Article

The Impact of Income Terms of Trade Changes on Private Savings

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Abstract: The terms-of-trade fluctuations have been an important factor in explaining macroeconomic capacity while foreign demand for certain export commodities is inflexible and has a significant impact on their economies in the shocks of external terms of trade. Changes in the external terms of trade might harm private savings while higher inflation rates and lower levels of social security tend to increase private savings due to higher uncertainty. This paper analyzes the characteristics of China's income terms of trade (ITT) and private savings from 2000 to 2019 based on the related macroeconomic literature and the functioning factors affecting the long-term private savings. Empirical regression models are constructed, and the results suggest that improvement of income terms of trade by 1% leads to an increase in private saving rate by 0.413%, but this relationship has the opposite effect after the 2008 global financial crisis. Policy recommendations are proposed on the promotion of independent innovation ability of foreign trade and the optimization of trade structure along with other progressive analyses on China's current problems in foreign trade.

1. Introduction

Economic globalization has forced a country's trade capacity and position in the world system to play an important role in development. Researchers have studied the impact of terms-of-trade shocks on macroeconomic capacity, but the perspective is mainly concentrated in developed countries. As many developing countries are heavily dependent on primary commodities in their external trade, terms-of-trade fluctuations dominate in explaining macroeconomic capacity with lower demand elasticity of export commodities and can have a significant impact on their economies. In response to sharp fluctuations in trade commodity prices and the resulting fluctuations in current account balances, profits are usually made through international trade instruments (Bouakez & Kano, 2008). Sharp declines in commodity prices and increasing volatility in commodity prices, however, have levied pressure on the current accounts of these countries. The 2008 world oil price correction, for example, boosted the economies of OPEC and other oil-producing countries, while other non-oil-producing countries faced significant trade losses due to the generally depressed prices of non-oil commodities and other export commodities. The asymmetry of commodity price movements also makes these countries vulnerable to the losses caused by the impact of the terms of trade.

The relationship between terms of trade and macroeconomics has always been the focus of research, especially between terms of trade and current account. Based on the Keynesian theory of national income, Harberger (1950) analyzed the impact of terms of trade on the current account. Under the assumption that Keynes's marginal propensity to consume is less than 1, the deterioration of the terms of trade leads to a decline in output and real income. The consumption falling less than that of income deteriorates the current account. Conversely, the improvement in the terms of trade has led to higher prices for export commodities and lower prices for imported goods than before. The Harberger-Laursen-Metzler (H-L-M) effect results in an increase in real income from export commodities and less increase in consumption than in the real income, which leads to improvement in the trade balance (Laursen and Metzler, 1950).

Sen and Turnovsky (1989) explained the H-L-M effect in terms of consumer marginal propensity to consume. When the deterioration of terms of trade leads to a decrease in real income, the marginal propensity to consume increases to maintain the previous living standard. Increases in the price of import goods fasten the depression of national savings and result in further deterioration of the current account. Lin and Liu (2012) empirically examined the H-L-M effect in China. The results showed a strong positive correlation between the terms of trade and the current account. Zhou (2015) proposed a current account cross-time present value model by expanding the terms of trade into the model. By using China's 1982-2012 time-series data, the model empirically demonstrated that the inclusion of the terms of trade has significantly improved the expansion model, and changes in terms of trade have become an important factor in China's current account fluctuations.

However, the existence of H-L-M theory depends on the durability of the terms-of-trade shock. Although the H-L-M effect

considers both the effect of exchange rate changes on prices and the validity of income effects, H-L-M theory is still a static analysis of general equilibrium based on Keynesian consumption functions. Obstfeld (1982) stated that in a two-product cross-period equilibrium model, a persistent impact of deteriorating terms of trade would cause income to fall for all future periods that result in a decline in consumer spending, unchanged savings, and no influence on the current account. Conversely, if the terms-of-trade shock is temporary, consumers save less to smooth consumption, which worsens the current account and leaves the H-L-M effect existing only in the short term. Mansoorian and Angyridis (2008) believed the H-L-M effect is recovered in an infinite horizon model with an endogenous rate of time preference. Svensson and Razin (1983) and Chowdhury (2015) also believed that the existence of the H-L-M effect depends on the type of terms of trade. Through cross-period optimization analysis, Svensson and Razin (1983) concluded that there is uncertainty as to the impact of changes in terms of trade on the current account, and the H-L-M effect is only established when changes in terms of trade are temporary. Chowdhury (2015) used panel data from 45 developing countries for 1990–2008 to analyze the impact of terms of trade on private savings. Compared with the cross-period equilibrium theory, he concluded that long-run terms of trade are positively related to private savings, and the short-run terms of trade have a greater impact.

