

MPC greater than unity: the “leverage effect” of transfer income*

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Abstract: This study investigates the explanation for abnormally large marginal propensity to consume (MPC). Focusing on Chinese household behaviors during the turbulent transition period, the analysis corroborates that a modest amount of transfer income could trigger substantial household spending (like a “leverage”); and the most significant spending response is observed in the scenario where the private transfer may have relaxed the liquidity constraints which prevented households from purchasing high-priced goods. On the other hand, “MPC greater than unity” implies a considerable opportunity cost of the contemporary transfer programs. Several prescriptions are provided to improve the effectiveness of social transfers.

Keywords: Marginal propensity to consume; Transfer income; Transfer program; China; Two-stage least squares

JEL classification: D12, D13, D91, I38

1. Introduction

Can marginal propensity to consume (MPC, hereafter) exceed unity? Most economists probably say no, and there is ample evidence that the MPC regarding different income sources and expenditures is far below unity. Theoretically, MPC is a merit of “induced consumption,” expressed as the derivative of consumption with respect to income ($\partial C / \partial I$). However, many empiricists interpret it as “the proportion of additional income that is consumed.” If this interpretation is correct, MPC is unlikely to exceed unity because people cannot spend more than one dollar *out of* one dollar.

When MPC is found greater than unity, common explanations are the econometric misspecification and data problem. A very few researchers asserted that this anomaly probably reflects the irrational dissaving behaviors under situations such as inflation, recession, and liquidity constraint (e.g., Landsberger, 1966; Ishikawa and Ueda, 1984; Maluccio, 2010)¹. However, these explanations are not self-evident. By exploiting a specific data source—the 2002 China Household Income Projects, this study provides an empirically relevant explanation for the anomaly. The estimated MPC of transfer income is greater than unity, and the phenomenon is primarily attributed to China’s economic features in 2002, in which the families had pent-up demand for certain high-priced goods, but the purchase was typically inhibited by the liquidity constraints².

¹ Another anomaly is the negative MPC. Choi et al. (2004) claimed that the MPC of windfall capital gains could be negative in the short run, due to the feedback effect of high rewards in the past.

² Strictly speaking, the term “MPC” should be used in the context where the consumption is continuously differentiable. However, the spending response and income fluctuation in the real

A prime example is the effect of private transfer on homeownership. In the early 2000s, due to the unanticipated privatization of China's housing market and the underdeveloped financial systems, house-demanding families in China had little savings in preparation, and they were on average borrowing constrained. This deficit was generally made up by private transfers (e.g., remittance and gift from relatives and friends), which helped the recipients to raise funds, shorten the saving time, and meet the down payment requirement (as argued by Engelhardt and Mayer, 1998; Guiso and Jappelli, 2002). In this case, a small amount of private transfer can trigger a purchase of otherwise unaffordable commodity house (a leverage effect), and the MPC is greater than unity.

This evidence applies to household's allocation of transfer income, which is of significant policy interest and deserves further exploration. Over the past decades, the emergence of quasi-experimental transfer programs has motivated a large body of empirical research. Researchers have unanimously found that the MPC of transfer income is larger than that of regular income (regarding the concerning expenditure), yet the derived MPCs appear exceedingly small³. These findings have raised acute questions. Whereas transfer income could have either large or small effect on household consumption, the reported MPC of regular income is often too small to be in line with the reality, implying that the conventional empirical methods might have systematically

world are never continuous. To avoid confusion, in this study the term "MPC" represents the induced consumption by a one-unit increase in income.

³ Kabeer et al. (2012) presented a comprehensive literature survey on conditional transfer programs, in which some of the policy effects were considered insignificant. In Senauer and Young (1986)'s survey, the reviewed MPC of food stamp on food spending is about 0.35, on average. Fraker (1990) reached similar conclusion: the reviewed MPC is between 0.2 and 0.45. Other existing evidence will be attached in the following parts of this study.

underestimated the marginal effects. This deficiency is particularly noticeable in the literature of food stamp (a typical in-kind transfer), in which the reported MPC of money income (on food spending) is below 0.10, on average (Senauer and Young, 1986; Fraker, 1990). More importantly, given that an average household usually spends more than 70% of its total income, one might suspect that many of the transfer projects—mainly designed to stimulate household spending (e.g., nutrition intake)—have failed to achieve their objectives, not absolutely but relative to the conventional consumption pattern. Empiricists often take an excessive interest in qualitative measures thus overlook the validity of quantitative estimates⁴.

Intuitively, the effectiveness of transfer program depends on the extent to which the recipients need it (viewed by beneficiaries), and whether they would allocate it in a socially desirable way (viewed by policymakers). The derived evidence indicates that private transfer has a much greater stimulative effect than does public transfer. Accordingly, targeting “the neediest” (as is done in conducting private transfer) will significantly improve the effectiveness of public transfers. Indeed, this involves a trade-off between the equity and efficiency of transfer programs. The evidence contributes to the on-going debate on the policy trade-off as it has revealed the underlying opportunity cost of the contemporary transfer programs—the MPC of transfer income could be enormous (the leverage effect).

The structure of this paper is as follows. Section 2 briefly reviews China’s

⁴ For intuitively reasonable estimates, for instance, see Kreinin (1961) and Landsberger (1966), who have reached similar MPCs of current income (about 0.7) but distinguished MPCs of windfall income. Also refers to the common-cited finding of Friedman: the average propensity to consume out of permanent income is roughly 0.9.

economic reform in the 1990s and discusses the behavior effects triggered by the background changes. Sections 3 and 4 report the data set and empirical strategy, respectively. Section 5 presents the estimates on the MPC of total transfer income. The stimulative effects of private and public transfers will be distinguished and investigated in Section 6. Section 7 assesses the MPCs of private and public transfers on different expenditures. Section 8 discusses the policy implication, and Section 9 concludes the study.

2. China's economic reform and the behavior effects

China's remarkable economic progress in the 21st century owes a great deal to the economic transition in the 1990s, of which the core concept is to shift from a socialist command economy to a market economy. The process involves (1) "opening up" strategy to internationalize the markets and introduce competitive mechanism (2) SOE reform aimed at downsizing the non-competitive state-owned enterprises (3) transition from the "cradle to grave" pension system to a market-oriented scheme, which has a broader coverage but a much lower replacement ratio (Feng et al., 2011) (4) the liberalization and privatization of market economy, including the commercialization of homeownership, and the introduction of price mechanism into educational and medical systems.

