Measuring the Targeting Accuracy of China's Urban *Dibao* System

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Abstract: *After China eradicated absolute poverty in 2020, the problems of relative poverty and urban poverty will draw more attention. Social protection system in urban areas lays the groundwork for economic transition and social stability. The targeting accuracy of urban minimum livelihood guarantee (Dibao) system is the key to the success of the system. After analyzing urban Dibao's targeting practice and performance with household survey data, this study found that the issuance of Dibao payments took account of household income, assets and demographic characteristics to ensure minimum livelihood guarantee and meet recipients' urgent needs. This practice is of great importance during China's economic transition. Under the multidimensional review mechanism, the exclusion error of urban Dibao is in the range of 38.45% and 66.28%, and the inclusion error is between 54.59% and 69.17%. By 2013, Dibao's targeting efficiency improved significantly over 2007. In evaluating Dibao's targeting efficiency, it is more appropriate to adopt multidimensional criteria instead of income alone. Multidimensional evaluation is also of great importance for evaluating Dibao's targeting policy.*

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2020 is a decisive year for China's poverty reduction campaign. After eliminating absolute poverty, China will shift the priority of its poverty reduction work to alleviating relative poverty. What will be the main forms and characteristics for China's poverty reduction in the next stage? How to effectively target at the poor? It is vital for policy design to answer these questions. From a long-term perspective, China's rising urbanization, continued migration of rural workforce to urban areas and further equalization of public services underscore the importance of poverty reduction and social protection in urban areas. Rising urbanization calls for improving the urban safety net, which is expected to cover all permanent urban residents in China. Meanwhile, China's economic growth has slowed since the dawn of the new normal, and industrial restructuring, changing patterns of international trade and greater efforts for environmental management have created shocks to people's employment and daily life. Over the years, China's manufacturing sector has seen an increasing capital density and created fewer jobs. Driven by the booming service sector market and thriving e-commerce and digital economy, China has seen a transfer of jobs from manufacturing to the service sector, highlighting structural and frictional unemployment problems such as the re-employment of laid-off workers.

China's urban minimum livelihood guarantee (*Dibao*) system was launched in 1997. During the reform of state-owned enterprises (SOEs), the recipients of urban *Dibao* relief increased sharply in a

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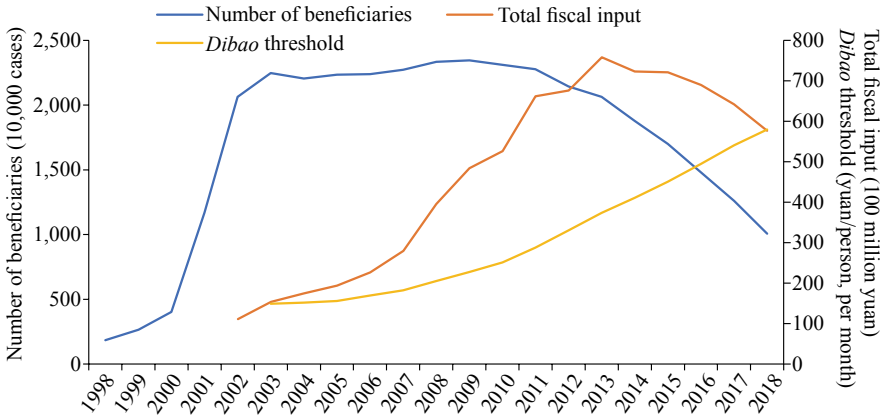


Figure 1: Number of Beneficiaries under China's Urban *Dibao* System, *Dibao* Threshold, and Total Fiscal Input

Source: the Ministry of Civil Affairs, *Statistical Communiqué on Social Service Development* for various years.

couple of years after 2000. In over a decade after 2002, the number of *Dibao* recipients stayed above 20 million persons. As a regular institutional arrangement, the *Dibao* system had problems such as the unintended inclusion of non-poor households and exclusion of eligible poor households exclusion error. Since 2011, the Ministry of Civil Affairs has enhanced the review and management of *Dibao* eligibility, removed ineligible recipients on a mass scale, and worked to improve *Dibao*'s targeting mechanism. From 2014 to 2018, the number of *Dibao* recipients in China decreased at an annual rate of 9.07%, 9.37%, 12.99%, 14.81%, and 20.14% year-on-year (see Figure 1); in 2018, the number of urban *Dibao* recipients more than halved from 2012. After taking stock of China's urban *Dibao* policy's evolution and evaluating its targeting efficiency based on urban household data, this paper will discuss problems regarding *Dibao*'s targeting efficiency using the income indicator, examine the multidimensional considerations and decision-making mechanisms of the civil affairs authorities in reviewing applicants for urban *Dibao* allowance, test the targeting efficiency of urban *Dibao* under a multidimensional evaluation mechanism, and analyze its explanatory power of *Dibao*'s targeting error when measured solely by the income indicator. Finally, this paper concludes with key findings and policy discussions.

