0.048)</td>
<td>0.555* (0.043)</td>
<td>0.690* (0.055)</td>
<td>0.636* (0.051)</td>
<td>0.761* (0.045)</td>
<td>0.748* (0.049)</td>
</tr>
<tr>
<td>$CN_{i,t-1}$</td>
<td>0.159* (0.043)</td>
<td>0.168* (0.048)</td>
<td>0.181* (0.046)</td>
<td>0.431* (0.045)</td>
<td>0.159* (0.062)</td>
<td>0.227* (0.048)</td>
<td>0.182* (0.046)</td>
<td>0.195* (0.050)</td>
</tr>
<tr>
<td>$P_{it}$</td>
<td>-0.027 (0.052)</td>
<td>-0.040 (0.046)</td>
<td>-0.048 (0.062)</td>
<td>0.073 (0.074)</td>
<td>-0.220* (0.074)</td>
<td>-0.031 (0.046)</td>
<td>-0.026 (0.046)</td>
<td>-0.017 (0.054)</td>
</tr>
<tr>
<td>$I_{it}$</td>
<td>0.023* (0.006)</td>
<td>0.023* (0.007)</td>
<td>0.021* (0.006)</td>
<td>-0.010 (0.007)</td>
<td>0.041* (0.010)</td>
<td>0.020* (0.007)</td>
<td>0.022* (0.006)</td>
<td>0.023* (0.008)</td>
</tr>
<tr>
<td>$D*Y_{it}$</td>
<td>0.033 (0.067)</td>
<td>-0.049 (0.064)</td>
<td>-0.028 (0.058)</td>
<td>-0.186* (0.058)</td>
<td>0.047 (0.066)</td>
<td>-0.103 (0.064)</td>
<td>-0.014 (0.063)</td>
<td>0.027 (0.068)</td>
</tr>
<tr>
<td>$D*CN_{i,t-1}$</td>
<td>-0.024 (0.072)</td>
<td>0.045 (0.069)</td>
<td>0.009 (0.062)</td>
<td>0.186* (0.068)</td>
<td>-0.052 (0.073)</td>
<td>0.097 (0.066)</td>
<td>0.011 (0.066)</td>
<td>-0.019 (0.070)</td>
</tr>
<tr>
<td>$D*P_{it}$</td>
<td>-0.005 (0.046)</td>
<td>0.032 (0.027)</td>
<td>0.051* (0.025)</td>
<td>0.011 (0.026)</td>
<td>0.533* (0.123)</td>
<td>0.039 (0.022)</td>
<td>0.018 (0.034)</td>
<td>-0.003 (0.035)</td>
</tr>
<tr>
<td>$D*I_{it}$</td>
<td>-0.013 (0.014)</td>
<td>-0.044* (0.013)</td>
<td>-0.037* (0.011)</td>
<td>-0.008 (0.011)</td>
<td>-0.083* (0.017)</td>
<td>-0.050 (0.013)</td>
<td>-0.017 (0.011)</td>
<td>-0.014 (0.013)</td>
</tr>
<tr>
<td>ESS</td>
<td>0.1888</td>
<td>0.1393</td>
<td>0.1405</td>
<td>0.2895</td>
<td>0.1666</td>
<td>0.1421</td>
<td>0.1906</td>
<td>0.1893</td>
</tr>
</tbody>
</table>

Notes: Estimators are corrected for serial correlation using Cochrane-Orcutt type procedures and heteroskedasticity using White covariance matrix whenever necessary.

Numbers in parentheses are standard errors.

2SLS estimators use exogenous variables and their one-lagged values as instruments.

* indicates significance at the 5% level.
# Table 2
Pooled estimators of consumption model for rural households