These vicissitudes have triggered significant changes in household behaviors. The SOE reform has yielded massive layoffs in the state sector; the breaking of the internal security system has largely scaled back the social benefits (e.g., pension, healthcare,

education, and housing); the market liberalization has enlarged families' burden and self-responsibility for their spending, which directly boosted the social consumption; the sweeping restructuring has resulted in considerable uncertainty, which stimulated precautionary savings of various motives (Meng, 2003).

The falling income, increasing demand, and surging prices caused by the reform can be generalized as an income shock in a broader sense. How people react to adverse shocks is a central and enduring economic topic. China's experience presents an ideal setting to test for the evidence of large MPCs, for its unique economic features: (1) market innovations have caused the price discontinuity⁵ of specific consumer goods that closely relate to the very interests of people (2) the transition is tremendous and unpredictable (3) the social security and financial systems are underdeveloped.

Chinese households have long grown used to the old systems. Thus they had very little buffer stock in the material and mental aspects. In the absence of sufficient public insurance systems to relieve the adverse outcome, households' extra spending was largely financed out of accumulated savings and the informal risk-sharing mechanisms (e.g., inter-family transfer and other social networks)⁶. China's experience provides a good example of the "excess sensitivity of consumption" phenomenon: household spending fluctuates significantly with transitory economic circumstances, due to the

⁵ Price discontinuity also relates to the notions of "indivisibility" and "down payment constraint."

⁶ There is ample evidence for the illiquidity. According to the CHIP 2002 (described in Section 3), when household heads were asked about how they raise CNY 10000 (about half of the average household income in 2002) if they encountered financial difficulties, 18% of the respondents said they would draw from the bank; 69% would turn to family members, relatives, and friends; only 3% would borrow from bank, credit union, and other financial institutions. Also, only 10% of the urban households reported obtaining a current deposit worth at least six months of their current income; only 5% have a debt more than CNY 20000. Besides, substantial anecdotal evidence suggests that there is a cultural bias against borrowing in Chinese society.

incomplete risk-pooling systems (Jappelli and Pistaferri, 2010).

As conventional theories have predicted, if there are rational agents and complete markets, the scenarios of “MPC greater than unity” and “failure of consumption smoothing” would be impossible. However, the agents in China’s case are more or less “short-sighted,” since the reform was entirely unanticipated. Also, Chinese households arguably have strong preference for specific goods (such as commodity house) over normal goods, implying the “irrationality.” On the other hand, the limited availability of credit has well demonstrated the underdevelopment of the mortgage market.

The above distinctions have made possible the scenario of MPC greater than unity. As corroborated by the following analysis, public and private transfers exhibited substantial stimulative effects on Chinese household consumption during the transition period, and the largest MPCs can be found in the cases where a timely private transfer had significantly contributed to the purchase of high-priced commodities.

3. Data

The primary purpose of this study is to capture the underlying causes of large MPC out of transfer income, which helps acquire a guideline to improve the effectiveness of transfer projects. As noted, a relevant case here is China’s experience around 2000, during which the radical transition might have triggered the failure of household consumption smoothing. The empirical analysis is based on the China Household Income Projects (CHIP, hereafter), carried out by the Chinese Academy of Social Science and National Bureau of Statistics (NBS) through multilateral cooperation. The

CHIP is a widely used data source in studying Chinese household behaviors. The main advantage of the CHIP over others is that it collected arguably the most detailed information on the receipt of transfer income, which suits the research purpose well.

The CHIP is a multi-wave retrospective household survey (CHIP1988, 1995, 2002, 2007, and 2013) containing distinct samples of rural, migrant, and urban populations. The survey followed a strict sampling procedure, and the respondents are nationally representative. Given that China's reform has mainly focused on urban regions, and it was not until 2000 that the reform has been in full operation for a sufficient period to generate significant impacts, the analysis will concentrate on the urban sample of the CHIP 2002 (covering over 6000 households in 11 provinces). All the variables employed in this study are taken and constructed directly from the CHIP 2002.

4. Empirical strategy

To present straightforward empirical regularities regarding household income and consumption, a reduced-form specification is utilized.

$$C_{i,t} = a + \beta_1 \text{Transfer}_{i,t} + \beta_2 \text{Income}_{i,t} + \beta_3 X_{i,t} + \delta_t + \mu_i + \varepsilon_{i,t} \quad (4.1)$$

The model outlined above is a standard linear regression assuming constant marginal effects, which is an intuitively appealing and extensively used specification in evaluating the MPCs of different income sources (e.g., Kreinin, 1961; Landsberger, 1966; Fraker et al., 1995). The data source is a cross-sectional household survey (the CHIP 2002), and the specification is on a household basis⁷. The subscripts t and i

⁷ In this specification, a household basis is mathematically equivalent to a per capita basis.

represent the time period and region, respectively; C denotes the total household consumption; $Transfer$ is the total transfer income, comprised of private transfer (e.g., gift) and public transfer (e.g., pension); $Income$ is the household regular income, calculated as the total household income excluding transfer income; for simplicity, the marginal effects of income variables are assumed to be additively separable; X is the set of other explanatory variables; δ and μ represent the unobservable time- and region-specific effects, respectively; ε is the disturbance term. The parameters of interest are the coefficients β_1 and β_2 , which capture the MPCs of transfer income and regular income, respectively.

To test the estimate robustness, the linear specification is transformed into the “share” and “double-log” specifications. The share specification is an extensively-used approximation to the life-cycle consumption function, which implicitly presumes that the income elasticity for consumption increases with income level⁸. The double-log specification is used to account for skewed distributions and outliers, which helps contribute to more precise estimates⁹.

$$CS_{i,t} = a + \beta_1 Transfer_{i,t} + \beta_2 X_{i,t} + \delta_t + \mu_i + \varepsilon_{i,t} \quad (4.2)$$

$$\ln C_{i,t} = a + \beta_1 \ln Transfer_{i,t} + \beta_2 \ln Income_{i,t} + \beta_3 X_{i,t} + \delta_t + \mu_i + \varepsilon_{i,t} \quad (4.3)$$

In the share specification (equation 4.2), household consumption and transfer

⁸ To avoid confusion, it is noteworthy that the share specification is also a “linear” specification. Moreover, although commonly used, the imposed assumption is often claimed implausible.