The impact of changes in terms of trade on the current account also depends on the rate of time preference. Edwards (1989) demonstrated the deterioration in terms of trade has two substitution effects. First, higher relative prices of imported goods raise opportunity costs for current consumption, prompt consumers to delay current consumption, lead to higher savings rates, and result in better current accounts. Second, shifts of demand for imported goods to domestic goods raise the real exchange rate, thereby increase the opportunity cost of current consumption and lead to an improvement in the current account. Chen and Hsu (2006) believed a model with uncertain lifetimes to be more appropriate to describe a small open economy at the steady-state equilibrium than a model with infinite lifetimes, and the H-L-M effect is discernible for temporary or permanent terms of trade shocks. In addition to validating the income effects of the H-L-M effect, Ostry and Reinhart (1992) also validated the substitution effect by calculating the size of the period and cross-period substitution effects. Otto (2003) showed strong support in the data for the existence of an H-L-M effect. The response of the trade balance and real income to terms of trade shock implied by the structural vector auto-regression model is consistent with a particular dynamic stochastic equilibrium model of a small open economy. Zhu (2013) found that improvement in the trade terms leads to current account surplus, whereas the deterioration in the trade terms stimulates the fiscal operation efficiency to accelerate the current account rebalancing. Based on the VAR model, Shao and Lu (2014) carried out an empirical analysis of China's terms of trade and current account for 1995–2012 and found that the H-L-M effect exists only in the long-run in China.

Changes in terms of trade significantly affect the trade balance surplus with a time lag, i.e., the so-called *J*-curve effect (Meade, 1988). Backus *et al.* (1994) analyzed empirical data from 11 developed countries and found that this asymmetrical cross-period correlation between terms of trade and the trade balance can be scattered as a horizontal *J*-curve. A study of central and western European countries by Lopes and Sequeira (2010) confirmed the *J*-curve effect. Based on the test of the *J*-curve hypothesis and the dynamic panel model, Wang and Wu (2014) obtained the empirical *J*-curve between the terms of trade and the trade balance of developed countries, and this is also true for the developing countries. The research of Dai (2011) on the dynamic relationship between China's terms of trade and the trade balance, however, showed that the empirical *J*-curve did not apply to China.

Most studies mentioned above focused on the relationship between terms of trade and current account or trade balance rather than on the relationship between fluctuations in terms of trade and savings behavior. In the absence of an effective domestic credit system, a less-developed capital market and more restrictions on access to international financial markets make the economies of developing countries more vulnerable to the credit crunch facing depression than developed countries. As a result, rising commodity prices on the international market force them to save more than expected. Research on the impact of income terms of trade (ITT) on private saving rates is mainly concentrated in developed countries, but relevant researches are crucial for developing countries (Ostry and Reinhart, 1992; Reinhart, 1992; Lopes and Sequeira, 2010; Wang and Wu, 2014; Zhou, 2015). Han and Zhang (1992) stated that the export structure of labor-intensive products with low price elasticity that mainly leads to the continuous decline of terms of trade in China, and the loss of welfare from the decline of terms of trade is not enough to offset the benefits of the economic growth. Athukorala (2003) found that the saving rate rises with the level and the rate of growth of disposable income. The real interest rate on bank deposits has a significant positive impact, but the magnitude of the impact is modest. Public savings have such impact less proportionately than private savings. Furthermore, the spread of banking facilities in the economy and the inflation rate have a positive impact, while changes in the external terms of trade have a negative impact on private savings. Tatliyer (2017) found that private and public saving rates are partly complementary to each other while higher inflation rates and lower levels of social security than the present ones tend to increase private savings due to higher uncertainty. He confirmed that favorable terms of trade promoted private savings by increasing income and current account balance influence private savings positively. Bano (2020) revealed the private savings can be explained with accumulated wealth, real interest rate, and political instability reflecting a positive and significant influence while dependency ratio, agricultural activities, domestic credit, and real GDP per capita showing a negative

but significant influence. Inflation rates, however, reflected an insignificant impact on private savings.