1. Evolution of Urban *Dibao*'s Targeting Policy

In the two decades from 1999 to 2020, China has established and refined its urban minimum livelihood guarantee (*Dibao*) policy. According to the *Regulations on the Minimum Livelihood Guarantee for Urban Households* enacted in 1999, cities shall provide living allowances to urban residents with local urban household registration (*hukou*) if their household per capita incomes are below the local minimum livelihood standard. In its *Emergency Notice on Strictly Regulating the Administration of the Minimum Livelihood Guarantee System* issued in 2004, the Ministry of Civil Affairs acknowledged the inclusion and exclusion errors in the implementation of the *Dibao* system. In its *Measures for the Recognition of Urban Low-Income Households* released in 2008, the Ministry of Civil Affairs incorporated household assets into the consideration of household economic conditions, identifying household income and assets as two criteria for identifying urban low-income households. In the *Notice on Further Enhancing the Identification of Eligible Urban Dibao Recipients* released in 2010, the Ministry of Civil Affairs stressed the importance of using household assets as basis for identifying eligible urban *Dibao* recipients. In 2012, the *Measures for the Review and*

Approval of Minimum Livelihood Guarantee Allowances further broadened and standardized the scope of household assets. In 2014, the Ministry of Civil Affairs enacted the *Interim Measures for Social Relief*, requiring recipient households to meet both income and assets criteria, and various localities also adopted thresholds according to local conditions. In the 12 years from 2004 to 2016, the reform of *Dibao* policy focused on removing ineligible recipients by introducing the assets criterion into the review of *Dibao* eligibility.

Dibao's targeting policy was further changed in 2016. The *Guiding Opinions on the Implementation of Rural Minimum Livelihood Guarantee System and Pro-Poor Development Policies by Civil Affairs and Other Departments* was circulated by the State Council. It required that *Dibao* eligibility should encompass the income, assets and necessary spending of household members, and take into account of healthcare expenditure for household members with handicaps and severe illnesses. In 2019, the Ministry of Civil Affairs enacted the *Notice on Further Enhancing Livelihood Guarantee for Laid-Off and Unemployed Persons in Hardships*, which requires necessary household spending to be considered in identifying urban *Dibao* eligibility, adding the third dimension to the targeting basis of urban *Dibao* in addition to income and assets. In December 2019, the Ministry of Civil Affairs enacted the *Guiding Opinions on Enhancing the Evaluation and Identification of Household Economic Conditions as Eligibility Criteria for Rural Minimum Livelihood Guarantee for Eradicating Absolute Poverty*, which identifies two additional indicators for rural *Dibao* eligibility, including daily consumption (water, electricity, fuel gas and telephone bills, etc.) and high consumption (expensive schooling, overseas study, overseas travel, etc.) on the basis of existing criteria of household income, assets and necessary spending. Although this change has yet to be reflected in the urban *Dibao* policy, the eligibility for *Dibao* allowance has already encompassed four dimensions at the implementation level, including income, assets, necessary spending and consumption.

2. Literature Review

In recent years, studies have employed the income indicator to measure *Dibao*'s targeting bias and found significant inclusion and exclusion errors. Gao *et al*. (2009) found that 2.3% of urban households in China were eligible for *Dibao* allowance, but the exclusion error was 54%, and that 74% of *Dibao* recipient households were in fact ineligible. Wang (2006) estimated the inclusion error of *Dibao* system, i.e., the ratio of all beneficiaries who are not eligible, in China's large and medium-sized cities to be 32.2% and the exclusion error, i.e., the ratio of eligible poor households who are not covered, to be 67.4%. Ravallion *et al*. (2006) found the inclusion error of *Dibao* system in Chinese cities during the initial stage of *Dibao*'s implementation to be 43%, and believed that the targeting effectiveness of China's *Dibao* system as a social relief system based on household income to be fair by international standards. Other studies have arrived at similar conclusions, i.e., the effective coverage of China's urban *Dibao* system was in the range of 39% to 51% around 2004, and the inclusion error was 40% to 42% (Du and Park, 2007; Wang, 2007). Yang *et al*. (2015) compared changes in the targeting of China's urban *Dibao*, believing that the exclusion error of China's urban *Dibao* had fallen from 54% to 42% from 2002 to 2007 and that the inclusion error had nudged up from 74% to 76%; the targeting effectiveness of China's *Dibao* system was even worse if examined in terms of *Dibao*'s gaps. Wang *et al*. (2016) estimated the targeting effectiveness of China's urban *Dibao* system to be 26.7%. Some studies on the targeting of China's rural *Dibao* system also found high inclusion and exclusion errors[1]. Song (2018) found that fiscal spending on other social relief and allowance policies were not effectively focused on low-income households. International studies have examined cash transfer programs in other countries. For instance, Veras and Guerreiro (2010) tested the targeting of Brazil's Bolsa Familia system at and its effects on poor households, and found its inclusion error to be 49% and exclusion error to be 59%.

In recent years, some policy authorities and researchers have considered it erroneous to measure *Dibao*'s targeting efficiency solely based on income. Ravallion (2008) found that the issuance of *Dibao* allowance was based on households' financial assets, durable goods consumption and living conditions instead of their self-reported income alone; if measured by income, the *Dibao* system would have a inclusion error of 43% and exclusion error of 71%; with other household economic indicators taken into account, however, these figures would be both 49%; the urban *Dibao* system was more effective at protecting minimum livelihood with factors other than income taken into account. As Liu (2012) noted, it would be hard to conduct an accurate survey of the economic conditions of *Dibao* recipient households, and local governments classified recipients with special hardships into different categories to provide them with tailored social protection - including to *Dibao* recipients, the oldest old, handicapped persons, and others with special hardships - not just based on their household income. Yao (2018) considered *Dibao*'s targeting effectiveness as subject to factors like local governments' social protection goals, priorities, difficulties for verifying incomes and assets, and the poor's initiative to apply, which make it inappropriate to measure *Dibao*'s targeting effectiveness solely based on income. According to Golan *et al*. (2017), since observable household economic conditions - including income that is hard to measure precisely - are an important basis for reviewing *Dibao* eligibility, *Dibao*'s targeting effectiveness solely based on income cannot reflect such an operational mechanism.