⁹ In assessing the MPCs of different income sources, the double-log specification is deemed to be a more flexible functional form that imposes fewer restrictions and presents more consistent estimates (Levedahl, 1995). Generally, the use of log form relieves the heterogeneity problem and helps satisfy the normality assumption. Its applications include Senauer and Young (1986), Moffitt (1989), and Handa et al. (2009).

income are expressed as percentages of total household income, and the parameter β_1 is interpretable as the MPC of transfer income. In the double-log specification (equation 4.3), $\ln C$ denotes the logged level of household consumption and likewise for income indicators. This specification is also known as the “constant elasticity model¹⁰,” for which the actual MPC can be computed as the product of the elasticity and the consumption/income ratio.

In contrast to part of the existing literature, this study utilizes a non-experimental data to assess the MPC of transfer income. In the real world, households’ labor supply and leisure demand are jointly determined in a function of economic circumstances and individual characteristics, which is also true for the allocation of consumption and income transfer (received or gave out). That is, income transfer hardly occurs “exogenously.” Unobservable factors such as incentives always play an essential role in the process. To allow for the simultaneity consideration and other endogeneity problems in the estimation, an endogenous framework, the two-stage least squares (2SLS), is employed. The instrument variable strategy is a standard solution to the problems of omitted variables, measurement error, and selection bias¹¹—the central challenges confronting the empirical research based on microdata. Also, the robust standard error is used to correct for the heteroscedasticity in the error term.

¹⁰ For conservativeness, the “semi-log” models were not employed here since it is unclear whether the marginal effect of income is diminishing or increasing regarding income level.

¹¹ Researchers have different motives to utilize the IV method in assessing the MPCs. See, for example, Case and Deaton (1998), Maluccio (2010), and Zhu et al. (2012). Measurement error is a crucial issue in this topic, since the respondents were presumably unwilling to report the right amount they received, or they might not recall the right amount in a retrospective survey. This kind of measurement error generally biases the estimated MPC towards zero, which might be the cause behind the small MPCs reported by the existing OLS and DID analyses.

Ideally, the causal effect of instrument variables on endogenous variables should be the *only* channel through which instruments affect the outcome (the exclusion restriction). However, this is difficult to satisfy. The estimation relaxes the strong assumption and exploits several promising instruments which presumably have more significant impacts on the transfer receipt than on consumption: (1) whether the household head has suffered severe disease during the survey year (2) whether the household head enjoys publicly subsidized medical benefits (3) the number of relatives and friends to turn to if the household head wants to change a job (social connections) (4) the disability degree of the household head¹². These instruments are valid predictors of transfer receipt, as advocated by the literature concerning the determinants of transfer income (e.g., Cox and Jimenez, 1990). Other covariates, which presumably have more direct effects on consumption, are utilized as control variables in the second stage regression of 2SLS¹³.

Such an adjustment provides some empirical flexibility and advantages: (1) Exogenous variables such as households' sociodemographic characteristics are relatively well reported and less correlated with the reporting error in income indicators; a full set of control variables helps capture the variation in endogenous variables, which improves the instrument relevance and the asymptotic efficiency of 2SLS. (2) As additional variables enter the model, one can inspect the validity of the derived parameters and whether the main conclusion is limited to particular specifications.

¹² The CHIP 2002 asked about households' state of mental and physical disabilities, according to which the disability degree (from zero to eight level) of household head is computed.

¹³ Note that these control variables would automatically enter the first stage regression of 2SLS and become "additional instruments" (Baltagi, 2011, p. 265).

These additional restrictions contribute to the transparency and honesty of empirical analysis.

The 2SLS estimators pivot critically on the underlying endogeneity and the validity of instruments, which can be examined by specification tests. The Hausman test is used to inspect whether there is a statistically significant difference between the OLS and 2SLS estimates. Theoretically, two methods would reach the same result if the instrumented variables are strictly exogenous. Thus a rejection of the null hypothesis illustrates that part of the concerned variables is endogenous in a statistical sense.

The F-statistic in the first stage regression of 2SLS evaluates the joint significance of the incorporated instruments, which serves as a test for weak instruments. As a simple rule of thumb, an F-statistic larger than 10 verifies a significant instrument relevance. The Sargan test is used to inspect the overidentification restriction, in which a failure to reject the null hypothesis lends credence to the exogeneity of instruments. These specification tests help to evaluate the overall reliability of 2SLS estimators.

5. The MPC of total transfer income

The MPC of total transfer income is a good angle to start the analysis. The benchmark linear specification is expressed as:

$$C_i = a + \beta_1 \text{Transfer}_i + \beta_2 \text{Income}_i + \beta_3 \text{Child}_i + \beta_4 \text{Old}_i + \beta_5 \text{Other}_i \quad (5.1)$$

Child and *Old* denote the numbers of dependent children (under 20) and elderly

(above 60), respectively. The two variables capture the size and composition of the family, serving as important determinants of household consumption. Table 1 presents the descriptive statistics, and Table 2 tabulates the estimate results.

[Tables 1 and 2 near here]

The column 1 of Table 2 demonstrates the result derived from the benchmark specification (equation 5.1) with both income variables being instrumented. In columns 2 and 3, to test the robustness, family background variables and 75 regional dummies (76 cities) are incorporated into the linear specification¹⁴. Following the same criterion, the share and double-log specifications are applied in turn, presented in columns 4-6 and 7-9, respectively. For consistency, this pattern will recur in following parts.