This paper empirically studies the effects of ITT on private saving rates in China. The deterioration of ITT results in higher current income and output reduction relative to consumption that causes a decline in the savings rate. Whereas the ITT deterioration also leads to a relative rise in the price of imported products, which in turn increases the current consumption costs of the economy thereby curbs consumption the resulting changes in the savings rate.

2. China's Private Savings and Income Terms of Trade

2.1. China's Private Savings

The data of private savings are obtained from the China Statistical Yearbook as the ratio of savings to corresponding disposable income using data from 2000 to 2019 (Fig. 1). According to the statistical value of the household savings rate given by the National Bureau of Statistics of China, we use "household savings = household disposable income - household final consumption" and "household savings rate = household savings / household disposable income", which is consistent with the United Nations Economic Accounting System estimation method. That is, the household savings rate is calculated and derived from 'household disposable income - household consumption'. The private saving rate index (PS) is expressed using the per capita savings rate in this paper. The measure of per capita disposable income is calculated using per capita disposable income of urban households and per capita net income of rural households weighted by the proportion of urban and rural residents to the total population.
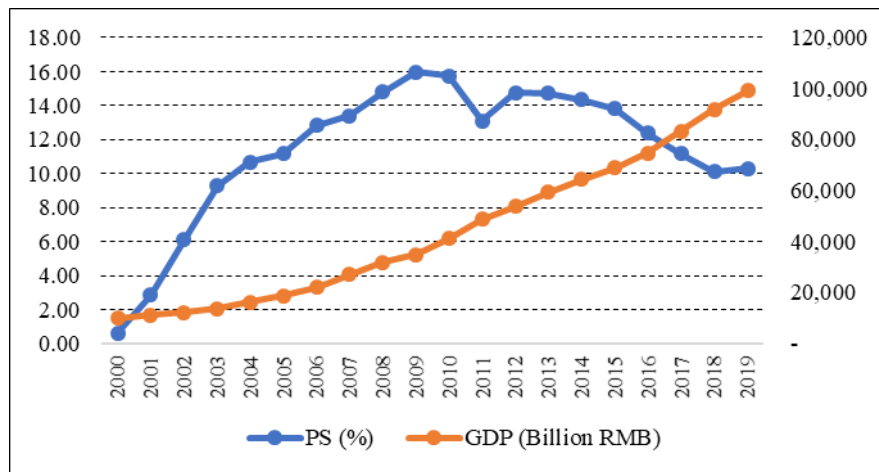

Fig. 1. China's private saving rates from 2000 to 2019.

Fig. 1 shows that China's private saving rates have fluctuated considerably over the past two decades in four periods, although annual GDP increases continuously. The first of which was the rise of 0.63% to the highest level of 15.96% between 2000 and 2009, which indicated that, in a depressed economy and low-income levels, people spent almost all of their disposable income in the current year. The nearly zero private saving rate was a result of the imminent use of previous savings and borrowing consumption. The second phase was a small decline between 2010 and 2011, from the highest point to 13.09%. The third stage was a temporary recovery in the private saving rate between 2012 and 2013. The fourth phase was the decline after 2014 when the private saving rates gradually declined to 10.31% in 2019.