More recent studies are shifting towards multidimensional poverty approaches for evaluating household poverty and testing *Dibao*'s targeting efficiency. Those studies include Han and Xu (2013), Zhu and Li (2017), Wang *et al*. (2016), Golan *et al*. (2017), among others. By examining household assets, workforce, child education and health conditions, they defined the level of multidimensional household poverty and tested whether *Dibao* had targeted at poor households. Most of those studies have adopted multidimensional poverty criteria to define poor households and found certain improvements in the targeting effectiveness of China's *Dibao* system. Some studies have introduced the propensity score matching (PSM) method for evaluating *Dibao*'s targeting effectiveness. For instance, Golan *et al*. (2017) found that after matching with family structure, living environment, the amount of durable consumer goods, community environment, among other factors, taken into account using the PSM method, the correct identification rate of China's rural *Dibao* system rose from 6% to 17% in 2007, from 7% to 20% in 2008, and from 11% to 17% in 2009.

Compared with the existing literature, this paper's contributions are threefold: first, this paper employs updated data to keep track of new developments under new policies to make up for the paucity of latest evaluation of the urban *Dibao* system's targeting performance. Such reassessment of urban *Dibao*'s targeting performance is necessary since the Ministry of Civil Affairs has improved *Dibao*'s eligibility review and administration after 2011. Second, this paper examines the multidimensional evaluation of eligibility for urban *Dibao* and uses this evaluation mechanism to test *Dibao*'s targeting error and distinguish between inclusion and exclusion as targeting errors measured by the income indicator and spurious inclusion and exclusion error arising from flexible demarcation. This approach is of academic value for a correct assessment of *Dibao*'s targeting efficiency and targeting error. Existing studies have identified *Dibao*'s targeting problems of inclusion and exclusion error without delving into the causes and consequences of those problems, leaving a gap to be addressed in this paper. Third, this study provides empirical basis for further improving the targeting policy, which is of practical value for improving the urban *Dibao* system. Despite policy adjustments and inclusion of more evaluation dimensions into the targeting mechanism, the government has yet to release standards and specific *Dibao* eligibility criteria to standardize *Dibao* eligibility at the local level, which is already based on all-round considerations. Without official guidelines for evaluating *Dibao*'s targeting efficiency, it is hard to identify problems existing in urban *Dibao*'s targeting performance and priorities of the targeting mechanism. This study offers empirical evidence for further improving the targeting policy, which is of practical significance to improving the urban *Dibao* system.

3. Data Source, Definition of *Dibao* Recipients and Evaluation of Targeting Efficiency

3.1 Data Source and Definitions of Income, Consumption and *Dibao* Recipients

Data employed in this paper are urban data of 2013 from the China Household Income Project (CHIP) surveys, and household disposable income encompasses household cash income and income in-kind from all sources, including wage income, net business income, net property income and net transfer income. Net transfer income contains *Dibao* allowance and other transfer incomes from the government. To test *Dibao*'s targeting effect, we deducted *Dibao* income from household disposable income to calculate original household incomes before receiving *Dibao* allowance. Household disposable income after deducting *Dibao* allowance, referred to as "*ex-ante* income", and household disposable income after including *Dibao* allowance, referred to as "*ex-post* income", are divided by the number of permanent household residents and further divided by 12 months to arrive at monthly average *ex-ante* and *ex-post* per capita disposable incomes to compare with local eligibility criteria for minimum livelihood guarantee and determine whether a household is eligible for *Dibao* allowance.

Based on data availability, this paper follows two methods for identifying *Dibao* households. The first method is based on *Dibao* allowance observation. If the "*Dibao* allowance" in a sample household's income source in 2013 is positive, it is regarded as a *Dibao* recipient ("*Dibao* Recipient Definition 1"). The second method is based on self-reported information from household heads. If a household head reports his or her household as a *Dibao* recipient by the end of 2013, this household is then regarded as a *Dibao* recipient ("*Dibao* Recipient Definition 2"). The distribution of *Dibao* recipients under both definitions is shown in Table 1. Overall, 3.14% of sample households received *Dibao* allowance, and 3.32% of household heads reported they were *Dibao* recipients by the end of 2013. Surveyed *Dibao* coverage was below urban *Dibao* coverage rate released by the National Bureau of Statistics (NBS). At the individual level, however, 2.72% of individual samples reported they were *Dibao* recipients by the end of 2013, which chimes with data released by the Ministry of Civil Affairs. The number of *Dibao* recipients released by the Ministry of Civil Affairs refers to households with individual *Dibao* recipients, many of whom entered into *Dibao* coverage as single-person recipients. Data employed in this paper are well-representative of China's nationwide urban *Dibao* system.

