# Capital assets and poverty transitions in rural China

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# Abstract

**Purpose** – This article aims to examine the role of capital assets in rural household poverty transitions of poverty escape and poverty descent over periods of 2014–2016 and 2016–2018.

**Design/methodology/approach** – Based on the sustainable livelihood approach, this paper uses binary logit model to explore the influence of multidimensional capital assets on poverty transitions and use instrumental variable estimation to solve the endogeneity between total net asset and poverty transitions.

**Findings** – Capital assets have significant impacts on household poverty transitions. The role of capital assets in households' poverty escape and poverty descent are not symmetrical. The authors verify that rural households with rich total net asset are more likely to escape poverty and less likely to descend into poverty by using instrumental variable estimation. The authors verify that there is a mediation effect that total net asset can help households' escaping poverty and prevent them from falling into poverty through promoting rural households to engage in business activities.

**Originality/value** – This paper is the first to explore how capital assets affect poverty transitions in rural China based on the sustainable livelihood approach. The findings of this research can provide valuable policy implications for the pursuit of common prosperity in China and references for other developing countries.

Keywords Poverty escape, Poverty descent, Capital assets, Poverty transitions, Rural China Paper type Research paper

# 1. Introduction

By the end of 2020, China had achieved her historic goal of eradicating absolute poverty. However, this does not imply the abolition of anti-poverty programs (Deng *et al.*, 2020). Instead, endless situations and problems continue to emerge (Liu *et al.*, 2018; Zhou and Liu, 2022), including the challenging issue of the "re-poverty phenomenon," whereby individuals who have previously been lifted out of poverty return to it (Pan *et al.*, 2022). According to a 2017 United Nations report (United Nations, 2017), 1.45 billion workers worldwide face a constant risk of slipping back into poverty. In China, nearly 2 million people who have escaped poverty are at risk of returning to it (LGOPAD, 2020).

Chinese scholars have been paying increasing attention to the "re-poverty phenomenon." Related research has conducted extensive analysis on the impact of various internal and external factors on poverty return, such as disease and health (Wang and Liu, 2019), education level (Li, 2019), economic factors (Zhuang *et al.*, 2011), institutional factors (Chen and Li, 2009; Zhuang *et al.*, 2011), and geographical and environmental factors (Bao and Yang, 2018; Yan *et al.*, 2022). However, only a small amount of literature has analyzed poverty return from the perspective of household assets, such as Lv *et al.* (2021) and Zhou and Wang (2019). Therefore, further research is needed to understand the role of household assets in poverty transitions.

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Studies have shown that capital assets play a critical role in enabling residents to resist the risks of returning to poverty. Physical capital endowments have been found to be closely associated with changes in poverty (Deininger and Okidi, 2003), while financial assets serve as important sources of income diversification (Brandolini *et al.*, 2010). In addition, natural capital, such as access to farmland, is crucial for rural households to sustain their livelihoods (Bhandari, 2013). For long-term development, human capital and social capital can provide a bottom-up approach to poverty alleviation (Banerjee and Duflo, 2011; DFID, 2000). However, previous studies examining single assets might not fully capture the complex interrelationships and trade-offs among them (Toner, 2003). The breaking down of people's livelihood capitals into different assets "tells us nothing of the relationships between assets, of how assets may change over a lifetime, or whether having high levels of one particular asset smoothing has received little prior theoretical attention (Drèze and Sen, 1991) until the sustainable livelihood approach (SLA) was developed to seek ways of nurturing and combining various assets to ensure survival (DFID, 2000).

Poverty transitions remain a contentious topic in academia, and preventing households from falling back into poverty is crucial (Deng *et al.*, 2020; Li *et al.*, 2019). Against the backdrop of the re-poverty phenomenon and the goal of achieving common prosperity, this paper seeks to investigate the impact of multidimensional capital assets in rural households on poverty transitions based on the sustainable livelihood approach. This research can contribute to enriching poverty prevention theory by providing important academic insights. Through empirical analysis, we find that capital assets significantly inhibit poverty return and promote poverty alleviation, with physical, natural, social and human capital having significant and positive effects on assisting rural households to escape poverty. Additionally, physical and social capitals have significant influences on preventing rural households from falling into poverty. We use instrumental variable estimation to confirm that rural households with rich total net asset are more likely to escape poverty and less likely to descend into poverty. Finally, the mechanism by which assets affect poverty is through the positive impact of total net assets on a household's livelihood strategies of business activities.

This paper is organized as follows. Section 2 introduces the framework. Section 3 introduces data, variable measurement and descriptive statistics. Section 4 presents the regression models and examines the role of capital assets in poverty transitions. Finally, Section 5 concludes the paper.

#### 2. Conceptual framework and empirical evidence

This paper employs the sustainable livelihoods approach (SLA) derived from research on eliminating poverty (Chambers and Conway, 1992; Sen, 1981). The concept of sustainable livelihood can be traced back to the United Nations Conference on Environment and Development proposed in 1992 (UNCED, 1992). The most widely used SLA, developed by the UK Department for International Development (DFID), proposed a number of factors that restricted or improved people's livelihoods and their interactions, such as vulnerability background, livelihood assets, structural and institutional changes, livelihood strategies and livelihood outcomes (DFID, 2000). It emphasized on achieving sustainability through poverty alleviation by using five capital assets: human, social, natural, physical and financial capitals.