Before proceeding, one should inspect the overall reliability of the results by looking into the estimates on regular income and other covariates. According to Table 2, the MPC of regular income is between 0.50 and 0.63 in the share specifications; the double-log specifications reach similar magnitudes, from 0.52 to 0.63¹⁵. These estimates seem sensible, given that from various sources the average consumption ratio (APC) of Chinese urban households is about 0.70 (also see note 4). This evidence implies that the turbulent transition in China did not significantly influence households' allocation of regular income. On the other hand, the derived parameters of other covariates (not shown) are broadly in line with the theory: holding all else constant, households spend more if they have more children and higher consumption level, being

¹⁴ The reform's behavior effects and the consumption patterns are different across regions. Regional dummies account for the unobservable geographical characteristics.

¹⁵ The actual MPC can be "backed out" by multiplying the derived coefficient (elasticity) by the ratio of the corresponding sample means. For instance, the MPC of transfer income = (total consumption/transfer income) × elasticity.

younger or female household head, or living in a rented house. Also, it is reassuring that the specification tests (i.e., endogeneity, weak instrument, and overidentification tests) support the overall legitimacy of the regressions¹⁶.

Turning to the issue of transfer income, the MPC of transfer income ranges from 1.57 to 1.63 and from 3.47 to 3.64 in the linear and share specifications, respectively. The large magnitudes are likely the consequence of outliers and measurement errors in the selected samples¹⁷. As noted, this bias could be relieved by the double-log specification, in which the corresponding MPC lies between 0.77 and 1.01. Although the double-log estimate seems conservative, it cannot rule out the possibility of MPC greater than unity.

Policymakers believe that transfer programs would at least accomplish the “second-best objective,” namely the immediate poverty reduction, through the “income effect.”¹⁸ However, many researchers found that the recipients tend to save the majority of their transfer income (e.g., Taylor et al., 1971; Ravallion and Chen, 2005; Shapiro and Slemrod, 2009). Against these views, the evidence here highlights a considerable marginal effect of transfer income on household spending, implying that the stimulative effect of transfer programs could be enormous under plausible conditions.

¹⁶ For the balance of this paper, and because the specification tests have verified the validity of the first stage regressions, the first stage estimates will not be reported.

¹⁷ In the CHIP 2002, households’ transfer income is possibly under-reported. This might cause an overestimation of MPC in the linear and share specifications (also see notes 11 and 24).

¹⁸ Since the receipt of transfer payment adds to household’s disposable income (income effect), it would more or less increase recipient’s overall spending in the short run (the “second-best objective”). Whereas the spending is unlikely to increase by an equivalent amount of the payment, for an effective transfer program, it is reasonable to expect a larger MPC of transfer payment than that of regular income, irrespective of whether the policy incentive is to stimulate total consumption or the spending on particular items.

6. Private and public transfers

The analysis in section 5 indicated that the MPC of total transfer income could reach unity under plausible conditions (China's case). However, the aggregation of all kinds of transfers might be implausible because they have different properties¹⁹. Also, one might wonder which type of transfer income has the most significant stimulative effect (MPC). Given the distinctions and the research purpose, a conventional strategy is to classify the eleven transfer categories into "private" and "public" transfers. The private transfer is the sum of alimony (for the aged), gift, "dahuofei,"²⁰ other transfers, and survey income²¹; the public transfer is the total transfer income net of the private transfer.

The MPCs of private and public transfers are estimated using the linear and double-log specifications²². Instead of incorporating three endogenous variables (regular income, public, and private transfers) into single estimation, the effects of

¹⁹ Intuitively, social transfer (such as pension) is more predictable and akin to labor income. Thus households' should allocate social transfer gains and regular income in a similar fashion. On the other hand, private transfer (such as gift) is more like an "emergency aid," which is temporary, less predictable, and often motivated by specific intentions. Moreover, social transfer ordinarily has a crowd-out effect on private transfer.

²⁰ "Dahuofei" is a fee paid by the relatives and friends who regularly live or eat in host families. Generally, the amount of dahuofei is arbitrary and unforced, showing the generosity of the host. However, it is often the case that, if host families encounter financial difficulties, borders would "consciously" pay a lot more to express their concern. This is a Chinese characteristic risk-pooling mechanism.

²¹ In the selected sample, roughly 30% of the households reported receiving no private transfer. To avoid losing too many observations in the double-log specification, 1/3 of the survey income (received by the majority of the interviewees) is counted into the private transfer. This adjustment is similar to the common-used form of $\log(1+x)$ when x can take on the value zero, and it does not alter the result substantially since the average amount of survey income is relatively small (about CNY 120). On the other hand, the use of log term will drop the respondents reporting receiving neither survey income nor other private transfer, which helps eliminate the low-performing interviewees in the sample.

²² The share specification is abandoned as it did not carry out very well in the previous section.

transfer income are specified in separate models²³:

$$C_i = a + \beta_1 \text{ Private Or Public Transfer}_i + \beta_2 \text{ Income}_i + \beta_3 X_i \quad (6.1)$$

$$\text{Ln } C_i = a + \beta_1 \text{Ln Private Or Public Transfer}_i + \beta_2 \text{Ln Income}_i + \beta_3 X_i \quad (6.2)$$

[Table 3 near here]

According to the estimates displayed in Table 3, the parameter of regular income is similar to those obtained in section 5, implying the consistency and reliability of the results. The MPC of public transfer ranges from 0.9 to 1.2 in the double-log specifications (by calculation), yet statistically insignificant in the linear specifications. The MPC of private transfer ranges from 2.4 to 2.8 in the linear specifications. The double-log specifications demonstrate even greater point estimates: the elasticity of private transfer is between 0.21 and 0.26 thus the concerning MPC ranges from 4.2 to 5.2 (by calculation). Turning to the specification tests, as expected, the F-statistic indicates that the public transfer is more predictable than the private transfer. The Hausman and Sargan tests broadly support the validity of the regressions.

Against the conventional view that there should be an upper limit (unity) on MPC, the evidence here points out the possibility of MPC greater than unity²⁴. In China's case, income transfer has become an effective vehicle for households to smooth consumption during the turbulent period. Relative to the public transfer and regular income, the

²³ Incorporating both transfers into single estimation would cause a spike in the number of endogenous variables (causing an overidentification bias), and a collinearity problem (due to the correlation between private and public transfers). On the other hand, using separate models would not lead to significant omitted variable bias, since the amount of both transfers is small relative to regular income, which accounts for 75% of total income.