3.2 Method for Evaluating Targeting Efficiency

The desirable targeting result of the *Dibao* system is the coverage of all eligible households, i.e., universal coverage, while excluding ineligible ones. We define "Accuracy of inclusion *P*1" and "Accuracy of exclusion *P*2" for measuring *Dibao*'s targeting efficiency with the equation specified as follows. When *P*1 is 100%, all eligible households are covered, achieving universal coverage; when *P*1 is 0, all eligible households are excluded. The higher *P*1's value is, the more efficient *Dibao* is at targeting poor

Table 1: Distribution of *Dibao* Recipients under the Two Definitions

Sample distribution (%)		Entitlement to *Dibao* allowance by the end of 2013 reported by household heads (%)		
		Yes	No	Sum
Receipt of *Dibao* allowance by the end of 2013	Yes	1.2837	1.8561	3.1398
	No	2.0405	94.8197	96.8602
	Sum	3.3242	96.6758	100.0000

Source: CHIPS2013 urban data, calculated by authors.

households. 1-*P*1 is the exclusion error indicator often used in the literature (Golan *et al*., 2017). When *P*2 is 100%, all ineligible households are excluded; when *P*2 is 0, all *Dibao* recipients are ineligible households; the higher *P*2's value is, the smaller the inclusion error.

$$P1=\frac{\text{Number of households eligible for and covered by } Dibao}{\text{Number of eligible households}} \quad (1)$$

$$P2=\frac{\text{Number of households ineligible for but still covered by } Dibao}{\text{Number of ineligible households}} \quad (2)$$

Desirably, fiscal funds for the *Dibao* system should be completely disbursed to eligible *Dibao* households. We define "Concentration of quotas *P*3" and "Concentration of funds *P*4" as two indicators for measuring *Dibao*'s targeting efficiency. Where, *P*3 measures the proportion of eligible households to all *Dibao* recipient households, and 1-*P*3 is the "inclusion error" indicator often used in the literature (Golan *et al*., 2017); *P*4 measures *Dibao* income received by eligible households as a share of total *Dibao* allowances granted to all recipient households. When the values of *P*3 and *P*4 are 100%, *Dibao* has the highest targeting efficiency, and when the values of those two indicators are 0, *Dibao* has the least targeting efficiency. Higher value of the indicators suggests greater targeting efficiency of *Dibao* funds.

$$P3=\frac{\text{Number of eligible households covered by } Dibao}{\text{Total number of households covered by } Dibao} \quad (3)$$

$$P4=\frac{\text{Total payments of } Dibao \text{ allowances to eligible households}}{\text{Total amount of } Dibao \text{ payments}} \quad (4)$$

3.3 *Dibao*'s Targeting Performance Measured by Income

The distribution of whether household per capita incomes are below the *Dibao* line and the coverage of eligible households by the *Dibao* system are shown in Table 2. Among 6,601 household samples, some 95.45% to 95.58% reported their weighted monthly per capita incomes above the *Dibao* line and were not targeted by the *Dibao* system; 0.22% to 0.31% of household samples reported per capita monthly incomes below the *Dibao* line and were covered by the *Dibao* system; 3.00% to 3.13% of households reported per capita monthly incomes above the *Dibao* line and received *Dibao* allowances; 1.1% to 1.20% of households reported per capita monthly income below the *Dibao* line but received no *Dibao* allowance.

Table 2: Distribution of Whether Household Incomes Are below the *Dibao* Line and Whether Households Are *Dibao* Recipients

		Whether average monthly incomes in 2013 met *Dibao* eligibility		
		Yes	No	Sum
Coverage definition 1: Receipt of *Dibao* allowance in 2013	Yes	0.3145	3.0001	3.3145
	No	1.1027	95.5827	96.6855
	Sum	1.4172	98.5828	100.0000
Coverage definition 2: Entitlement to *Dibao* allowance by the end of 2013 reported by household heads	Yes	0.2184	3.1281	3.3464
	No	1.1988	95.4547	96.6536
	Sum	1.4172	98.5828	100.0000

Source: CHIPS2013 urban data, calculated by authors.

Table 3: Targeting Performance of China's Urban *Dibao* System Measured by Income

	Accuracy of inclusion (*P*1)	Accuracy of exclusion (*P*2)	Quota concentration (*P*3)	Fund concentration (*P*4)
Receipt of *Dibao* allowance in 2013	22.1916	96.9568	9.4886	12.9516
Entitlement to *Dibao* allowance by the end of 2013 reported by household heads (%)	15.4107	96.8269	6.5264	

Source: CHIPS2013 urban data, calculated by authors.

Targeting indicators *P*1, *P*2, *P*3 and *P*4 under both *Dibao* definitions are shown in Table 3. The accuracy of inclusion is 22.19% and 15.41%, respectively. That is, the exclusion error is between 78.80% and 84.59%, and the accuracy of exclusion is close to 97%. The accuracy of inclusion (*P*1) is high if calculated based on Definition 1 and less so if based on Definition 2 (*P*2). *Dibao*'s quota concentration and fund concentration values are both low. Among all *Dibao* households, only 6.53% to 9.49% met eligibility criteria for income, i.e., the inclusion error is 90.51% to 93.47%, and most *Dibao* households had per capita incomes above local *Dibao* lines. Judging by fund concentration, only 12.95% of *Dibao* funds were disbursed to eligible *Dibao* households, and this ratio is higher than quota concentration.