2.2. China's Terms of Trade

Terms of Trade (TOT) are a measure of the profitability of a country's exports relative to imports over a certain period and the benefits of trade, which are generally expressed in terms-of-trade indices in a country's foreign trade and are particularly important in bilateral trade. The terms of trade can be divided into Net Barter Terms of Trade (NBTT), Income Terms of Trade (ITT), Single Factorial Terms of Trade (SFTT), Double Factor Terms of Trade (DFTT), and so on. We focus on Income Terms of Trade (ITT), i.e. the product of NBTT and volume index of exports. All the indexes are available on the United Nations Conference on Trade and Development website and are described below based on the data collected for 2000~2019.
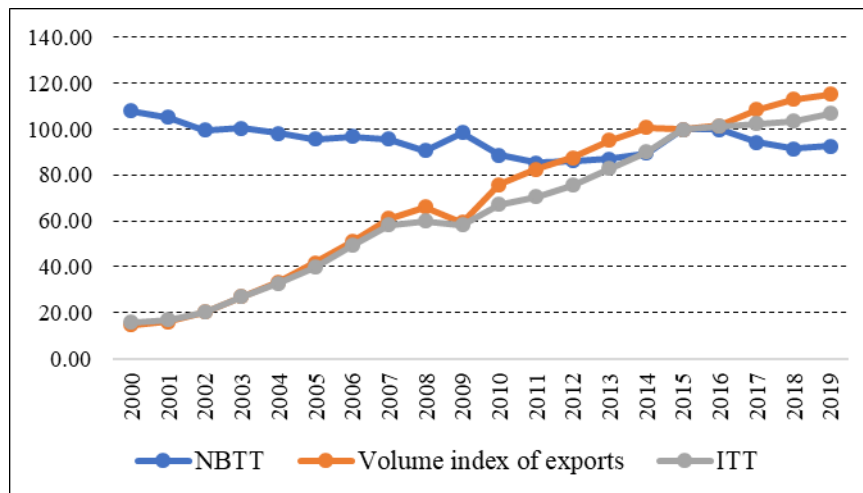
Fig. 2. China's terms of trade index from 2000 to 2019.

Fig. 2 shows that the trends of changes in ITT and volume index of exports are generally consistent but differ from that of NBTT. For example, the NBTT continued to deteriorate during the period 2000–2014, but the ITT improved every year owing to the increases in the volume of exports. The ITT is a measure of the overall capacity of a country's exports in terms of total export earnings. Figure 2 also divides changes in the ITT into four stages: a decline in the NBTT but a significant improvement in the ITT in 2000~2007, an improvement in the NBTT but a relatively stable ITT in 2007–2009, a relatively stable NBTT but significant improvement in the ITT in 2009–2015, and a declining NBTT but a rising ITT after 2015. The changing tendency shows that China's overall export profitability has increased over years.

2.3. The Role of ITT to Private Savings

The relationship between temporary terms of trade shocks and private savings in developing countries is ambiguous. The private savings may rise or fall in response to transitory terms of trade shock, depending on the values of the intertemporal elasticity of substitution and the intratemporal elasticity of substitution between traded and nontraded goods (Ostry and Reinhart, 1992). Since the impact of ITT has asymmetrical effects on the savings rate, the rise or fall in commodity prices leads to different reactions to changes in social welfare. On the one hand, credit restrictions in financial markets limit smooth consumption through credit facing the impact of ITT, more savings are therefore required to maintain smooth consumption than without the restrictions. The impact of ITT in periods of a weak economy leads to restrictions on credits. On the better-off ITT, on the contrary, credit constraints and the risk of rising commodity prices also reduce consumption and increase private savings. On the other hand, the impact of the ITT causes the prices of imported goods to rise relatively, which increases the cost of consumption in the current period, delays current consumption, and leads to an increase in private savings.

3. Model Construction

3.1. Hypothesis

The impact of the ITT shock on the savings rate is studied in this paper where the ITT index is expressed as $\left(\frac{P_x}{P_m}\right) \times Q_x$, i.e., the export price index over the import price index multiplied by the volume index of export. The impact of the ITT index refers to the increase in the volume index of export less than the decrease in the net terms of trade. The savings rate is referred to as 'disposable income-consumer spending' and divided by disposable income. Previous studies showed that the relationship between TOT and current account or trade balance was studied through income. We assume that the fluctuations in commodity prices and the impact of TOT cause changes in income, which in turn leads to a decline in the private saving rates.