#### 2.1 Physical capital and poverty transition

Physical capital includes basic infrastructure and producer goods, such as affordable transportation, safe housing, productive tools and equipment, adequate water supply and sanitation (DFID, 2000). Physical capital is frequently defined by household durables, real

estate and production durables (Deininger and Okidi, 2003; Liu and Liu, 2016; Okrasa, 1999; Soltani *et al.*, 2012). Some also incorporate infrastructure and public services (Foster *et al.*, 2011; Liu and Xu, 2016), community physical resources and urban centers (Bhandari, 2013; Diniz *et al.*, 2013).

Physical assets are typically reviewed as a repository for future consumption that can be converted into cash during times of economic stress (Haveman and Wolff, 2004). It can improve people's ability to diversify their income by engaging in various business activities, such as owning rental properties, operating shops, or operating taxis (Kristjanson *et al.*, 2010). Productive durables, as the building blocks for constructing one's path out of poverty, have both direct and indirect effects on income and thus welfare (Carter and May, 2001) through their impact on income-generating activities (Radeny *et al.*, 2012).

# 2.2 Financial capital and poverty transition

Financial capital typically consists of monetary resources, such as bank holdings and financial investments and is the least accessible asset to the poor (DFID, 2000) because only a few citizens in developing countries own any, and data are unavailable (Moser and Felton, 2007). Financial assets generate income diversification by paying out interest or dividends. Households can rely on financial asset capitalization (i.e., savings) to cover income shortfalls (Adato *et al.*, 2006; Brandolini *et al.*, 2010) and to reallocate their assets to reduce risk exposure (Carter and Barrett, 2006). Households with savings accounts were less vulnerable and more likely to stay out of poverty than those without (Okrasa, 1999).

# 2.3 Human capital and poverty transition

Human capital is the quantity and quality of available labor (Bhandari, 2013; Liu and Liu, 2016). Different dimensions of human capital include education (Bhandari, 2013; Diniz *et al.*, 2013; Liu and Liu, 2016; Sati and Vangchhia, 2017), knowledge, skills (Liu and Xu, 2016; Soltani *et al.*, 2012) and health or nutrition (Liu and Xu, 2016). Poor health could lead to decreased productivity or inability to work and increased household expenditure. Meanwhile, education and training can help people access better jobs (Banerjee and Duflo, 2011) and reduce poverty and new entrants into poverty (Thorat *et al.*, 2017).

### 2.4 Social capital and poverty transition

Social capital mainly consists of three components: social networks, social norms and social trust (Coleman, 1990; van Oorschot *et al.*, 2006). When tragedy strikes, bonding social capital, that is, the strong ties that connect family members, neighbors and close friends, can provide immediate practical assistance (World Bank, 2001). Furthermore, connections to people with political power can benefit the poor (Krishna, 2004). Help from friends and relatives and property inheritance are essential for poverty escape in Kenya (Kristjanson *et al.*, 2010). Household member having a position as a village cadre increases the probability of leaving poverty in three Chinese provinces (Glauben *et al.*, 2012).

# 2.5 Natural capital and poverty transition

Natural capital refers to natural resource stocks that can be used to supplement household income. Land-related variables, such as the right to access or own land and land quality (Bhandari, 2013; Liu and Liu, 2016), water-related factors, climate factors and forests, are commonly used in research to identify natural capital (Sati and Vangchhia, 2017). Liu *et al.* (2017) found that the lack of natural endowments, poor geographic conditions and fragile ecological environment drive China's persistent poverty. In particular, the access to farmland and its ownership is the most important natural capital (Bhandari, 2013). In Kenya, land

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subdivision drives households into impoverishment (Kristjanson *et al.*, 2010). However, Glauben *et al.* (2012) find that land endowment and reliance on cropping as a single household business will result in poverty persistence in China because agricultural activities yield only modest returns.

A review of the literature above shows that very few studies have used current value of monetary assets, possibly because of data limitations. Therefore, these studies may not accurately capture the level of capital assets, such as physical capital and financial capital, and fail to investigate the influence of asset structure on poverty transitions. In particular, financial capital is usually omitted in previous research. Moreover, examining single assets may fail to capture the linkages of different assets and trade-offs among them (Toner, 2003). In this paper, based on detailed asset data at the household level, we have investigated the impact of asset level and the structure of assets on rural household poverty transitions.

#### 3. Data and measures

#### 3.1 Data source

We utilized data from the nationally representative China Family Panel Studies (CFPS) launched by the Institute of Social Science Survey of Peking University [1] in 2014, 2016 and 2018 to investigate the role of capital assets in poverty transitions. The CFPS covers 94.5% of the total population in Mainland China across 25 provinces [2] and provides comprehensive data on community, family, family relationships, adult family members and child family members. Our study employed two traceable datasets comprising 3018 rural households without missing values between 2014 and 2016, and 3946 households between 2016 and 2018, yielding a total sample size of 6964 rural households.

