Journal of Applied Sciences

ISSN 1812-5654

science alert

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Journal of Applied Sciences 13 (15): 2933-2939, 2013
ISSN 1812-5654 / DOI: 10.3923/jas.2013.2933.2939

Financial Development and Current Account Imbalance: Evidence from Dynamic Panel Data Model with Gmm Estimation

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Abstract: This study discusses current account imbalance and its influence factors, especially studies effect of financial development level and financial openness on current account. Adopting Generalized Method of Moment (GMM) estimation method and using annual data of 59 countries or regions from 1986-2010, dynamic panel regression model is established to research empirically. The findings are showed as follows: (1) There is a significant relationship between current account imbalance and financial deepening, market efficiency of developed countries and developing countries, (2) Developed countries should increase budget surplus, raise labor productivity, expand trade openness, improve the efficiency of financial market, lessen consumer demand and investment and reduce financial deepening to increase their current account surplus or reduce deficit, (3) Developing countries should increase net foreign assets, expand trade openness, improve terms of trade, enhance the efficiency of financial market to improve their current account. While increase per capita income, stimulate consumer demand and investment, appreciate currency, expand financial deepening will cut down excess of current account surplus, (4) Real effective exchange rates will not impact on current account of developed countries significantly, which means appreciation or depreciation of currency cannot change the imbalance of current account.

Key words: Current account imbalance, financial development, dynamic panel data, GMM

INTRODUCTION

Global imbalance has been tending to expand since in the 21 century, which mainly represents that the United States has huge current account deficit and increasing debts while OPEC, China, Japan and other Asian emerging market countries hold large American trade surplus and have continued current account surplus. Global imbalance has become potential hidden danger to threat sound development of world economy (Caballero and Krishnamurthy, 2009; Obstfeld and Rogoff, 2009). If relevant coordinate measures cannot be proved effectively, it is possible that trade deficit will cause disruptive depreciation of US dollar to shock world economy seriously.

No matter current account is surplus or deficit, both of which are expression of imbalance. Many studies lay stress on influence of macro-economic factors on current account imbalance. However, researches on global and current account imbalance view from financial development are much lesser. Some economists have realized that there are maybe some kind of relationship between financial factors and balance of payment. Discussion on financial development has been especially emphasized since the outbreak of American subprime mortgage crisis and European debt crisis.

Hereby, the purpose of this study is to study the mechanism of current account imbalance and its influence factors, especially discuss effect of financial development level and financial opening on current account. Adopting Generalized Method of Moment (GMM) estimation method and using annual data of 59 countries or regions from 1986-2010, dynamic panel regression model will be established to research empirically. This study is organized into 4 sections. In section 1, research background is introduced and the question is posed. Related literatures at home and abroad are reviewed in section 2. In section 3, a dynamic panel data model is built to do empirical research. In the final section, empirical results and conclusions are illustrated.

LITERATURE REVIEWS

Many studies lay stress on influence of macro-economic factors on current account imbalance, such as government fiscal policy, saving-investment

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condition and so on. However, researches on global and current account imbalance view from financial development are much lesser. To sum up, there are two main aspects to measure financial development academically: Financial development level (financial deepening degree) and financial openness degree (financial liberalization).