3.2. Model Construction and the Data Sources

The data from 2000–2019 are selected to investigate the impact of ITT on China's private saving rates. The data is obtained from the website of the China Bureau of Statistics, the China Statistical Yearbook, the Wind database, the World Bank website, and the ITT, and the private saving rate are processed according to the relevant data. The dependent variable is the private saving rate (PS_t) and the independent variables are the income terms of trade index (ITT_t), the controlling variable is the one-period lag of

private saving rate (PS_{t-1}), real per capita income ($RPCY_t$), real per capita income growth rate ($GRPCY_t$), monetization rate (M_2/GDP_t), inflation rate (INF_t), dependency ratio (DEP_t). The private saving rate function is calculated by using the regression model (Equation 1).

$$PS_t = \beta_0 + \beta_1 PS_{t-1} + \beta_2 ITT_t + \beta_3 RPCY_t + \beta_4 GRPCY_t$$

$$+\beta_5 \frac{M_2}{GDP_t} + \beta_6 INF_t + \beta_7 DEP_t + \varepsilon_t \tag{1}$$

3.3. Stability Tests

The EViews 10.0 software carries out the stability test on the dependent and independent variables for unit root tests. Most of the macroeconomic variables have intercept items where extra trend items exist in income terms of trade, real per capita income, monetization rate, and dependency ratio. The Augmented Dickey-Fuller (ADF) test form includes intercept and time trend items, and the lag length is *automatically* determined according to the AIC/SC information guidelines (Table 1). Tests for unit root are conducted for all variables except real per capita income (RPCY) which is subject to the I(2) process, i.e., the corresponding first-order differential values for the variables are obtained in a smooth process.

Table 1. Unit root tests for the selected variables.

Variables	Level			1st Difference		
	Test Type[a] (C, T, L)	ADF-Statistics	Prob.[*]	Test Type (C, T, L)	ADF-Statistics	Prob.[*]
PS	(C, T, 0)	−2.0103	0.5591	(N, N, 0)	−2.4299	0.0184
ITT	(C, T, 0)	−1.5538	0.7727	(C, N, 0)	−3.3758	0.0262
RPCY	(C, T, 0)	−1.4613	0.8068	(C, T, 3)	−2.3958	0.3663
GRPCY	(N, N, 2)	−0.6212	0.4332	(N, N, 1)	−3.7383	0.0009
M₂/GDP	(C, N, 0)	−1.2875	0.6130	(C, N, 1)	−3.8514	0.0107
INF	(N, N, 0)	−1.7432	0.0771	(N, N, 3)	−2.5669	0.0142
DEP	(C, N, 1)	−1.3528	0.5813	(N, N, 0)	−2.1933	0.0308

[a] Test type (C, T, L) represents intercept, trend, lag length, and none respectively

3.4. Co-integration Tests

Co-integration exists only when two variables follow the same time series process. Unit root tests show that PS, ITT, GRPCY, M₂/GDP, INF, and DEP follow I(1) process while only RPCY follows I(2) process. Johansen co-integration tests of trace statistic and maximum Eigen statistic are applied in this study, and the results are illustrated in Table 2.

Table 2a. Johansen co-integration tests (PS, ITT, RPCY, GRPCY).

Hypothesized No. of CE(s)	Trace Statistic	5% Critical Value	Prob.[**]	Max-Eigen Statistic	5% Critical Value	Prob.[**]
None[*]	79.8095	47.8561	0.0000	43.7135	27.5843	0.0002
At most 1[*]	36.0959	29.7971	0.0082	18.0385	21.1316	0.1284
At most 2[*]	18.0575	15.4947	0.0201	17.1312	14.2646	0.0171
At most 3	0.9263	3.8415	0.3358	0.9263	3.8415	0.3358

[*] denotes rejection of the hypothesis at the 0.05 level;
[**] MacKinnon-Haug-Michelis (1999) *p*-values.

Hypothesized No. of CE(s)	Trace Statistic	5% Critical Value	Prob.[**]	Max-Eigen Statistic	5% Critical Value	Prob.[**]
None[*]	96.0990	47.8561	0.0000	52.4329	27.5843	0.0000
At most 1[*]	43.6661	29.7971	0.0007	22.9869	21.1316	0.0271
At most 2[*]	20.6792	15.4947	0.0075	16.9828	14.2646	0.0181
At most 3	3.69635	3.8415	0.0545	3.6963	3.8415	0.0545

[*] denotes rejection of the hypothesis at the 0.05 level;
[**] MacKinnon-Haug-Michelis (1999) p-values.

Johansen's trace statistic and maximum Eigen statistic in Table 2 demonstrate that there is at least a co-integrated relationship between the seven variables. The unit root test of non-equilibrium error is carried out at the same time that the obedience to I(0) process is stable, which further confirms the existence of the co-integration relationship in the sequence.