Research on poverty transitions is not limited by the length of data, which differs from the research on poverty duration. Empirical research on poverty transitions, for example, Zhou and Wang (2019) used three rounds of CFPS data from 2010 to 2014. Lv *et al.* (2021) used five rounds of CFPS data from 2010 to 2018. Thorat *et al.* (2017) used two waves of India data over the period 2005–2012. Therefore, although data period is short, we believe that this dataset is suitable for our research purpose.

#### 3.2 Measures of poverty transitions

We first define poverty status in each period as either poor or nonpoor. We then use two periods of poverty status to define the transitions. Specifically, if a household is poor in 2014 (2016) but nonpoor in 2016 (2018), we consider it as out of poverty; if a household is nonpoor in 2014 (2016) but poor in 2016 (2018), we consider it as falling into poverty; if a household is poor in both 2014 (2016) and 2016 (2018), we consider it as consistently poor (poor); if a household is nonpoor in both 2014 (2016) and 2016 (2018), we consider it as consistently poor (poor); if a household is nonpoor (nonpoor). Therefore, we investigate households' poverty transitions over a relatively short period of time. It is important to note that this approach is consistent with previous studies that have focused on short-term poverty transitions, given our data availability.

The conventional income poverty measurement has been widely used but has been criticized for being an imperfect indicator of well-being and the mismeasurement of income (Bosco and Poggi, 2020). Consumption-based measures of poverty seems to be a better indicator of economic status, as they capture what households consume, and the data are more accurate and obtainable (Ucar, 2015). Additionally, using consumption-based poverty measures allows for consistent international comparisons, as the World Bank's widely used international poverty line (IPL) is based on consumption. Therefore, this paper employs a consumption-based poverty standard. According to the World Bank, China entered the ranks

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of upper-middle-income countries in 2010[3]. Therefore, we use US\$5.50 per person per day to measure poverty, adjusted by the 2011 purchasing power parity (PPP) conversion factor [4] and China's consumer price index (CPI) [5] for different years. We also apply the OECD equivalence scale [6] to adjust a household's consumption based on its size and composition.

Table 1 displays poverty transitions using four standards: China's national poverty line, US\$5.50/day IPL, US\$3.20/day IPL and US\$1.90/day IPL. China's national poverty line is an income-based poverty measure. The highest poverty incidence is with US\$5.50/day IPL, followed by US\$3.20/day IPL, China's national poverty line and US\$1.90/day IPL. As poverty line decreases, households falling back into poverty, escaping poverty and remaining poor decrease. The limited sample under lower poverty standards further suggests that we need a higher standard to identify better who is poor.

#### 3.3 Measures of capital assets

The Sustainable Livelihood Approach (SLA) informs our investigation of poverty transitions, with a focus on five key capitals: human, social, natural, physical and financial. Detailed definitions are given in Table 2.

We consider four types of physical capital (houses, durables, business assets and agricultural assets) and two types of financial assets (investment assets and savings), all measured as current market value. Natural capital is limited to the current market value of land assets. We utilized principal component analysis (PCA) to construct separate indices for human and social capital. For human capital, five potential variables were identified and are shown in Table 2. Each indicator, except for job classification, was measured at the household level. Similarly, ten potential indicators were identified for the social capital index, which were measured at the household level. Due to the presence of negative values in both indices, we applied min-max normalization to transform the original index into values between 0 and 1.

#### 3.4 Measures of control variables

Following previous research on poverty transitions, we control household head's characteristics (age, gender, marriage status), family characteristics (family size, dependency ratio [7], income [8], non-housing debts, participation in pension and medical insurance), year and province dummies. Household participation in pension and medical insurance are measured separately by family endowment insurance and medical insurance coverage rates. Year and province dummies are used to control unobservable missing variables. Province dummies control features that do not change over time, such as

Poverty standards	Poverty transitions						
	Nonpoor	Falling into poverty	Poor	Escaping poverty			
US\$5.50/day IPL	4,331	784	808	1,031			
	62.28%	11.27%	11.62%	14 83%			
US\$3.20/day IPL	5,958	349	185	462			
	85.68%	5.02%	266%	6.64%			
US\$1.90/day IPL	6,645	118	34	157			
	95.56%	1.7%	0.49%	2.26%			
China national poverty line	6,111	214	78	551			
(\$/day)	87.88%	3.08%	1.12%	7.92%			

**Note(s):** Current official poverty line is based on the unchanged 2010 price of 2300 yuan and adjusted by consumer price index (CPI) for different years. The official poverty lines (yuan per year/adult unit) were 2800 yuan in 2014, 2950 in 2016 and 2995 in 2018