4. *Dibao*'s Targeting Efficiency under a Multidimensional Review Mechanism

4.1 Test of the Existence of a Multidimensional Review Mechanism for *Dibao* Eligibility

Based on *Dibao* eligibility criteria for 2013, we incorporated household income Y and household assets F indicators into the identification mechanism model to test the relationship between the disbursement of allowance and those two types of indicators. Given the different levels of *Dibao* allowance across regions, we measured household income by subtracting regional *Dibao* lines from household *ex-ante* per capita disposable incomes (*DB distance*). The set of household assets indicators F includes financial assets, housing, and car ownership. Among them, financial assets include the two variables of household per capita Renminbi-denominated financial assets (*FA*) and household per capita movable properties (*MP*). Housing conditions include five aspects of housing characteristics: whether the domicile has no access to tap water, no flush toilet, no showering facilities, whether housing construction materials are bricks and tiles or bamboo, grass and adobe structures (other than concrete or masonry), and whether the domicile is not equipped with home appliances. If answers to all the above five questions regarding housing conditions are no, the housing conditions are not considered as poor, and the value of housing hardship indicator HousPoor is 0; if one answer is yes, the value is 1, and so on and so forth; since few households meet three or more aspects of poor housing conditions, the value of *HousPoor* for all those households is 3; car ownership indicator is *Has auto*. In addition, we included a set of basic household demographic characteristics X into the identification model, including household size (*Hhscale*), household head's length of education (*Hhhedu*), whether household head is a divorced or widowed woman (*Frighhh*), number of household members who are disabled or report themselves as in very poor health (*Disab_1* and *Disab_2*), as well as the existence of unemployed persons in a household (*Unemp*). Lastly, we controlled for the fixed effect of region. The operational design and implementation of the *Dibao* system have strong regional characteristics, and the amount of *Dibao* allowance varies at the district/county level. Controlling for the fixed effect at the district/county level, therefore, should be the optimal practice for controlling for the regional difference. Since the incidence of *Dibao* is low and *Dibao* household samples at the district and county level are few, the result of actual estimation could be limited by sample size, thus affecting the robustness of conclusions. Moreover, the scope of samples is

drastically narrowed by controlling for the fixed effect of districts and counties. Hence, we have included a test to control for the fixed effects of cities and provinces for examining the robustness of the model results. The identification mechanism for *Dibao* eligibility is estimated with the Probit model with the following equation:

$$\text{Prob}(DB_i) = \text{f}(Y_i, F_i, X_i, D_i) \quad (5)$$

Where, DB_i denotes whether household i is a *Dibao* household, Prob(DB_i) is the probability of household i to receive *Dibao* allowance, and Y_i, F_i, X_i and D_i respectively denote a set of household i's characteristic variables, including income, assets, demographic structure, and region.

As can be seen from the regression results, the variables of household income and assets are of great importance to determining *Dibao* eligibility, and *Dibao* eligibility review at the local level has observed the policy requirements in this stage. Meanwhile, the effects of household demographic characteristics are also clear (see Table 4). The marginal effect of those variables suggests that income is an important factor for *Dibao* eligibility. Other factors include household head's education, household financial assets, household movable assets, whether there is any unemployed household member, whether the household head is a divorced or widowed woman, and lastly, the number of household members who are handicapped or in poor health. Take Model 1 (controlling for district/county fixed effect), an increase in a household's per capita income by 100 yuan above the local *Dibao* line will lead to a 3.57% decrease in the chance for the household to receive *Dibao* allowance; an increase in the household head's length of education by one year will lead to a 1.72% decrease in the chance for the household to receive *Dibao* allowance; an increase in the household per capita financial assets by 10,000 yuan will lead to a 1.05% decrease in the chance for the household to receive *Dibao* alliance; an increase in the household per capita immovable assets by 10,000 yuan will lead to a 0.72% decrease in the chance for the household to receive *Dibao* allowance; unemployment will lead to a 0.90% increase in the chance for a household to receive *Dibao* allowance; household head being a divorced or widowed woman will lead to a 0.18% increase in the chance for the household to receive *Dibao* allowance; and the existence of a household member who is disabled or in poor health will lead to a 0.11% increase in the chance for the household to receive *Dibao* allowance. After controlling for the fixed effects of city and province, the conclusions are still robust, and multidimensional factors still exhibit significant effects. These results suggest that China's urban *Dibao* eligibility review has adopted multidimensional criteria: income level has indeed played a dominant role, household financial assets are an important condition for obtaining *Dibao*, and household fragility will affect a household's *Dibao* coverage. The fact that the household head's longer education is correlated with a smaller chance for the household to be covered by *Dibao* - instead of a result of *Dibao*'s targeting discrimination - is likely to be because better educated household heads are less keen to apply for *Dibao* as mentioned by Yao (2018). The fact that household fragility will increase the chance for a household to be covered by *Dibao* reflects the multidimensional review mechanism at work.

4.2 *Dibao*'s Targeting Performance under a Multidimensional Review Mechanism

Based on the estimated results of Table 4, we further estimated the probability $\widehat{P}_l$ for each household to obtain *Dibao* allowance. Specifically, the values of household i's characteristic variables (including the distance between household *ex-ante* per capita monthly income and the *Dibao* line, household assets, housing conditions, car ownership and variables of household demographic structure) are substituted into Models 1-3, and the resultant value of the explained variable $Prob(DB)_i$ is the estimated probability for the household to receive *Dibao* allowance under the multidimensional review mechanism. Then, we employed the following two methods to determine whether a household is eligible for *Dibao*. First, whether the estimated probability $\widehat{P}_l$ for a household to receive *Dibao* allowance is greater than 50%: if $\widehat{P}_l$ is greater than or equal to 50%, the household is more likely to be deemed as eligible for *Dibao* under

Table 4: Test of *Dibao*'s Targeting Mechanism Measured by Multidimensional Factors