3.5. Granger's Causality Tests

The co-integration tests demonstrate a long-term equilibrium relationship between PS, ITT, RPCY, GRPCY, M$_2$/GDP, INF, and DEP. Granger's causality tests require further verification of the relationship between the causes and effects. Table 3 validates that the causality exists for ITT, RPCY, GRPCY, and M2/GDP to PS in a one-period lag. For GRPCY, M2/GDP, and INF to PS, the causality exists in a two-period lag. For a three-period lag, however, Granger causality tests hold for all variables except DEP. The results suggest that real per capita income growth rate and monetization rate affect the private saving rate, while the impact of the income terms of trade index, real per capita income, and inflation rates on private saving rates is uncertain.

Table 3. Granger causality tests.

Null Hypothesis	Lags to Include	F-Statistic	Prob.	Result
ITT does not Granger Cause PS	1	8.2237	0.0112	Reject
RPCY does not Granger Cause PS		7.6454	0.0138	Reject
GRPCY does not Granger Cause PS		5.8122	0.0283	Reject
M$_2$/GDP does not Granger Cause PS		12.4674	0.0028	Reject
INF does not Granger Cause PS		1.5202	0.2354	Not Reject
DEP does not Granger Cause PS		0.1268	0.7264	Not Reject
ITT does not Granger Cause PS	2	2.8705	0.0928	Not Reject
RPCY does not Granger Cause PS		2.6511	0.1082	Not Reject
GRPCY does not Granger Cause PS		6.9585	0.0088	Reject
M$_2$/GDP does not Granger Cause PS		6.8065	0.0095	Reject
INF does not Granger Cause PS		7.9210	0.0056	Reject
DEP does not Granger Cause PS		0.2863	0.7556	Not Reject
ITT does not Granger Cause PS	3	4.8603	0.0245	Reject
RPCY does not Granger Cause PS		12.1660	0.0011	Reject
GRPCY does not Granger Cause PS		6.0452	0.0129	Reject
M$_2$/GDP does not Granger Cause PS		19.2039	0.0002	Reject
INF does not Granger Cause PS		6.9214	0.0084	Reject
DEP does not Granger Cause PS		3.1445	0.0737	Not Reject

4. Empirical Results

Unit root tests and co-integration tests prove the existence of co-integration relationships among non-stable variables of this study followed by the Granger causality tests for the demonstration of causes and effects. The results are presented in Table 4. Model 1 reveals the initial regression results including all independent variables. The Chow breakpoint test is further applied regarding the possible impact of the global financial crisis on China's private saving rates in 2008. Dummy variables are introduced

and the stepwise least squares method is applied for plausible model results.

The regression results of Model 2 show that the coefficient of the private saving rate in the one-period lagged is positive. The past savings path is an important variable in China's current savings volume because of the fitness of the residents' saving habits. According to life cycle theory, a higher per capita income causes a relatively high savings rate. The negative impact of per capita income on the private saving rate obtained by this model indicates that with the continuous development and opening up of the economy, there exist multiple ways for investment and consumption. Per capita income growth rate in this model also indicates a negative impact on the private saving rate, which represents a simultaneous increase in per capita income, and its growth rate results in optimistic anticipation of the future economy and income, which stimulates consumption and reduces the private saving rate. When coupled with the positive stimulus of a one-period lagged private saving rate, the model demonstrates overly cautiousness is unnecessary for the time being.

Table 4. Empirical results of ITT to private saving rates.

Variables	Model 1	Model 2
C	−2.3490	−63.5440
(t-statistic)	(−0.1305)	(−3.7573)[**]
DUM		56.8047
		(5.0214)[**]
PS_{t-1}	0.5084	1.0277
	(1.4909)	(3.7166)[**]
ITT	0.0499	0.4130
	(0.4320)	(4.0169)[**]
DUM×ITT		−0.5586
		(−4.7533)[**]
RPCY	−0.0001	−0.00039
	(−0.7636)	(−3.7829)[**]
GRPCY	0.4016	−0.5923
	(1.0128)	(−3.0826)[**]
DUM× GRPCY		−1.4755
		(−3.3531)[**]
M_2/GDP	8.2706	−7.5796
	(1.1988)	(−1.1882)
INF	0.1216	−0.6400
	(0.3480)	(−2.8256)[**]
DEP	−0.2343	1.8535
	(−0.6593)	(3.9224)[**]
R^2	0.8777	0.9860
$\bar{R}^2$	0.8063	0.9684
D-W	1.4272	2.3559
Chow test[a]	0.0447[*]	