Source(s): Authors' analysis of China Family Panel Studies

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Table 1. Poverty transitions under different absolute poverty

standards

CAER 15.2	Capital type	Asset categories	Components
10,0	Physical	Net housing asset	Self-owned house
	capital	Durables	Such as vehicles, computers, home appliances, television, jewelry, antiques, and instruments
		Business asset	Self-owned business assets
568		Agricultural asset	Agricultural machines
	<ul> <li>Financial capital</li> </ul>	Savings	Cash and deposits
		Financial products	The stock, fund, state debt, trust, foreign exchange, futures, stock equity, and other financial products
	Natural capital	Land asset	Land asset
	Human capital	Educational year	Family average variables among adults
		Educational level Working years	
		Training experience	Total training times among adults in the past year. Such as tutoring classes for the national judicial examination, foreign language tutoring classes, and ideological and political training
		Job classification	Household head's job classification <sup>1</sup> : jobless, home farming, agriculture work for others, self-employed, and employed by others
	Social capital	Mobile phone usage	Percentage of usage in a family
		Internet usage Monthly wireless fee Frequency of using the internet to study	Family average variables among adults
		Frequency of using the internet to work	
		Frequency of using the internet to socialize	
		Frequency of using the internet to entertain	
		Frequency of using the internet to	
		do commercial-related activities	
		Selfish evaluation of others	
		Relationship expenditure	Total money spent while giving birth festivals
		Relationship experience	weddings, or funerals in the past 12 months
Table 2.		Relationship income	Total money received while giving birth, festivals, weddings, or funerals in the past 12 months
capital, asset categories, and	Note(s): The definitions rel	questionnaire of CFPS did not ask what ated to household head, such as decision	o is the household head of a family, but designed several n maker, finance manager and real estate owner. From an
components	economic poir	it of view, we choose finance manager	to represent the household head of a family in this pape

geographic locations and the culture of a region. Time dummies are to control changes in the macro-environment, such as annual economic situation and policy.

# 3.5 Summary statistics of capital assets and poverty transitions

Table 3 presents summary statistics for five capital assets across poverty status. Apart from the mean of capital assets, we report the differences in mean values for each group. All monetary assets were measured in 10,000 yuan.

Capital and assets	Poor	Escaping poverty	Mean diff	Nonpoor	Falling into poverty	Mean diff	and poverty
Total net asset	13.387	17.993	-4.606***	35.573	19.518	16.055***	transitions
Physical capital	9.793	13.628	$-3.835^{**}$	28.447	14.051	14.396***	
Financial capital	0.917	1.223	-0.306**	2.911	1.813	1.098***	
Natural capital	2.845	3.345	-0.500 **	4.729	4.172	0.557	
Human capital	0.158	0.169	$-0.012^{***}$	0.215	0.190	0.025***	569
Social capital	0.194	0.208	$-0.014^{***}$	0.270	0.223	0.047***	
Proportion to total	net asset						
Physical capital	0.029	0.027	0.002	0.040	0.032	0.008**	
Financial capital	0.073	0.077	-0.004	0.105	0.092	0.014*	
Natural capital	0.277	0.245	0.032***	0.177	0.250	$-0.073^{***}$	Table 3
Observations	808	1,031		4,331	784		Household
Note(s): ***, ** a Source(s): Author	nd * denote rs' analysis	statistical signif of China Family	icance at the 19 Panel Studies	%, 5% and 10	% levels, respectiv	ely	characteristics by poverty status

We found that households with more physical capital have better economic status, implying that physical capital may help households resist risks. When looking at the proportion of physical capital, there is a significant difference between the descending and nonpoor groups, but no significant difference between the escaping and poor groups.

The disparity in financial capital is much smaller than the difference in physical capital. Those with higher economic status have more financial capital. When compared to other groups, the nonpoor group has the highest level and proportion of financial capital.

Natural capital also showed a significant mean difference between the groups. Besides, the land asset proportion makes up the second-largest of the total monetary assets for each group, which indicates that land assets is essential for rural households. However, it showed a negative relationship between land asset proportion and poverty transitions.

The distinction between groups for human capital and social capital remains. Households with higher economic status have higher levels of human capital and social capital than poorer households. Furthermore, the difference in means is statistically significant.

To summarize, summary statistics show a positive relationship between the level of capital assets and the transition from poverty to a better economic status while there is a negative relationship between natural capital proportion and poverty escape. Other factors may affect households' poverty escape and descent apart from capital assets. Therefore, in the following section, we will use logit model to examine the relationship between capital assets and poverty transitions by controlling other factors.

# 4. Empirical analysis

# 4.1 Estimated models

Because escaping and falling into poverty are binary variables, the logit model is used, which has an advantage over the linear probability model in that the estimated probabilities ( $p_i$ ) compiles with the condition,  $0 \le p_i \le 1$ . A standard logit regression model can be stated as follows:

$$Prob(Y = 1|X) = \frac{\exp(X'\beta)}{1 + \exp(X'\beta)} = F(X,\beta)$$
(1)

where *Y* is the economic situation experienced by household *i*, *X* represents the vector of explanatory variables, and  $\beta$  is a vector of coefficients on *x* applicable to households. Equation (1) can be restated and presented in a reduced form as:

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$$Y_i = \beta_0 + \beta_1 C A_i + \beta_2 X_i + \varepsilon_i \tag{2}$$

We use Equation (2) to separately estimate poverty escape and poverty descent. For poverty escape estimation,  $Y_i$  was coded as 1 for escaping poverty and 0 otherwise; for poverty descent estimation,  $Y_i$  was coded as 1 for descending into poverty and 0 otherwise.  $X_i$  represents the vector of control variables.  $CA_i$  is the household capital asset. The logit model can compare groups based on their log odds of escaping or descending into poverty. The odds ratio (OR) is the ratio of the probability of the outcome to the probability of the base category. Logit regressions are clustered at household level to control some heterogeneity at the family level.