	1	2	3
DB distance	-0.0023***	-0.0014***	-0.0009***
	(4.8224)	(4.5144)	(5.0023)
FA	-0.0057***	-0.0029***	-0.0023***
	(2.9154)	(2.5898)	(3.0198)
MP	-0.0080**	-0.0049**	-0.0024**
	(2.4028)	(2.5193)	(2.0532)
HousPoor1	0.0056	0.0038	0.0026
	(1.1585)	(1.3666)	(1.3667)
HousPoor2	0.0094	0.0066	0.0054*
	(1.3808)	(1.6197)	(1.9226)
HousPoor3	-0.0038	-0.0008	0.0002
	(0.4688)	(0.1752)	(0.0779)
Has auto	0.0105	0.0059	0.0014
	(1.3973)	(1.3472)	(0.4874)
Hhscale	-0.0046**	-0.0027**	-0.0009
	(2.4938)	(2.4653)	(1.4014)
Hhhedu	-0.0021***	-0.0010**	-0.0006**
	(2.9128)	(2.5724)	(2.3551)
Frighhh	0.0208***	0.0110***	0.0076***
	(3.0447)	(2.7457)	(2.8507)
Disab_1	0.0322***	0.0172***	0.0105***
	(3.3974)	(3.1160)	(3.0202)
Disab_2	0.0013	0.0001	-0.0024
	(0.0416)	(0.0031)	(0.1611)
Unemp	0.0149***	0.0082***	0.0046**
	(2.8344)	(2.6105)	(2.2963)
Fixed effect	District-county level	Municipal level	Provincial level
Constant term	0.0482**	-0.0004	-0.0091
	(1.9988)	(0.0430)	(1.2686)
Sample size	2,092	2,910	4,398

Source: CHIPS2013 urban data, calculated by authors.

Notes: ***, ** and * denote significance at 1%, 5% and 10% levels, and numbers in parentheses are *t* statistics.

the current *Dibao* eligibility review practice; on the contrary, if $\widehat{P}_l$ is smaller than 50%, the household is less likely to be deemed as eligible for *Dibao* under the current *Dibao* eligibility review practice. We refer to the household eligibility status thus determined as Q1. The number of households deemed as eligible based on this method is smaller than that of households actually receiving *Dibao* allowance, which indicates that the 50% probability threshold is a more stringent standard set for the review mechanism as reflected by current policy practices.

Second, we determined the probability threshold $\overline{P}$ according to the principle of "selecting the same number of households" to make the number of $\widehat{P}_l > \overline{P}$ households equal to that of households actually receiving *Dibao* allowance. If the estimated probability for a household *i* to receive *Dibao* allowance $\widehat{P}_l > \overline{P}$, we consider the household as eligible for *Dibao*, and if $\widehat{P}_l < \overline{P}$, the household is ineligible; and the *Dibao* eligibility status thus defined is Q2. The thresholds for receiving *Dibao* allowance under the review mechanism in Models 1 - 3 are 43.46%, 25.95% and 19.50%, respectively, which are all below the 50% level in the first method. By the definitions of Q1 and Q2, urban *Dibao*'s targeting performance is shown in the following Table 6. Where, the results estimated based on Model 1 are the targeting

performance of *Dibao*'s eligibility review mechanism obtained from the robustness test after controlling for the fixed effects of city and province, and Models 2- 3 are *Dibao*'s targeting performance obtained after controlling for the fixed effects of city and province. Meanwhile, we have listed the evaluation results of targeting efficiency measured by income as reference. Based on the considerations of three-dimensional characteristics including household income, assets and demographic characteristics, the exclusion accuracy of China's urban *Dibao* system remains basically unchanged relative to the targeting status by the income threshold, and the accuracy of inclusion, quota concentration and fund concentration have all significantly increased. With the accuracy of inclusion estimated with $\hat{P}_l$ >0.5 still higher than the accuracy of inclusion *P1* estimated by "selecting the same number of households", the implication is that if *Dibao* eligibility is determined by more stringent criteria under the current review mechanism, most eligible households would be effectively included under the *Dibao* system.

Comparison of *Dibao*'s targeting performance estimated with Method Q2 and targeting performance estimated with the income standard (as shown in Table 5) leads to three key findings: first, the exclusion error of the urban *Dibao* system is between 38.45% and 66.28%, i.e., between 1-61.55% and 1-33.72%. That is to say, although the per capita monthly incomes of some households are below *Dibao* criteria, they were not included under the urban *Dibao* system due to their assets, household demographics and other characteristics. Obviously, it is necessary to introduce supplemental indicators into the evaluation of urban *Dibao*'s targeting performance. Second, the accuracy of exclusion falls into the value range of 94.45% and 97.75%, which is roughly equivalent to the accuracy of exclusion measured by the income indicator, reflecting the effective exclusion of ineligible households by the civil affairs authorities. However, the accuracy of exclusion obtained after controlling for the district/county fixed effect is smaller than that measured by the income threshold. A possible explanation is that if multidimensional factors are taken into account, *Dibao*'s efficiency of exclusion is worse than the result measured by the income threshold. Some households eligible by their income level should actually be excluded if measured by multidimensional factors. It remains extremely important to further identify households in real hardships based on multidimensional indicators and exclude ineligible *Dibao* households. Third, quota concentration rose to a range between 30.83% to 45.41% (i.e., the inclusion error has been decreased to the range between 54.59% and 69.17%), and fund concentration increased to a range between 38.83% and 53.18%. Capital concentration is higher than quota concentration, and the difference between the two (preference of funds granted to eligible groups) is significantly higher than