²⁴ Due to the potential endogeneity and the weak instrument consideration, the 2SLS estimations might have systematically overstated the concerning MPCs. However, these problems do not influence the conclusion that the private transfer has a more significant marginal effect than those of the public transfer and regular income.

private transfer exhibits a much greater stimulate effect in facilitating social consumption.

7. Transfer income and different expenditures

In sections 5 and 6, a crude definition, total consumptive expenditure (see Table 1), is used to capture household consumption. The aggregation might be controversial since some of the components (such as housing and education) are considered a sort of saving (or investment) rather than a consumer good. To avoid the distinction of expenditures, also to test the limits of previous conclusions, this section directly assesses the marginal effects of private and public transfers on all nine categories of household expenditures.

In the preceding estimations, the introduction of additional covariates did not significantly alter the estimates, and the specification tests have broadly corroborated the overall validity of the results. For consistency and simplicity, the analysis here follows the econometric techniques in section 6 and focuses on the better-performing double-log specification with two control variables. For instance, the specifications for food expenditure are as follows:

$$\text{Ln Food}_i = a + \beta_1 \text{Ln PrivateTransfer}_i + \beta_2 \text{Ln Income}_i + \beta_3 \text{Child}_i + \beta_4 \text{Elderly}_i \quad (7.1)$$

$$\text{Ln Food}_i = a + \beta_1 \text{Ln PublicTransfer}_i + \beta_2 \text{Ln Income}_i + \beta_3 \text{Child}_i + \beta_4 \text{Elderly}_i \quad (7.2)$$

[Table 4 near here]

Table 4 summaries the estimates on the spending responses to the receipts of public

and private transfers across nine categories of expenditures. According to the results, by and large, households spent their public transfer gains on health care (MPC=0.430), transportation & communication (MPC=0.242), food (MPC=0.224), and home equipment (MPC=0.137). On the other hand, the private transfer was used to finance health care (MPC=1.295), transportation & communication (MPC=0.884), home equipment (MPC=0.634), and house expenditure (MPC=0.591). By adding up the statistically significant point estimates, the MPC of public and private transfers regarding total spending is about 1.03 and 3.40, respectively, consistent with the findings in section 6.

The permanent income hypothesis (PIH) predicted that people would consume their permanent income and retain the temporary one. However, this theory cannot explain the spending responses during China's transition period: the private transfer is considered more transitory and unexpected than the public transfer, yet has displayed greater stimulative effects. Alternatively, a leading hypothesis of "mental accounts" implies that people would not bother to save or invest a windfall income when the amount is small, due to the relatively large transaction cost per dollar (e.g., Landsberger, 1966; Keeler et al., 1985). However, this cannot explain the presence of MPC greater than unity.

The consistent evidence presented in this study establishes that, under certain conditions (i.e., price discontinuity, increasing demand, and borrowing constraint), even a small amount of transfer payment could trigger considerable consumption in the short run, by relieving the liquidity constraints that prevented households from

undertaking the purchase of expensive goods. This also stresses that the MPC of transfer income could serve as a metric to identify the illiquidity and unmet demand for financial services at the household level.

The relevant cases regarding MPC and illiquidity are: (1) Due to the cutting down on social benefits, combined with the commercialization of housing and medical services, Chinese households generally financed their extra spending via the receipt of private and public transfers. (2) A convincing story here is the case of health care, as it is more unpostponable and expensive relative to other expenditures. As suggested by the results, part of the families successfully obtained the costly medical service with the help of income transfer, whereas others had to save money until they can afford the expense. Although the amount of transfer income was often small, it could render a sizable consumption gap between the two scenarios (receivers or not). (3) the considerable marginal effects of transfer income on home equipment and transportation & communication are the behavioral consequence of the increasing integration of global economy, which has introduced various high-tech products (e.g., personal computer, high-definition TV, automobile, and cellphone) favored by Chinese consumers. (4) As a comparison, since the price and demand of normal goods (such as food and clothes) are relatively low, the stimulative effects on these items seem insignificant.

As another implication, *ceteris paribus*, households less influenced by the above factors will demonstrate smaller MPCs. This can be seen from the literature focused on Chinese rural households, on which the reform's behavior effect was less significant.

For instance, exploiting a unique survey in 2001 and 2004, Zhu et al. (2012) conducted 2SLS estimations and found that Chinese rural households have spent their remittances mainly on consumption, virtually dollar-for-dollar²⁵. Using the DID method based on a Chinese rural household survey, Ravallion and Chen (2005) found that the participants of the poor-area program in China chose to save a large fraction of the income gains from the program; this indicates that the transfer payment has no discernable stimulative effect on beneficiaries' spending.

8. Implication: the potential of transfer programs

In the previous sections, the analyses have verified the enormous stimulative effects of transfer income on households' spending during China's transition period. Whereas the MPC of regular income appeared normal (about 0.5 to 0.7), the MPC of the public transfer reached unity, and the private transfer exhibited even greater marginal effects (MPC greater than unity). This evidence leads to renewed policy interest in the effectiveness of transfer programs.

Over the past decades, a variety of transfer projects have been launched with well-defined social intentions (e.g., to improve the nutrition intake of needy families). For one thing, many of the projects were motivated by research purposes. As a consequence, researchers pursued the framework of "random assignment"²⁶ to allow for rigorous

²⁵ In view of the above argument, it is of particular interest that part of the reported MPCs in Zhu et al. (2012) appeared slightly above unity.

²⁶ There are roughly two types of "randomness." One is the random distribution of eligibility and participation into the program. The other one is the randomness in selecting samples (e.g., the common-used strategy of exogenous stratified sampling).

empirical evaluations²⁷. Prime examples are the innovations of food stamp, conditional cash transfer, tax rebate, and other stimulus programs. For another thing, this strand of research often found that the recipients have spent very little out of the receipt, revealing statistically significant but essentially insignificant stimulative effects (e.g., Levedahl, 1995; Case and Deaton, 1998; Handa et al., 2009; Shapiro and Slemrod, 2009). Given the limited “bang for the buck” and the underlying externality of transfer programs²⁸, many governments and donors hold a pessimistic view that social transfer is a second-best policy instrument (also see note 18).