Concerning the relationship between financial development level (financial deepening degree) and current account imbalance, plenty of literatures indicate that the development of financial instruments, financial market and financial institutions, which are also collectively called financial development or financial deepening, can promote economic growth (Levine, 2005). Financial development can promote savings and investment through improving information asymmetry, reducing information and transaction cost, improving corporate governance, motivating risk management to increase rate of return, lower capital cost and investment risk (Robert and Ross, 1993; Rajan and Zingales, 2001; Baker and Wurgler, 2000; Wang *et al*., 2013). It is certain that financial development can promote investment, but whether it can affect savings is not sure. Traditional financial deepening theory thinks financial development influences savings positively. Financial deepening can bring more savings through expanding the depth of financial system and mixed operation (Ye and Zhu, 2012; Chen and Zhang, 2013). The opposite views, however, consider that well-developed financial market will reduce precautionary saving demand and then lower saving rate. Bernanke (2005) believed that financial development can solve global saving glut problem in the long term through reducing saving rate of emerging market countries in Asia. Similarly, Clarida (2005a, b) thought American mature investment market can absorb excessive savings all over the world, resulting in higher current account deficit of the Chinn and Ito (2007) controlled the interaction between financial deepening and other variables such as institutional development and financial openness, studied the determination of current account from macro economic factors and institutional factors. Regression results were showed that: (1) Financial deepening variables of industrialized countries are negative related to current account but not significant statistically. On the contrary, the coefficients of developing countries are positive, (2) The estimated coefficients of financial development variables from both industrialized countries and developing countries are negative significantly, which indicates that well-developed financial market will reduce current account balance and the influence of financial factors on industrialized countries is stronger than on developing countries. Mendoza *et al*. (2009) found that the difference of financial deepening can affect foreign portfolio of a country. A country with negative net foreign assets will maintain positive non-diversified equities and net foreign direct investment. Therefore, net export and current account balance is negative related to financial development variables. Can financial development (financial deepening) improve current account surplus through promoting savings or lead to current account deficit through reducing precautionary saving demand and decreasing domestic savings? Both viewpoints were reflected in some scholar's researches. Further proof will be presented in this study.

Financial openness (financial liberalization), which means the openness degree of transnational financial transactions, can influence capital flow and current account. Financial liberalization can raise the efficiency of international capital allocation, which will bring diversification of international portfolio and increase potential earnings (Feldstein and Horioka, 1980; Prete, 2012). Further direct relationship is that financial openness can affect saving and investment decision and then transnational capital flow. Dooley *et al*. (2004) considered that excessive savings from East Asian countries flow into the U.S. and other developed countries due to lack of well-developed domestic and regional financial system and widespread implementation of financial liberalization policies in East Asian countries. Bailliu (2000) used capital inflow as a proxy variable of capital account openness and found that higher domestic financial development level can push economy and then improve current account. Chinn and Ito (2007) used capital market openness index (KAOPEN), which is based on the IMF Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER), to measure financial openness. They discovered that there is a high correlation between financial development and financial openness. Financial openness can promote financial development, especially when a nation has a high legal and institution development level. Chinn and Ito (2007) panel regression analyzed annual data of 19 industrialized countries and 70 developing countries from 1986-2005 to study different types of financial market such as bank, stock, bond and insurance, different dimension of financial development which can be divided into size, activity and efficiency of financial market and the effect of legal or institution development on current account balance and saving-investment. Conclusions were drew

that estimated coefficients of financial development and legal or institution variables from developing countries are all significant positive, while financial openness variable (KAOPEN) is significant negative, which indicates that a developing country with well-developed financial market, advanced legal system and institution and/or closed financial market, whose current account tends to be surplus.

In conclusion, it is still a new question to study current account imbalance from financial development perspective. Though domestic and overseas researches have been concerned with different aspects, a perfect system is not established yet. Whether financial development can bring current account surplus through increasing savings or lead to deficit because of reducing precautionary saving demand and decreasing domestic savings? These questions will be discussed in this paper from financial development level and financial openness degree.

EMPIRICAL RESEARCHES

Model: Traditional methods of estimation in econometrics, such as ordinary least square, instrumental variable method or maximum likelihood method, have certain limitation. For example, only when parameter estimation satisfies some assumption, such as random error term of the model must obey normal distribution, it will be reliable. Dynamic panel model, however, due to dependent variable lagged term served as explanatory variable, leads to explanatory variable is related to random disturbance term and model with cross section dependence. Arellano and Bond, Blundell and Bond brought forward Generalized Method of Moment (GMM) estimation, which possesses these advantages: (1) Current account may have certain inertance compared with other years' data, yet dynamic panel model can identify this inertness very well, (2) Current account and other variables are maybe determined simultaneously, which will result in endogenous explanatory variable, while GMM estimation can control endogeneity effectively.