It is critical to recognize that capital assets and poverty are endogenous, and thus the observed correlation between these capital assets and poverty transitions may be spurious (Thorat *et al.*, 2017). When endogeneity is not a problem within the specified model, the conventional logit model produces unbiased estimators. We first use lag capital assets in our basic regressions to alleviate the endogeneity. To be specific, we measure the odds of a nonpoor (poor) household in wave one falling into poverty (escaping poverty) in wave two, given the household capital assets and other controls in wave one. Second, the instrumental variable (IV) probit and two-step methods were used to detect and correct the endogeneity of capital assets. Therefore, Equation (2) can be re-estimated as:

First stage estimation:

$$CA_i = \alpha_0 + \alpha_1 Z_i + \alpha_2 X_i + \eta_i \tag{3}$$

Second stage estimation:

$$Y_i = \gamma_0 + \gamma_1 C A_i^* + \gamma_2 X_i + \epsilon_i \tag{4}$$

In Equation (3),  $CA_i$  is the endogenous variable (capital assets) and  $Z_i$  is an instrumental variable for  $CA_i$ . In Equation (4),  $CA_i^*$  is the predicted value for the endogenous variable  $CA_i$ . Following previous research (Lei and Lin, 2009), we instrumented for household capital asset using village-level capital asset which is the mean value of the villages' total net asset (excluding the sample family).

This instrument must meet two requirements to be valid. The first is the presence of a high correlation between household capital asset and village-level capital asset, as shown in the Section 4.3, where the first-stage F statistics are greater than 20 with a *P*-value of 0.00. Second, the village-level capital asset is exogenous in relation to a household's poverty transition status. Since village-level capital asset is higher-level data aggregation, we believe this is a reasonable assumption after controlling for variables at the regional level. Section 4.3 further tests this assumption.

#### 4.2 Baseline regressions

4.2.1 Capital assets and poverty escape. Table 4 presents the odds ratios and coefficient directions of escaping poverty. The significantly positive effect of total monetary assets implies that households with more assets are more likely than poor households to escape poverty. Column (1) and (2) reports the level of households' capital assets. Column (3) shows the proportion of physical, financial and natural capital to total net asset. Column (5) and (6) investigate the interaction term of capital assets.

Column (1) shows that total net asset (total monetary asset) has significant impact on poverty escape. When looking into the structure of total net asset, we find that the level of physical capital and natural capital significantly and positively impact poverty escape but the impact of financial capital is not significant, as shown in column (2). Physical capital may

Variables	(1) Level	(2) Level	(3) Proportion	(4) Level	(5) Level	Capital assets and poverty
Total net asset	1.010***			-0.998		transitions
Physical capital		$1.007^{*}$	-0.673		-0.999	
Financial capital		1.041	1.081		1.006	
Natural capital		1.031***	-0.680*	-turbutu	1.030***	
Human capital	2.823*	2.848*	2.972*	10.260***	$10.190^{***}$	571
Social capital	3.735*	$4.097^{*}$	3.892*	$-0.482_{**}$	-0.682	
Total net asset*human capital				$-0.905^{***}$		
Total net asset*social capital				1.158	0 0 <b>0 **</b> **	
Physical capital*human capital					-0.861	
Physical capital*social capital					1.182	
Financial capital*human capital					1.203	
Financial capital*social capital	V	V	V	V	1.027	
Control variables	Yes	Yes	Yes	Yes	Yes	
Province dummies	Yes	Yes	Yes	Yes	Yes	
Year dummies	res	res	res	res	res	
Observations	1,833	1,833	1,833	1,833	1,833	
Note(s): ***, ** and * denote statis household head	tical signific	ance at the 19	%, 5% and 10% l	evels, respective	ly; hh means	Table 4.Results of poverty
Source(s): Authors' analysis of Ch	ina Family P	anel Studies				escape

encourage rural households to diversify their income-generating activities. However, the effect of physical capital proportion is not significant. The lack of financial asset in capital imperfections may deter households from engaging in risky behavior that could result in an increase in household income in the future (Azpitarte, 2011). Furthermore, barriers and constraints, such as a lack of education, financial services and strict traditional laws can limit rural households' access to and returns on financial assets (Chowa *et al.*, 2012). For natural capital, the level of land assets plays a significant role in poverty alleviation for rural households. Rural households require natural capital because their livelihoods are derived from resource-based activities. However, the proportion result shows that the impact of land proportion is negative, which may be due to the low returns of agricultural activities.

The influences of human capital and social capital are significant at the 10% level and have rather large odds ratios compared to monetary capital assets. We also investigate into the effects between social capital, human capital and monetary capital. The negative effects of the interaction terms between human capital and physical capital, on the other hand, suggest that human capital has a weaker adjustment effect in the relationship between physical capital and poverty escape. This may be due to the low level and low quality of rural households' human capital. Social capital is critical for poverty eradication and has the highest odds ratio. Furthermore, the interaction term between social capital and total monetary asset is positive and significant, implying that social capital has a greater adjustment in the relationship between monetary assets and poverty emancipation.