Table 5: *Dibao*'s Targeting Efficiency by Multidimensional Criteria

Dibao's definition 1	Accuracy of inclusion (*P*1)	Accuracy of exclusion (*P*2)	Quota concentration (*P*3)	Fund concentration (*P*4)
Estimated with p>0.5 (Q1)				
Model 4 (district/county level fixed effect)	63.6916	93.5682	18.7148	25.5770
Model 5 (municipal fixed effect)	61.2315	95.1954	14.4748	19.5840
Model 6 (provincial fixed effect)	80.1950	96.9855	6.6391	10.6126
Estimated by "selecting the same number of households" (Q2)				
Model 4 (district/county level fixed effect)	61.5522	94.4357	30.8306	38.8277
Model 5 (municipal fixed effect)	46.8023	96.8012	45.4068	53.1834
Model 6 (provincial fixed effect)	33.7236	97.7501	32.2889	44.7969
Reference: Measured by the income indicator	22.1916	96.9568	9.4886	12.9516

Source: CHIP surveys data (2013), calculated by authors.

that measured by the income threshold. These results suggest a higher proportion of eligible households among *Dibao* recipients than the results estimated with the income indicator. Judging by the distribution of funds, *Dibao*'s transfer payments are more focused on multidimensionally poor households.

Comparison of *Dibao* eligibility under the income and multidimensional review methods uncovers potential key problems in *Dibao*'s targeting. The cross-distribution of households' receipt of *Dibao* allowance and eligibility measured by income and multidimensional indicators are shown in Table 6. If measured by multidimensional indicators, 26.12% of urban *Dibao* recipients in China considered ineligible are actually eligible, but 76.10% of uncovered households considered eligible are actually ineligible. *Dibao*'s overall targeting performance is better than the results measured by the income indicator alone. Yet we also found that 9.44% of "correctly targeted *Dibao* households" are ineligible by multidimensional criteria, i.e., inclusion error, while 1.84% of "correctly excluded households" could be entitled to *Dibao*, i.e., exclusion error. A further inspection of the effects of such biases reveals that households correctly included by the income indicator account for 0.31% of total household samples (see Table 4), of which 9.44% are mistakenly included, accounting for 0.03% of total households.

Households mistakenly included by the income threshold account for 3.00% of total household samples, of which 26.12% are actually eligible by multidimensional criteria, accounting for 0.78% of total households. Uncovered households eligible by the income indicator make up for 1.10% of total household samples, of which 75.6% are ineligible by multidimensional criteria, accounting for 0.83% of total households. Correctly excluded households by the income indicator represent 95.58% of total samples, of which 1.84% are actually eligible but not covered, accounting for 1.76% of total households.

Two conclusions can be drawn based on the magnitude of impact: first, by the income indicator, the biggest problem of China's urban *Dibao* system is exclusion error, i.e., 2.54% (1.76%+0.78%) of households in real hardships are wrongly excluded due to their income level. The other problem is inclusion error: 0.86% (0.83%+0.03%) of low-income households which are not vulnerable groups are mistakenly covered by *Dibao* simply due to low incomes. The exclusion error is three times as high as the inclusion error. Second, for the low-income group, *Dibao*'s targeting error is extremely low no matter measured by the income level or multidimensional criteria. To further improve *Dibao*'s targeting policy, attention should be given to evaluating the real hardships of middle-income families to ensure that no one is left out. In the assessment of *Dibao* eligibility, local authorities would rather "leave out some eligible households than mistakenly including ineligible ones", which led to severe consequences.

Table 6: Comparison of *Dibao*'s Targeting Performance under the Income Indicator and Multidimensional Indicators

Estimated with the equation after controlling for the fixed effect of province		Classification by multidimensional indicators (after controlling for the fixed effect of province)				
		Correctly included households	Wrongly included households	Left out eligible households	Correctly excluded households	Total
Classification by the income indicator	Correctly included households	90.5642	9.4358	0.0000	0.0000	100.0000
	Wrongly included households	26.1179	73.8856	0.0000	0.0000	100.0000
	Left out eligible households	0.0000	0.0000	23.8971	76.1029	100.0000
	Correctly excluded households	0.0000	0.0000	1.8412	98.1588	100.0000
	Total	1.0398	2.1805	2.0435	94.7363	100.0000

Source: CHIP surveys data (2013), calculated by authors.

Table 6 presents the regression results controlling for the fixed effect of province. After controlling for municipal and district/county fixed effects, the multidimensional targeting mechanism has a greater explanatory power for targeting error under the income indicator.

5. Conclusions and Policy Discussions

After eradicating absolute poverty by 2020, China is faced with increasing priorities to address relative poverty and urban poverty. The urban social safety net is expected to achieve near universal coverage and pave the way for successful economic transition and smooth social change. Targeting accuracy is key to success of the urban *Dibao* system. After constant policy reforms in recent years, China's urban *Dibao* system has improved the identification of social groups in hardships and broadened the criteria from income alone to a four-dimensional evaluation system. Biases in the operation and policy design of *Dibao* eligibility make it elusive to evaluate *Dibao*'s targeting efficiency. Based on the existing literature, which identified *Dibao*'s inclusion and exclusion errors, this paper further analyzed the composition and causes of those inclusion and exclusion errors.