Basic principle of GMM estimation is showed:

$$Y_{i,t} = \alpha Y_{it-1} + \beta X_{i,t} + \mu_{i,t} + \nu_i \quad (1)$$

where, Y is dependent variable, X is independent variable, μ is random error term, ν is unobservable individual effect. In order to eliminate unobservable individual effect, GMM estimation uses previous explanatory variables and lagged explained variables as instrumental variables to solve endogeneity. The above formula is first order difference as follow:

$$Y_{i,t}-Y_{i,t-1} = \alpha (Y_{i,t-1}-Y_{i,t-2}) + \beta(X_{i,t}-X_{i,t-1}) + (\mu_{i,t}-\mu_{i,t-1}) \quad (2)$$

By means of first order difference, individual effect can be eliminated, but including the lagged term ($Y_{i,t}$-$Y_{i,t-1}$). In order to solve the endogenous problem of explanatory variable and correlation between the new residual term and lagged term, instrumental variables should be used to estimate. Arellano and Bond thought that the predetermined variable of explanatory variable is not related to current residual term. So, the two lag phase of explanatory variable and its level value can be used as instrumental variable.

The dynamic panel model is built as follow:

$$CA_{i,t} = \alpha + \beta CA_{i,t} + \gamma X_{i,t} + \omega Y_{i,t} + \mu_{i,t} + \nu_i \quad (3)$$

where, i presents different country or region, t means time; CA is the ratio of current account balance to GDP; X is the vector quantity of macroeconomic variables, including government fiscal budget, net foreign assets, openness of trade, relative per capital income, consumption rate, gross capital formation, young and old dependency ratio, term of trade; Y is the vector quantity of financial development variables, including financial system structure, financial development level and financial opens degree; α is individual influence, $\mu_{i,t}$ is random disturbance term, whose mean value is 0 and variance is σ^2, ν_i is individual effect.

Variables explanation: Specifically, variables which influence current account imbalance can be reduced to macroeconomic variables and financial development variables. These two kinds of variables consist of some secondary quantitative indexes. Variables explanation is showed as Table 1.

Sample selection and data sources: Twenty three developed countries and 36 developing countries are selected as sample countries. Annual data from 1986-2010, which come from World Development Indicators (WDI) of World Bank, International Financial Statistics (IFS) of International Monetary Fund and Financial Structure Dataset of World Bank.

Empirical results: Table 2 illustrates empirical results estimated by GMM method using E views 7.1. Explained variable CA is the ratio of current account balance to GDP. The first array of table is the result which indicates the influence of each explanatory variable on explained variable. The remaining arrays are the regression results of whole sample countries, developed countries and developing countries, respectively.

Table 1: Variables explanation

	Name	Explanation
Macroeconomic variables	Government fiscal budget (GOV)	The ratio of financial revenue and expenditure to GDP
	Net Foreign Assets (NFA)	The ratio of net foreign assets to GDP
	Relative Labor Productivity (LP)	The ratio of a country's labor productivity to American
	Relative per Capital Income (RINC)	The ratio of a country's per capita income to American
	Consumption Rate (CRATE)	The ratio of consumption expenditures to GDP
	Gross Capital Formation (FIXEDKRATE)	The ratio of newly increased fixed assets plus stock to GDP
	Exchange Rate (REXCHG)	multilateral and trade weighed real effective exchange rate
	Openness of Trade (TOPEN)	The ratio of total export-import value to GDP
	Term of Trade (TOT)	The ratio of export price index to import price index
Financial development variables	Financial Deepening Degree (FDEEP)	The ratio of M2 to GDP
	Market Size (SIZE)	The ratio of the sum of private credit and stock market capitalization to GDP
	Market Activity (SMTV)	The ratio of stock market trading volume to GDP
	Financial Openness Degree (FOPEN)	The ratio of net foreign direct investment to GDP