Empiricists have long been investing much effort in assessing the policy effects, and their findings should be valid—the beneficiaries indeed spent very little out of the receipt. As the analyses presented above have implied, a potential culprit behind the ineffectiveness of transfer programs is the blind pursuit of randomness. That is, due to the “random assignment,” the targeted population is not necessarily the “most suitable.”²⁹ Thus there is no guarantee that the recipients would behave in a socially desirable way.

Unsurprisingly, the spending response to transfer receipt turns out case specific.

²⁷ Through random distribution, the receipt and amount of the transfer payment are presumably independent of the unobservable factors that affect household consumption. Randomness relieves the undetected biases (such as those from individual characteristics and self-selection) in empirical assessments.

²⁸ Transfer programs could result in a welfare dependence of beneficiaries (the “charity hazard”), a crowding-out of private transfers, a disincentive to work, and distortion of optimal household budgets.

²⁹ For example, if not the “neediest” but the “kind of needy” is being targeted (as was done in most transfer programs), there is still room for efficiency improvement. This can be seen from the previous literature: Meng (2003) addressed that, to cope with the adverse outcome of China’s reform, social transfer should concentrate on the “neediest”, rather than distribute substantial resources to all the unemployed people; Levedahl (1995) and Angelucci and Attanasio (2009) found that the most impoverished families have the most significant spending responses to the receipt of transfer income.

The derived evidence suggests that a direct solution to the policy ineffectiveness is to conduct the social transfer in a “private manner”—by confining the eligibility to a particular group who shares the same objective with the policymaker. That is, if the pressing issue is to encourage house purchasing, a modest amount of transfer payment targeting house-demanding families would probably meet the policy objective (with a certain administrative cost)³⁰. However, if the policymaker values equality over efficiency, the standard strategy is to randomly or equally distribute the resources among a crudely-defined group; in this case, the outcome might be undesirable.

As far as policy efficacy is concerned, “targeting the most suitable” is an intuitively appealing strategy supported by not only this study but also other empirical evidence³¹. On the other hand, the trade-off between policy effectiveness and equality is a long-standing question, a matter of judgment. This study contributes to the topic as it has revealed suggestive quantitative evidence—the considerable opportunity cost of the contemporary transfer programs. That is, because there should be no fundamental difference between a well-targeting transfer program and a private transfer, public transfer could be as productive as private transfer in stimulating social consumption (MPC greater than unity, and high benefit/cost ratio).

³⁰ As direct evidence, Engelhardt and Mayer (1998) and Guiso and Jappelli (2002) found that house-demanding families who received private transfers have significantly shortened their saving time and largely increased the value of the house purchased.

³¹ The spending response depends on various factors. Many studies found that women tend to spend their transfer income in a “family friendly” way (e.g., Adato et al., 2000; Rubalcava et al., 2009; Maluccio, 2010). Todd et al. (2010) argued that the PROGRESA (a transfer program in Mexico) has encouraged recipients’ investment in productive activities, especially for smallholder households. Levedahl (1995) found that the MPC of food stamp increased with the number of food stamp hold by the recipients. Shapiro and Slemrod (2009) observed that the low-income beneficiaries of the US tax rebate were particularly likely to use the transfer to pay off debt. Parker (2017) found that households’ allocation of transfer income is highly related to their persistent behavior characteristics (e.g., impatience).

Based on this idea, several prescriptions are provided here to improve the design of transfer programs:

(1) Whereas the contemporary transfer scheme has achieved some fundamental objectives, due to the randomization, the opportunity cost is proved substantial. This calls for a major reassessment of the current transfer scheme.

(2) Since the world is not as “vacuumed” as assumed by the randomization (Leamer, 2010), the estimated effect of a randomized transfer applies only to specific domains where transfers occur exogenously (the internal validity), not to the real world where transfers always interact with various social confounders (the external validity). Social transfer is an atypical topic, in which the blind pursuit of exogenous frameworks in the program design and the following research work could blind us to the reality and provide little implication for improving the policy effectiveness.

(3) Contrary to the permanent income hypothesis, the evidence highlights a sizable stimulative effect of private transfer (viewed as temporary income). This indicates that some conventional strategies of transfer programs, such as a multi-wave setting and a preannouncement, might have impaired the policy effectiveness.

(4) There seems a near consensus that transfer payments are virtually ineffective at facilitating households’ spending on cheap and low-demand goods (such as food and clothes; in some cases, education). However, a well-targeting transfer might have an enormous stimulative effect on the purchase of expensive and high-demand goods (such as commodity house and medical service)³². Facing the tightening budget constraints

³² In fact, the insight here is a simplified version of the existing evidence. For instance, the literature on food stamp addressed that the poor performance of food assistance programs was

and the problem of global overcapacity, policymakers should pay more attention to the nature of consumer goods in order to undertake social transfers in an economically productive way.

9. Conclusion

This study investigates households' spending response to transfer receipt using a unique survey data (the CHIP 2002). The empirical analyses present the evidence that the MPC of transfer income could exceed unity (especially for private transfer) as the behavioral consequence of illiquidity and surging demand at the household level, verified by a variety of alternative estimations³³.

This insight stands in sharp contrast to the conventional wisdom that households' spending is relatively unresponsive to the receipt of transfer income. Based on the evidence, several plausible instruments are provided for improving the effectiveness of transfer programs. The derived implications are not confined to the case of social transfers; they are also suggestive to the topics of insurance and tax systems, corporate's

mainly attributed to the fact that most beneficiaries have already spent more than the earmarked transfer for food (namely the "infra-marginal" transfer). The research on conditional transfers typically found that the stimulative effects depend heavily on the performance of conditionality (e.g., conditioning the beneficiaries on actions intended to improve human capital investment). Many studies found that the recipients did not immediately spend the increase in transfer income. In summary, these findings implied that, if the recipients currently spend little but will spend more on receiving the transfer payment, then the transfer program will be effective at stimulating household consumption—the core concept of this study.