In the two decades from 1999 to 2019, China's urban *Dibao* targeting policy was established and refined. In this paper, we found that although each city had its own minimum livelihood guarantee (*Dibao*) threshold, the issuance of urban *Dibao* allowance was based on not just household income but multidimensional considerations such as household income, assets, and demographic characteristics. The multidimensional evaluation system reflects the complexity in the determination of *Dibao* eligibility. Asset difference and employment shocks create even greater impacts, and fragile households are faced with fewer alternative means of livelihood. These problems are more striking for urban poverty. The multidimensional evaluation of *Dibao* eligibility addresses both livelihood and urgent needs, which is vitally important during this stage of economic transition and mass re-employment of workers in other sectors or regions. Under the multidimensional evaluation mechanism, the urban *Dibao* system had an exclusion error rate between 38.45% and 66.28%, and the error rate of inclusion was between 54.59% and 69.17%, both of which are significantly below the targeting error rate estimated with the income indicator. China's urban *Dibao* system had a much higher targeting efficiency in 2013 than that in 2007.

The conclusions of this paper are as follows: while the targeting efficiency of China's urban *Dibao* system measured by the income indicator kept worsening over recent years, this paper found that the urban *Dibao* system had followed multidimensional indicators to evaluate households' *Dibao* eligibility, which reflects progress in *Dibao*'s targeting policy. Among various dimensions of *Dibao* eligibility, household income and assets are the most influential factors, followed by household employment and demographic features. The multidimensional considerations of *Dibao*'s targeting largely explain urban *Dibao*'s targeting error measured by the income indicator. This paper also identified mid-and low-income households and middle-income households as the most vulnerable to be mistakenly excluded and the most fragile during economic transition. If measured by the income indicator alone, the exclusion error would be three times as high as the inclusion error. This points to an urgent need for a more precise multidimensional evaluation policy for the *Dibao* system. Further standardizing the screening policy of the multidimensional evaluation system is key to improving the urban *Dibao* system in the next stage. Only with multidimensional eligibility criteria will the multidimensional evaluation system be free from interference of subjectivity and identification errors. CE

References:

[1] Deng, D. S., and Z. W. Wang. 2008. "Targeting the Object of Minimum Standard of Living in the Countryside under 'Hard System' and 'Soft Environment' Background: A study Based on Data of Rural Residents in 33 County Level Cities and Counties, 10 Provinces." *Chinese Journal of Population Science*, 5: 18-25.

[2] Du, Y., and P. Albert. 2007. "Urban Poverty in China: Social Assistance and Its Effects." *Economic Research Journal*, 12: 24-33.

[3] Gao, Q., I. Garfinkel, and F. Zhai. 2009. "Anti-poverty Effectiveness of the Minimum Living Standard Assistance Program in Urban China." *Review of Income and Wealth*, 55: 630-655.

[4] Golan, J., T. Sicular, and N. Umapathi. 2017. "Unconditional Cash Transfers in China: Who Benefits from the Rural Minimum Living Standard Guarantee (*Dibao*) Program?" *World Development*, 93: 316-336.

[5] Han, H. W., and Y. B. Xu. 2013. "A Study on the Poverty Targeting of the Minimum Living Standards Security (MLSS) Scheme in Rural China: Evidence from Henan and Shaanxi Province." *Chinese Journal of Population Science*, 4: 117-125.

[6] Liu, X. T. 2012. "Prominent Problems and Policy Suggestions of Urban Minimum Living Allowance in China." http://shaanxi.mca.gov.cn/article/llyj/201210/20121000367730.shtml.

[7] Ravallion, M. 2008. "Miss-targeted or Miss-measured?" *Economics Letters*, 100: 9-12.

[8] Ravallion, M., S. Chen and Y. Wang. 2006. "Does the Di Bao Program Guarantee a Minimum Income in China's Cities?" In *Public Finance in China: Reform and Growth for a Harmonious Society,* edited by Jiwei Lou & Shuilin Wang. The World Bank, 317-334.

[9] Song, J. 2018. "Beneficiaries and Redistribution Effect of Fiscal Expenditure on Heating." *Journal of Beijing Technology and Business University* (Social Sciences), 33(6): 23-31.

[10] Veras, P. and R. Guerreiro. 2010. "Evaluating the Impact of Brazil's Bolsa Família Cash Transfer Programmes in Comparative Perspective." *Latin American Research Review*, 45: 173-190.

[11] Wang, D., S. Li, and J. Song. 2016. "China's *Dibao* Program and Its Impacts on Urban Poverty and Inequality." The World Bank Working Paper.

[12] Wang, M. 2007. "Emerging Urban Poverty and Effects of the *Dibao* Program on Alleviating Poverty in China." *China & World Economy*, 15: 74-88.

[13] Wang, Y. J. 2006. "The Evaluation of the Implementation of the Minimum Living Security Policy for Urban Residents." *Statistical Research*, 10: 49-54.

[14] Yang, S., Q. Gao, and S. Li. 2015. "Targeting and Anti-Poverty Effectiveness of the Urban *Dibao* in China." *Studies in Labor Economics*, 3: 52-78.

[15] Yao, J. P. 2018. "The Targeting Dilemma of Urban *Dibao* in China: Eligibility Obstruction, Technological Problem, or Political Influences?" *Journal of Social Science*, 3: 61-72.

[16] Zhu, M. B., and S. Li. 2019. "The Key to Precise Poverty Alleviation Rests in the Precise Identification of Impoverished Populations: An Analysis of the Targeting Effectiveness of China's Rural *Dibao* Program." *Social Sciences in China*, 40(2): 60-76.