Table 2: Empirical results of influence of factors on current account imbalance

Explanatory variables	Whole sample countries	Developed countries	Developing countries
CA(-1)	0.382133***	0.629583***	0.264812***
	(4.396406)	(15.12920)	(2.795153)
GOV	0.132285*	0.103954*	-0.018640
	(1.858788)	(1.841203)	(-0.179391)
NFA	-0.008433	-0.001342	0.064564***
	(-0.757595)	(-0.183517)	(3.685214)
LP	0.089883	0.103895**	-0.078978
	(1.010227)	(2.295590)	(-1.457484)
RINC	0.009068	0.025182	-0.144863***
	(0.362969)	(1.422253)	(2.980669)
CRATE	-0.393876***	-0.380327***	-0.339824***
	(-3.260878)	(-3.355063)	(-2.619621)
FIXEDKRATE	-0.583387***	-0.422309***	-0.649588***
	(-5.611801)	(-6.512305)	(-6.932350)
REXCHG	-0.052522**	0.009011	-0.075880***
	(-2.286072)	(0.326793)	(-3.665120)
TOPEN	0.045699***	0.046469**	0.028256***
	(3.917735)	(2.123581)	(3.245577)
TOT	0.073473***	0.116280	0.053649**
	(3.786575)	(3.689863)	(3.106929)
FDEEP	-0.016049	-0.010081*	-0.045781***
	(-1.521794)	(-1.678450)	(-2.773802)
SIZE	0.003889	0.006406	0.002103
	(1.023021)	(1.119045)	(0.378245)
SMTV	0.001088	-0.001244	-0.000643
	(0.267423)	(-0.359657)	(-0.190278)
NETINT	0.232027	0.584092***	0.347962***
	(1.347727)	(2.782447)	(2.838695)
FOPEN	0.002940	0.000985	0.137431
	(0.439551)	(0.299744)	(1.567222)

Figures in the parentheses denote values of the t-statistics; *, **and ***Indicates statistical significance at the 10, 5 and 1%, respectively

With regard to CA (-1) variable, the whole sample, developed and developing countries all pass the test of significance, regression coefficient is 0.382133, 0.629583 and 0.264812 correspondingly, which means that previous current account is significantly related to current one, the more previous current account surplus (deficit), the more current surplus (deficit). Therefore, current account has lagged influence.

About GOV variable, both of the whole sample and developed countries pass the test of significance at the 10% significance level, regression coefficient is 0.132285 and 0.103954, which is much bigger than 0.09 shown by Gruber and Kamin (2005) or 0.07 obtained by Bussiere *et al.* (2005) and close to 0.306 achieved by Chinn and Prasad (2003). The regression coefficient of developing countries is negative but non-significant. The result of this study indicates that "twin deficit theory" is effective, government fiscal budget can influence current account positively and significantly.

Towards NFA variable, only developing countries pass significance testing, whose coefficient is 0.064564, which shows that current account surplus will increase by 0.064564 percent with 1 percent growth of net foreign assets of developing countries.

About LP variable, only developed countries pass significance testing, whose coefficient is 0.103895, which is close to 0.156 obtained by Zhang *et al.* (2007). The result shows that a country with higher labor productivity will have stronger international competitiveness and more current account surplus.

With regard to RINC variable, the coefficient of developing countries is negatively and significantly related to current account, which means that current account surplus will decrease by 0.144863 percent when relative per capital income increases by 1 percent. The regression coefficients of the whole countries and developed countries are positive but non-significant. The result confirms that hypothesis of stages of economic growth is effective.

About CRATE and FIXEDKRATE, regression coefficient is -0.393876 and -0.583387, respectively, which indicates that current account tends to deficit with increase of consumption and investment and investment has stronger affect on current account than consumption. Concerning REXCHG variable, the whole sample and developing countries pass significance testing, regression coefficient is -0.052522 and -0.075880 correspondingly, which means that current account surplus will decrease with the appreciation of real effective exchange rate. The coefficient of developed countries is positive but non-significant, which indicates that exchange rate fluctuation doesn't affect current account of developed countries significantly.