³³ In addition to the robustness checks presented in the previous sections, regressions were also run over alternative samples, such as households with a head aged 25-55, cohorts within the 5th-95th income deciles, and nuclear families. The saving equation is also used to assess the marginal propensity to save (to test the identity of $MPS+MPC=1$). Besides, alternative instruments (e.g., household head's occupation and party affiliation) and other definitions of income and consumption variables (e.g., permanent income as the weighted average of past incomes) are employed to test the estimate sensitivity. These robustness checks (not shown) suggest that the main conclusion is not limited to specific choices of samples, measures, and instruments.

allocation of cash flow, and government's spending responses to financial grants (e.g., the "flypaper" effect). These findings are open to discussion, and I look forward to furthering the exploration on the related topics.

Reference

- Adato, M., De la Briere, B., Mindek, D., & Quisumbing, A. (2000). The impact of PROGRESA on women's status and intrahousehold relations. *Final Report, International Food Policy Research Institute, Washington DC*.
- Angelucci, M., & Attanasio, O. (2009). Oportunidades: program effect on consumption, low participation, and methodological issues. *Economic development and cultural change*, 57(3), 479-506.
- Baltagi, B. H. (2011). *Econometrics*. New York: Springer.
- Cox, D., & Jimenez, E. (1990). Achieving social objectives through private transfers: A review. *The World Bank Research Observer*, 5(2), 205-218.
- Case, A., & Deaton, A. (1998). Large cash transfers to the elderly in South Africa. *The Economic Journal*, 108(450), 1330-1361.
- Choi, J. J., Laibson, D., Madrian, B. C., & Metrick, A. (2004). *Consumption-Wealth Comovement of the Wrong Sign* (No. w10454). National Bureau of Economic Research.
- Engelhardt, G. V., & Mayer, C. J. (1998). Intergenerational transfers, borrowing constraints, and saving behavior: Evidence from the housing market. *Journal of Urban Economics*, 44(1), 135-157.
- Fraker, T. (1990). The effects of food stamps on food consumption: a review of the literature. *Current perspectives on food stamp program participation (USA)*.
- Fraker, T. M., Martini, A. P., & Ohls, J. C. (1995). The effect of food stamp cash out on food expenditures: An assessment of the findings from four demonstrations. *Journal of human resources*, 633-649.
- Feng, J., He, L., & Sato, H. (2011). Public pension and household saving: Evidence from urban China. *Journal of Comparative Economics*, 39(4), 470-485.
- Guiso, L., & Jappelli, T. (2002). Private transfers, borrowing constraints, and timing of homeownership. *Journal of money, credit, and banking*, 34(2), 315-339.
- Handa, S., Peterman, A., Davis, B., & Stampini, M. (2009). Opening up Pandora's box: The

effect of gender targeting and conditionality on household spending behavior in Mexico's PROGRESA program. *World Development*, 37(6), 1129-1142.

Ishikawa, T., & Ueda, K. (1984). The bonus payment system and Japanese personal savings. *The economic analysis of the Japanese firm*, 133-192.

Jappelli, T., & Pistaferri, L. (2010). The consumption response to income changes. *Annu. Rev. Econ.*, 2(1), 479-506.

Kreinin, M. E. (1961). Windfall income and consumption: Additional evidence. *The American Economic Review*, 51(3), 388-390.

Keeler, J. P., James, W. L., & Abdel-Ghany, M. (1985). The relative size of windfall income and the permanent income hypothesis. *Journal of Business & Economic Statistics*, 3(3), 209-215.

Kabeer, N. (2012). What are the economic impacts of conditional cash transfer programmes? A systematic review of the evidence.

Landsberger, M. (1966). Windfall income and consumption: comment. *The American Economic Review*, 56(3), 534-540.

Levedahl, J. W. (1995). A theoretical and empirical evaluation of the functional forms used to estimate the food expenditure equation of food stamp recipients. *American Journal of Agricultural Economics*, 77(4), 960-968.

Leamer, E. E. (2010). Tantalus on the Road to Asymptopia. *Journal of Economic Perspectives*, 24(2), 31-46.

Moffitt, R. (1989). Estimating the value of an in-kind transfer: The case of food stamps. *Econometrica: Journal of the Econometric Society*, 385-409.

Meng, X. (2003). Unemployment, consumption smoothing, and precautionary saving in urban China. *Journal of Comparative Economics*, 31(3), 465-485.

Maluccio, J. A. (2010). The impact of conditional cash transfers on consumption and investment in Nicaragua. *The Journal of Development Studies*, 46(1), 14-38.

Parker, J. A. (2017). Why Don't Households Smooth Consumption? Evidence from a \$25 Million Experiment. *American Economic Journal: Macroeconomics*, 9(4), 153-83.

Ravallion, M., & Chen, S. (2005). Hidden impact? Household saving in response to a poor-area development project. *Journal of public economics*, 89(11-12), 2183-2204.

- Rubalcava, L., Teruel, G., & Thomas, D. (2009). Investments, time preferences, and public transfers paid to women. *Economic Development and cultural change*, 57(3), 507-538.
- Senauer, B., & Young, N. (1986). The impact of food stamps on food expenditures: Rejection of the traditional model. *American Journal of Agricultural Economics*, 68(1), 37-43.
- Shapiro, M. D., & Slemrod, J. (2009). Did the 2008 tax rebates stimulate spending?. *American Economic Review*, 99(2), 374-79.
- Taylor, L. D., Duesenberry, J., Hall, R., & Jaszi, G. (1971). Saving out of different types of income. *Brookings Papers on Economic Activity*, 1971(2), 383-415.
- Todd, J. E., Winters, P. C., & Hertz, T. (2010). Conditional cash transfers and agricultural production: lessons from the Oportunidades experience in Mexico. *The Journal of Development Studies*, 46(1), 39-67.
- Zhu, Y., Wu, Z., Wang, M., Du, Y., & Cai, F. (2012). Do migrants really save more? Understanding the impact of remittances on savings in rural China. *Journal of Development Studies*, 48(5), 654-672.