[a] The Chow breakpoint test is implemented at the breakpoint of the year 2008

[*] denotes rejection of the hypothesis at the 0.05 level

[**] denotes rejection of the hypothesis at the 0.01 level

The monetization rate represents financial development and reform, and the negative impact on the private saving rate means that when M_2 growth increases by 1% of GDP, the private saving rate falls by 7.58%. This result reveals that financial reform stimulates consumption and reduce savings, although it is contradictory to the universal belief that the savings rate is positively correlated with the monetization rate. Countries with high savings rates tend to have higher monetization rates (Duan and Chen, 2020a). Easing domestic liquidity constraints by increasing bank credit thereby reduce the private saving rate. The statistical insignificance of this variable is found as the traditional definition of M_2 has been partially replaced by WeChat and Alipay in consumer finance. The increase of long-term e-money substitution reduces the level of transactional money demand, increases the difficulty of forecasting the total amount of money demand, and thus weakens the efficiency of execution (Duan & Chen, 2020b).

The significant negative impact of inflation on the private saving rate indicates a fall of the private saving rate by 0.64% when

inflation increases by 1%. In terms of macroeconomic uncertainty, when prices generally rise in the market, people need to spend more and save less than before. The positive impact of the dependency factor indicates that the higher the dependency rate, the more savings needed to be spent on taking care of children and the elderly. With the reform of social welfare, education, and old-age pension system, on the other hand, people reduce the consumption expenditure on education and retirement. The relationship is confirmed in this study by the coefficients.

The impact of income terms of trade on the private saving rate is positive and significant. When the income terms of trade improved by 1%, the private saving rate increases by 0.413% as the profitability of exports relative to imports increases after the improvement of income terms of trade. The increase in net export increases national income, and in the absence of effective domestic credit and a perfect capital market, consumption increases less than income, which increases the private saving rate. Conversely, if the income terms of trade deteriorate, national income decreases more than consumption, and savings decrease. The resulting impact in this study is less than 1, which indicates the possibility of the inability of immediate reaction at the time of shock in the terms of trade. The negative impact of income terms of trade on private saving rate after the global financial crisis in 2008 suggested that the deterioration in the income terms of trade stimulated the willingness-to-saving, which resulted in significantly increasing domestic private saving rate.

5. Conclusions and Implications

This paper adopts the multiple regression method to empirically analyze the impact of income terms of trade on China's private saving rate. The following is studied in this research.

First, in the absence of effective domestic credit and perfect financial markets coupled with the macro background of many restrictions on access to international financial markets, China, as a developing country, is more vulnerable to credit restrictions in the face of bad economic conditions. Rises in international commodity prices make savings vulnerable to shocks. In a better economic situation, however, economic entities need to consider the risk of rising commodity prices and increase savings. Second, the conduction mechanism of H-L-M theory, that is, the relationship between terms of trade and the current account is found, and the relationship between terms of trade and savings rates is investigated. Third, the terms of trade reflect changes in import and export prices and the income terms of trade measure a country's ability to import based on total export earnings. The income terms of trade affect national income, which in turn affects the change of private saving rate. The results show that the private saving rate changes in the same direction as the income terms of trade.

This paper analyzes whether there is a long-term stable relationship between the fluctuation of terms of trade, that is, the fluctuation of import and export commodity prices and the private saving rate from the perspective of macroeconomic and international trade. The results show that a 1% improvement in the income terms of trade results in a 0.413% increase in the private saving rate. This relationship has had the opposite effect after the 2008 global financial crisis. Government policies for the fluctuations in the savings rate need to consider the impact of terms of trade to improve income levels, smoothen consumption path, and enhance the ability to save to cope with rising prices and to resist external risks. On the other hand, the independent innovation ability of foreign trade and the trade structure require to be promoted and upgraded to adjust the fluctuation of savings rate by improving the terms of trade.

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