4.2.2 Capital assets and poverty descent. The odds ratios and coefficient directions for falling into poverty are shown in Table 5. In general, the disadvantages of returning to poverty are explained by households' lower physical and social capital resources.

Column (1) shows that total monetary asset has a negative and significant impact on keeping households out of poverty. Unlike the results of rural households escaping poverty, we find that only physical capital is significant among monetary assets. Physical capital is vital in preventing rural households from falling into poverty. When faced with a severe

0.4 DD						
CAER 15,3	Variables	(1) Level	(2) Level	(3) Proportion	(4) Level	(5) Level
572	Total net asset Physical capital Financial capital Natural capital Human capital	-0.988***	$-0.985^{***}$ -0.998 1.001 1.096	-0.813 1.531 2.377*** 1.023	-0.988 1.510	$-0.977^{***}$ 1.042 1.001 1.238
	Social capital Total net asset*human capital Total net asset*social capital Physical capital*human capital Physical capital*social capital Financial capital*human capital Financial capital*social capital	-0.024***	-0.026***	-0.027***	-0.018*** -0.981 1.015	$-0.021^{***}$ 1.010 1.023 -0.876 -0.935
	Control variables	Yes	Yes	Yes	Yes	Yes
	Province dummies Year dummies	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
Table 5.Results of povertydescent	Note(s): ***, ** and * denote stat Source(s): Authors' analysis of C	5,103 istical significat hina Family Pa	5,103 nce at the 1%, nel Studies	5,103 5% and 10% le	5,103 vels, respectivel	5,103 y

issue, poor households cut spending, sell assets or borrow. It can act as an insurance against descent in poverty. According to Thorat *et al.* (2017), physical capital is more important in explaining who avoids poverty than who escapes poverty. However, when it comes to the OR of physical capital, we find that the probability of descending is lower than the probability of escaping. However, the proportion results show that the effect of physical capital proportion is not significant.

Like poverty escape, a household's financial capital has no significant impact, which may be because rural households hold very few financial products and imperfect financial markets.

Social capital is significantly associated with poverty descent with the largest OR, but human capital is insignificant. Furthermore, we find no interaction effects between social capital and other monetary assets. Different results suggest that the factors affecting households escaping poverty and falling into poverty are hardly symmetrical.

# 4.3 Instrumental variable estimation

Table 6 reports the results of data analysis with IV approach. The F-values of the first stage estimation were larger than 10, which indicated that there is a high correlation between household net asset and village-level capital asset. The *p*-values of IVs in the first stage estimation are 0.00. Additionally, the Wald test showed that the logit model does have some endogeneity. The weak IV tests showed that both AR and Wald tests were significant, which indicated that there is no "weak instrumental variable problem" in this model. Multicollinearity test showed that there was no serious correlation among the explanatory variables. It was confirmed by low values of variance inflation factor (VIF).

Since IV was village level aggregated variable, we controlled province dummies and village dummies. The IV-probit model showed that the impacts of total net asset on poverty escape and poverty descent are significant and odds ratios are similar to our basic logit model. When it comes to the components of capital assets, the level of financial capital and natural capital significantly impact poverty escape. Furthermore, the level of physical capital and social capital significantly affect poverty descent.

Variables	(1) Poverty escape	(2) Poverty escape	(3) Poverty escape	(4) Poverty descent	(5) Poverty descent	(6) Poverty descent	Capital assets and poverty transitions
Total net asset	1 01/***	1.007**		0.000***	0.004***		
Physical capital	1.014	1.007	1.004	-0.330	-0.554	_0.994***	
Financial capital			1.004 $1.034^{**}$			-0.997	
Natural capital			1.004 $1.030^{**}$			-0.998	573
Human capital			1.000			1 543	010
Social capital			1 902			$-0.103^{***}$	
Control variables	Ves	Ves	Yes	Ves	Ves	Yes	
Province dummies	Yes	165	105	Yes	105	105	
Village dummies	100	Ves	Ves	100	Ves	Ves	
Year dummies	Ves	Yes	Yes	Ves	Yes	Yes	
F-value of first stage	32.58***	53 33***	56 54***	60.38***	131 66***	132.04***	
estimation	02.00	00.00	00001	00.00	101100	102101	
<i>b</i> -value of IV for	0.00	0.00	0.00	0.00	0.00	0.00	
physical capital							
<i>p</i> -value of IV for			0.00			0.00	
financial capital							
<i>p</i> -value of IV for			0.00			0.00	
natural capital							
p-value of IV for			0.00			0.00	
human capital							
p-value of IV for			0.00			0.00	
social capital							
Adj R-squared	0.36	0.88	0.89	0.30	0.90	0.90	
p-value of Wald test	0.02	0.65	0.23	0.05	0.05	0.01	
of exogeneity							
p-value of AR of	0.00	0.03	0.02	0.00	0.00	0.00	
weak IV test							
p-value of Wald of	0.00	0.03	0.02	0.00	0.00	0.00	
weak IV test							
VIF	3.20	1.78	1.79	3.17	1.56	1.56	
Observations	1,821	1,664	1,664	4,942	4,199	4,199	
Note(s): ***, ** and *	denote statist	ical significant	ce at the 1%, 5	% and 10% leve	els, respectively	. Other control	Table 6.
variables are the same	e with previou	s models					Instrumental variable
Source(s): Authors' a	analysis of Ch	ina Family Pa	nel Studies				estimate