Table 1. Descriptive statistics of the full sample

Variable	N	Mean	SD	Description
Consumption (total)	6834	18173	12837	Total household consumptive expenditure
Food	6834	6925	3810	Foodstuff and edible oil
Clothes	6834	1765	1578	Expenditure on clothes
Home equipment and service	6834	1178	2130	Expenditure on home equipment, facilities, and services
Health care	6834	1274	2437	Health and medical expenditure
Transportation and communication	6834	1818	3034	Expenditure on transportation and communication
Education and entertainment	6834	2775	3978	Expenditure on education, entertainment, and culture services
House expenditure	6834	1833	4284	Expenditure on housing and the related
Other expenditure	6834	605	1148	Expenditure on miscellaneous goods and services
Transfer income (total)	6834	5686	8838	Total transfer income (sum of the eleven categories of transfers)
Private transfer	6834	921	2664	Alimony, donation, "dahuofei", other transfers, plus 1/3 of the survey income
Public transfer	6834	4784	8201	Total transfer income excluding private transfer
Regular income	6834	18716	14878	Total household income excluding total transfer income
Child	6834	0.645	0.565	Number of children (under 20) in the family
Elderly	6834	0.349	0.684	Number of elderly (above 60) in the family
Consumption level (logged)	6822	9.363	0.523	Expenses needed to maintain the current living standard
Age	6832	47.95	11.16	Age of household head
Education level	6831	10.71	3.322	Years of household head's education until 2002
Disability degree	6832	0.026	0.228	The disability degree of household head
Social connections	6831	1.201	2.031	The number of relatives and friends to turn to

Source: authors' tabulation based on the urban samples in the CHIP 2002, available from <https://www.icpsr.umich.edu/icpsrweb/ICPSR/series/243>

Note: monetary values are in current Chinese Yuan units (CNY). Dummies (two variables) serving as instruments are not reported here. Other dummies used in the analyses are described in Table 3.

Table 2. 2SLS estimates on the marginal effects of total transfer income on household consumption

Variable	Linear specification			Share specification			Double-log specification		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Consumption (level)			Consumption (share)			Consumption (logged level)		
Transfer	1.631** (0.744)	1.571** (0.661)	1.590** (0.767)	3.484*** (1.037)	3.643*** (1.193)	3.470*** (1.043)	0.317** (0.132)	0.239*** (0.085)	0.291** (0.129)
Regular income	0.629*** (0.0609)	0.572*** (0.107)	0.503*** (0.114)				0.650*** (0.075)	0.530*** (0.076)	0.549*** (0.094)
Constant	-1,441 (1,628)	-23,655* (12,492)	-26,608** (11,820)	0.306** (0.130)	-0.221 (0.390)	-0.303 (0.463)	1.141** (0.503)	0.756** (0.361)	0.726 (0.897)
Control for Child and Elderly	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control for Consumption level, Rent house, Income decline, Education level, Male, Working status, and Age	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Regional dummy	No	No	Yes	No	No	Yes	No	No	Yes
Observations	4,801	4,798	4,798	4,801	4,798	4,798	4,511	4,508	4,508
R-squared	0.319	0.361	0.381	NA	NA	NA	0.088	0.385	0.276
Hausman test	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
F-statistic	60.0	80.9	26.1	96.5	57.5	13.2	143.2	86.0	25.4
Over-id test	0.88	0.81	0.88	0.86	0.75	0.81	0.34	0.26	0.53

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Note: “Rent house” is a dummy denoting whether the family lives in a rented house; “Male” is a dummy denoting whether the household head is male; “Income decline” is a dummy denoting whether the household reported anticipating an income decline in the next year; “Working status” is a dummy denoting whether the household head is working (employee or the self-employed) during the survey year; the adjusted R-squared and F-statistic are obtained from the first stage regression of 2SLS; “over-id test” is the Sargan test (Prob> chi-squared reported); all the specifications have excluded missing variables, and the use of log terms will retain only the samples with non-zero values.

Table 3. 2SLS estimates on the marginal effects of private and public transfers on household consumption

Variables	Linear specification					Double-Log specification						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Private transfer	2.399** (1.189)	2.777** (1.197)	2.658** (1.256)				0.215** (0.091)	0.246*** (0.092)	0.259** (0.102)			
Public transfer				2.052 (1.378)	2.256 (1.539)	2.053 (1.586)				0.332** (0.147)	0.246*** (0.092)	0.259** (0.123)
Regular income	0.681*** (0.044)	0.516*** (0.101)	0.460*** (0.116)	0.641*** (0.074)	0.630*** (0.118)	0.501*** (0.122)	0.716*** (0.053)	0.518*** (0.088)	0.551*** (0.092)	0.585*** (0.111)	0.481*** (0.095)	0.381*** (0.100)
Household status	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Regional dummy	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes
Observations	4,801	4,798	4,798	4,801	4,798	4,798	4,447	4,445	4,445	4,312	4,309	4,309
R-squared	0.404	0.415	0.461	0.175	0.108	0.224	0.256	0.228	0.267	NA	0.272	0.265
Hausman test	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
F-statistic	4.38	4.6	5.2	77.4	47.2	10.4	7.3	8.6	15.9	185.0	111.0	33.4
Over-id test	0.05	0.13	0.17	0.74	0.84	0.64	0.18	0.57	0.80	0.50	0.35	0.24

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Note: “Household status” is the set of sociodemographic variables used in Table 1; the adjusted R-squared and F-statistic are obtained from the first stage regression of 2SLS; “over-id test” is the Sargan test (Prob> chi-squared reported).

Table 4. 2SLS estimates on the marginal effects of private and public transfers on different expenditures

Category	Food	Clothes	House equipment and service	Medical service	Transportation and communication	Education and entertainment	House expenditure	Other expenditure
Coefficient	0.155*	-0.005	0.556*	1.616**	0.638**	0.37	0.38	-0.144
Actual MPC	0.224	0.000	0.137	0.430	0.242	0.000	0.000	0.000
				(Public transfer)				
Coefficient	0.122	0.144	0.496*	0.937**	0.448**	0.165	0.297*	-0.089
Actual MPC	0.000	0.000	0.634	1.295	0.884	0.000	0.591	0.000
				(Private transfer)				

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Note: only the double log specifications are reported here, which follow the econometric techniques used in Table 3; “Coefficient” is the estimated parameter (elasticity) of transfer income; the actual MPC is computed as the product of elasticity and the ratio of variable means, for which the statistically insignificant elasticities are assigned with zero MPC; the results of specification tests and other parameters (not shown) broadly support the overall validity of the regressions.