<table>
<thead>
<tr>
<th></th>
<th>POLS</th>
<th>WITHIN</th>
<th>FEGLS</th>
<th>REGLS</th>
<th>FD2SLS</th>
<th>WITHIN 2SLS</th>
<th>WSLS</th>
<th>2SLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>$Y_{it}$</td>
<td>0.369*</td>
<td>0.589*</td>
<td>0.615*</td>
<td>0.266*</td>
<td>0.621*</td>
<td>0.577*</td>
<td>0.392*</td>
<td>0.359*</td>
</tr>
<tr>
<td></td>
<td>(0.049)</td>
<td>(0.056)</td>
<td>(0.041)</td>
<td>(0.038)</td>
<td>(0.087)</td>
<td>(0.048)</td>
<td>(0.038)</td>
<td>(0.411)</td>
</tr>
<tr>
<td>$CN_{i,t-1}$</td>
<td>0.575*</td>
<td>0.179*</td>
<td>0.183*</td>
<td>0.697*</td>
<td>-0.177*</td>
<td>0.204*</td>
<td>0.569*</td>
<td>0.588*</td>
</tr>
<tr>
<td></td>
<td>(0.056)</td>
<td>(0.063)</td>
<td>(0.048)</td>
<td>(0.044)</td>
<td>(0.088)</td>
<td>(0.057)</td>
<td>(0.044)</td>
<td>(0.048)</td>
</tr>
<tr>
<td>$P_{it}$</td>
<td>-0.400*</td>
<td>-0.296*</td>
<td>-0.333*</td>
<td>-0.523*</td>
<td>0.044</td>
<td>-0.304*</td>
<td>-0.328*</td>
<td>-0.409*</td>
</tr>
<tr>
<td></td>
<td>(0.154)</td>
<td>(0.121)</td>
<td>(0.104)</td>
<td>(0.130)</td>
<td>(0.184)</td>
<td>(0.131)</td>
<td>(0.116)</td>
<td>(0.136)</td>
</tr>
<tr>
<td>$I_{it}$</td>
<td>0.048*</td>
<td>0.042*</td>
<td>0.045*</td>
<td>0.063</td>
<td>-0.042</td>
<td>0.043*</td>
<td>0.041*</td>
<td>0.049*</td>
</tr>
<tr>
<td></td>
<td>(0.020)</td>
<td>(0.016)</td>
<td>(0.014)</td>
<td>(0.016)</td>
<td>(0.025)</td>
<td>(0.017)</td>
<td>(0.015)</td>
<td>(0.017)</td>
</tr>
<tr>
<td>$D*Y_{it}$</td>
<td>-0.329*</td>
<td>-0.256*</td>
<td>-0.243*</td>
<td>-0.327*</td>
<td>-0.455*</td>
<td>-0.266*</td>
<td>-0.356*</td>
<td>-0.333*</td>
</tr>
<tr>
<td></td>
<td>(0.060)</td>
<td>(0.050)</td>
<td>(0.041)</td>
<td>(0.058)</td>
<td>(0.141)</td>
<td>(0.052)</td>
<td>(0.053)</td>
<td>(0.058)</td>
</tr>
<tr>
<td>$D*CN_{i,t-1}$</td>
<td>0.383*</td>
<td>0.309*</td>
<td>0.280*</td>
<td>0.383*</td>
<td>0.280*</td>
<td>0.320*</td>
<td>0.397*</td>
<td>0.389*</td>
</tr>
<tr>
<td></td>
<td>(0.071)</td>
<td>(0.058)</td>
<td>(0.048)</td>
<td>(0.068)</td>
<td>(0.096)</td>
<td>(0.060)</td>
<td>(0.062)</td>
<td>(0.066)</td>
</tr>
<tr>
<td>$D*P_{it}$</td>
<td>-0.043</td>
<td>-0.049</td>
<td>-0.032</td>
<td>-0.036</td>
<td>0.399</td>
<td>-0.050</td>
<td>-0.027</td>
<td>-0.043</td>
</tr>
<tr>
<td></td>
<td>(0.031)</td>
<td>(0.026)</td>
<td>(0.021)</td>
<td>(0.033)</td>
<td>(0.284)</td>
<td>(0.029)</td>
<td>(0.025)</td>
<td>(0.032)</td>
</tr>
<tr>
<td>$D*I_{it}$</td>
<td>-0.081*</td>
<td>-0.051*</td>
<td>-0.043*</td>
<td>-0.104*</td>
<td>0.112*</td>
<td>-0.053*</td>
<td>-0.072*</td>
<td>-0.084*</td>
</tr>
<tr>
<td></td>
<td>(0.021)</td>
<td>(0.020)</td>
<td>(0.017)</td>
<td>(0.022)</td>
<td>(0.038)</td>
<td>(0.021)</td>
<td>(0.018)</td>
<td>(0.022)</td>
</tr>
<tr>
<td>ESS</td>
<td>1.1696</td>
<td>0.8080</td>
<td>0.7981</td>
<td>1.3227</td>
<td>0.8385</td>
<td>0.8091</td>
<td>1.1822</td>
<td>1.1704</td>
</tr>
</tbody>
</table>

Notes: Estimators are corrected for serial correlation using Cochrane-Orcutt type procedures and heteroskedasticity using White covariance matrix whenever necessary.

Numbers in parentheses are standard errors.

2SLS estimators use exogenous variables and their one-lagged values as instruments.

* indicates significance at the 5% level.
Table 3
Test for variances equality of residuals between regions

<table>
<thead>
<tr>
<th>Method</th>
<th>Urban Value</th>
<th>Urban Probability</th>
<th>Rural Value</th>
<th>Rural Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bartlett</td>
<td>36.43488</td>
<td>0.1319</td>
<td>67.02742</td>
<td>0.0000</td>
</tr>
<tr>
<td>Levene</td>
<td>1.413296</td>
<td>0.0869</td>
<td>2.767067</td>
<td>0.0000</td>
</tr>
<tr>
<td>Brown-Forsythe</td>
<td>1.191495</td>
<td>0.2384</td>
<td>1.898812</td>
<td>0.0050</td>
</tr>
</tbody>
</table>

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