# 4.4 Mechanism investigation

This section investigates how capital assets affect poverty transitions. People's access to various levels and combinations of assets is most likely the major influential factor in their choice of livelihood strategies (DFID, 2000). Those with a diverse set of assets have a wider range of opportunities and the ability to choose among multiple strategies for changing their livelihoods. Previous research has focused on non-farm or non-agriculture activities (Bhandari, 2013; Hoang *et al.*, 2014; Liu and Liu, 2016), diversified agricultural intensification (Soltani *et al.*, 2012), diversified non-agricultural production methods (Deng *et al.*, 2020) or a mixed strategy combining agricultural and non-agricultural activities (Diniz *et al.*, 2013). Rural households' non-farm or non-agriculture activities have played an important role in household income growth or poverty alleviation in China (Jia *et al.*, 2017; Li *et al.*, 2021). Therefore, we assume that household assets can help rural households escape poverty by promoting their business activities. If any of the family members engage in self-employed business (individually operated business or private enterprises), this household is considered as doing business activities.

CAER	Table 7 presents the results of mechanism investigation using different methods. First, generalized structural equation model showed that there is a significant direct effect of
10,0	business activities on poverty escape and descent. Furthermore, the traditional Baron–Kenny mediation test procedure of logit and IV-probit regressions showed that the total pet asset has
	a positive influence on household's business activities. Different methods confirmed that
574	there is a mechanism that total net asset can help households escaping poverty and prevent them from falling into poverty through engaging in business activities.

#### 4.5 Robustness check

Previous sections have shown that capital assets can help households escape poverty and prevent them from falling into poverty but capital assets affecting households escaping and descending are hardly symmetrical. To prove the robustness of the above conclusions, this section adopts three methods for robustness check.

First, since households' monetary asset may have some extreme values, we bilaterally trimmed the total net monetary asset in the 1% percentile to test the robustness. Table 8 shows the result of deleted samples, which is similar with the basic model. Second,

Variables	(1) Business activities	(2) Business activities	(3) Poverty escape	(4) Poverty escape	(5) Poverty descent	(6) Poverty descent
Generalized structural	equation mode	l (GSEM)				
Total net asset	1.000***		$1.009^{**}$		$-0.986^{***}$	
Business activities			$1.756^{**}$		$-0.353^{***}$	
Observations	6954		6954		6954	
Logit model						
Total net asset	$1.004^{***}$		$1.009^{**}$		$-0.989^{***}$	
Business activities			$1.715^{**}$		$-0.350^{***}$	
Observations	6951		1833		5103	
IV-probit model						
Total net asset	$1.003^{**}$	$1.003^{***}$	$1.013^{***}$	$1.007^{**}$	$-0.991^{***}$	$-0.995^{***}$
Business activities			$1.378^{**}$	$1.426^{*}$	$-0.618^{***}$	$-0.553^{***}$
F-value of first	91.73	107.48	32.75	52.33	61.68	132.32
stage estimation						
p-value of IV	0.00	0.00	0.00	0.00	0.00	0.00
Adj R-squared	0.32	0.83	0.37	0.88	0.30	0.90
p-value of Wald test	0.79	0.25	0.03	0.60	0.07	0.05
of exogeneity						
<i>p</i> -value of AR of	0.04	0.00	0.00	0.04	0.00	0.00
weak IV test						
p-value of Wald of	0.04	0.00	0.00	0.04	0.00	0.00
weak IV test						
VIF	3.07	1.62	3.13	1.77	3.12	1.55
Observations	6768	5100	1821	1664	4942	4199
Controlled	Yes	Yes	Yes	Yes	Yes	Yes
variables						
Province dummies	Yes		Yes		Yes	
Village dummies		Yes		Yes		Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes

Table 7.