About TOPEN variable, the whole sample, developed and developing countries all pass the significance testing, regression coefficient is 0.045699, 0.046469 and 0.028256, respectively, which indicates that a country's current account surplus will increase with the openness of its international trade.

About TOT variable, the whole sample and developing countries pass the significance testing, regression coefficient is 0.073473 and 0.053649, which shows that along with the term of trade improvement, a country's exports international competiveness will be increased and its current account will be improved.

In this study, financial deepening degree, size, activity and efficiency of financial market is adopted to study the influence of financial development level on current account: (1) About FDEEP variable, traditional opinion thinks that financial development can affect savings positively and improve current account surplus. But opposite opinion considers that developed financial market will reduce saving rate and lead to current account deficit. The result of this paper indicates that both of developed and developing countries pass the test of significance, regression coefficient is -0.010081 and -0.045781, which shows that financial deepening affect current account negatively. The possible reason is that the more well-developed financial market can allocate financial resources more effectively, thus reduce precautionary saving demand and result in current account deficit, (2) About SIZE variable, none of the whole sample, developed and developing countries pass the test of significance, every coefficient is positive, which indicates that size of financial market cannot influence current account significantly, (3) About SMTV variable, none of the whole sample, developed and developing countries pass the test of significance, its coefficient is positive or negative, which shows that activity of financial market cannot influence current account significantly, (4) About NETINT variable, both of developed and developing countries pass the significance testing, coefficient is 0.584092 and 0.347962, which demonstrates that a country with higher efficiency and competitiveness of financial market will tend to current account surplus.

Concerning FOPEN variable, none of the whole sample, developed and developing countries pass the test of significance, every coefficient is positive, which indicates that financial openness cannot influence current account significantly.

CONCLUSION

Based on annual data of 59 countries or regions from 1986-2010, dynamic panel regression model is established and GMM estimation method is adopted to discuss current account imbalance and its influence factors, especially from the perspective of financial development level and financial openness. The findings are showed as follows:

- Among macroeconomic variables, previous current account, government fiscal budget, openness of trade, term of trade can affect current account of the whole sample countries positively and significantly, while consumption rate, gross capital formation, real effective exchange rate can influence it negatively and significantly. In general, when a country expands previous current account balance, increases government budget surplus, improves openness and term of trade, its current account surplus will be increased or deficit will be reduced. On the contrary, raising labor productivity, expand consumption and investment, appreciating currency will worsen current account
- Among financial development variables, financial development level and financial openness cannot influence the whole sample countries significantly
- Towards developed countries, previous current account, government fiscal budget, relative labor productivity, openness of trade, efficiency of financial market can affect current account positively and significantly, while consumption rate, gross

capital formation, financial deepening degree can influence it negatively and significantly. Developed countries increase government budget surplus, raise labor productivity, expand openness of trade, enhance financial market efficiency, inhibit consumption demand and investment, lower financial deepening degree will reduce current account deficit. Real effective exchange rates will not impact on current account significantly, which means appreciation or depreciation of currency cannot change current account imbalance

- Towards developing countries, previous current account, net foreign assets, openness of trade, term of trade, efficiency of financial market can affect current account positively and significantly, while relative per capita income, consumption rate, gross capital formation, real effective exchange rate, financial deepening degree can influence it negatively and significantly. Developing countries increase foreign assets, improve openness and term of trade, enhance financial market efficiency, will increase current account surplus (or reduce deficit). While raising per capita income level, stimulating consumption demand and investment, appreciating currency, expand financial deepening degree will reduce current account surplus

ACKNOWLEDGMENT

This study is sponsored by Chinese Ministry of Education Humanities and Social Science Research Project (10YJC790201): Study on Generating Mechanism of Financial Crisis Based on Current Account Sustainability.

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