Results of mechanism Source(s): Authors' analysis of China Family Panel Studies

variables are the same as previous sections

Variables	(1) Poverty escape	(2) Poverty escape	(3) Poverty descent	(4) Poverty descent	Capital assets and poverty
The subsample of 1%	6 bilaterally trimmed				transitions
Total net asset	$1.010^{**}$		-0.988		
Physical capital		1.007		$-0.985^{***}$	
Financial capital		1.041		-0.998	
Natural capital		1.030		1.002	575
Human capital	3.000*	3.034	1.074	1.123	
Social capital	$3.787^{*}$	4.141*	$-0.023^{***}$	$-0.024^{****}$	
Observations	1,812	1,812	4,986	4,986	
The subsample of 20	016 and 2018				
Total net asset	$1.010^{*}$		$-0.984^{***}$		
Physical capital		1.006		$-0.979^{***}$	
Financial capital		1.052		-0.998	
Natural capital		1.069****		1.005	
Human capital	3.550	$3.898^{*}$	-0.729	-0.806	
Social capital	2.895	2.961	$-0.031^{***}$	$-0.032^{***}$	
Observations	1,036	1,036	2,891	2,891	
Probit regression					
Total net asset	$1.006^{***}$		$-0.993^{***}$		
Physical capital		$1.004^{*}$		$-0.992^{***}$	
Financial capital		$1.025^{*}$		-0.998	
Natural capital		$1.020^{**}$		-1.000	
Human capital	$1.875^{*}$	$1.893^{*}$	-0.990	1.016	
Social capital	$2.294^{*}$	$2.427^{*}$	$-0.147^{***}$	$-0.152^{***}$	
Observations	1,833	1,833	5,103	5,103	
Control variables	Yes	Yes	Yes	Yes	
Province	Yes	Yes	Yes	Yes	
Year	Yes	Yes	Yes	Yes	
Note(s): ***, ** an variables are the sam Source(s): Authors	d * denote statistical s ne as previous sections. s' analysis of China Far	significance at the 1%. We presented odds rat nily Panel Studies	, 5% and 10% levels, r io and directions of coef	espectively. Control ficients in the Table	Table 8.           Results of robustness checks

we used the subsample of 2016 and 2018 dataset. It showed significant influence of total net asset on poverty transitions. Since the effects of human capital and social capital on poverty escape in basic regression were less significant, we found that it become not significant after using a smaller subsample. The result of poverty descent is robust. Third, we used the probit model which is used to model dichotomous or binary outcome variables. The result is rather similar with logit model in terms of the significance of capital assets.

# 5. Conclusions

With the shift from "poverty alleviation" to "poverty prevention," maintaining the achievement of sustainable poverty reduction has become a key policy issue for China to achieve common prosperity. However, only a few studies have focused on the influence of capital assets on poverty transitions. Therefore, we examine the role of capital assets in household poverty transitions of poverty escape and poverty descent based, using the SLA, which can enrich dynamic poverty analysis and provide policy implications by shedding light on internal forces to maintain sustainable poverty alleviation.

Based on the empirical results of this paper, some conclusions could be drawn as follows: (1) capital assets can promote poverty alleviation and inhibit poverty descent, which is robust by using IV-probit model; (2) capital assets affecting households escaping poverty and falling into poverty are hardly symmetrical. Physical, natural, social and human capitals have significant and positive impacts on assisting rural households to escape poverty. In particular, physical and social capitals have significant influences on preventing rural households from falling into poverty. Lastly, (3) the mechanism by which assets affect poverty is due to the positive impact of total net asset on a household's livelihood strategies of business activities.

Based on the conclusions drawn from our empirical analysis, following recommendations might be proposed. First, there is a need to enhance the monitoring and analysis work of poverty transitions, particularly with regards to household capital assets. Second, it is important to establish an asset-based welfare policy aimed at promoting the accumulation of various capital assets by households, including: (1) improving rural financial systems to provide rural households with better access to financial markets and protect them from risks associated with financial transactions; (2) supporting individuals from poor families to receive education and training to enhance human capital, thereby increasing their earning potential and improving their economic status; (3) developing "industrial poverty alleviation" programs to encourage families to accumulate physical capital as well as other forms of capital.

# Notes

- 1. Data available at http://www.isss.pku.edu.cn/cfps/
- Twenty-five provinces includes Beijing, Tianjin, Hebei, Shanxi, Liaoning, Jilin, Heilongjiang, Shanghai, Jiangsu, Zhejiang, Anhui, Fujian, Jiangxi, Shandong, Henan, Hubei, Hunan, Guangdong, Guangxi, Chongqing, Sichuan, Guizhou, Yunnan, Shaanxi, Gansu and excludes Hong Kong, Macao, Taiwan, Xinjing, Tibet, Qinghai, Inner Mongolia, Ningxia and Hainan.
- IPL of \$1.90 a day for lower-income countries, US\$3.20 for lower-middle-income counties, US\$5.50 for upper-middle-income countries and US\$21.70 for high-income countries. Historical classification by income is available from: https://datahelpdesk.worldbank.org/knowledgebase/articles/378833-how-are-the-income-group-thresholds-determined
- 4. Purchasing power parity conversion factor is acquired from the International Comparison Program database of World Bank.
- 5. Consumer price index (CPI) is acquired from the official website of National Bureau of Statistics.
- 6. OECD equivalence scale is one of the most commonly used. "OECD-modified scale" assigns a value of 1 to the household head, of 0.5 to each additional adult member and of 0.3 to each child (aged 0–14 years). This implies that a household of a single person has needs twice as large as one composed of a couple. Additional adults or children need the addition of a lower proportion of a couple's income to maintain the same standard of living. For instance, if a household, composed of a couple and two children aged under 14 years, has annual total income of 40000 yuan, equivalized per capita income of a household is 19047.6 (40000/(1 + 0.5 + 0.3 + 0.3)).
- 7. China Statistical Yearbook often uses the population aged under 14 and over 65 years as the raised population and the population aged between 15 and 64 years as the raising population. Therefore, the dependency ratio in this paper refers to the ratio of the non-working population (aged under 14 and over 65 years) to the working population (aged between 15 and 64 years)
- Household income includes agricultural income, self-employed business income, wage income, transfer income, financial income and other income.

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