

Study on Sustainability of American Double Gaps and its External Debt

Shuo FENG^{1,a,*}, Xiao-Feng HUI^{2,b}

^{1,2}School of Management, Harbin Institute of Technology, Harbin, China, 150001

^afsfreefromcare@126.com, ^bxfhui@hit.edu.cn

*Corresponding author

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Abstract. The changes of a nation's external debt are the main external manifestations of economy, namely foreign trades and international capital flows. The sustainability of American external debt is, in a certain degree, determined by the continuous external imbalance in American economy. In essence, there is a close relationship between the aggravation of the external and internal imbalance in American economy. The empirical analysis shows that no matter how the USA's economic status is, the inter-conversion between fiscal gap and savings- investment gap of private sector result in the continuous expansion of American external debt and moreover ensure the sustainability of American external debt.

Introduction

Contemporary America is not only the country with the world's most net capital inflow but also one with the world's most net external debt. According to the statistics from America Ministry of Commerce, NIIP in America has turned from positive to negative, which is the starting point of American external debt, since 1980's. The decrease of fiscal revenue and the increase of fiscal expenditure have led to the rapid expansion of financial deficits. By the 1990's, the Federal Reserve Bank of America had carried out the long-term expansionary monetary policies, the low interest of which has brought about the patterns of deficit spending and excessive consumption in America so as to the domestic savings cannot meet the need of inland investment, from which saving-investment gap has been produced. From 2013 American Treasury Report, we learn that the American external debt kept huge and having a rapid growth. Obama agreed to raise the debt ceiling and signed the Deficit Reduction Act. Consequently, the problem of the sovereign debt has been relieved to some degree, but the external debt, as part of the sovereign debt, continues to grow.

The influence of the domestic economy on the external debt can finally be found in the exterior department, and the external adjustment patterns of the external debt can be divided into two kinds: adjustment of the increasing fixed assets and adjustment of the existed assets. In the 21st century, the growth of American economy has been slowed down, with persistent current account deficits and net external debt rising fast. The flow adjustments of American external debt are full of such great uncertainty that many researchers have had pessimistic expectations on American external imbalance. In the following years, the American huge net external debt continues, but there is no crisis at all. Therefore, study on the adjustment modes of American external debt gradually springs up with the theory of the valuation effect in order to explain the sustainability of American external debt and predict its coming trend.

Changes of the external debt

The competent department in charge of American external debt statistics is the Ministry of Finance. The data changes of American external debt gross in 2003-2013 has been counted up in the paper.

As is shown in Fig. 1, in 2003 outstanding obligation in American external debt is US\$ 6.946289 trillion. After America has experienced the recovery from the new economic crisis shatter and the recession under the impact of the international financial crisis, the external debt is characterized by continuous and rapid growth. It reflects that during 2003-2013, the total sock of American external debt has been rising obviously. The main reason of a little shrink in 2009 is that the economic crisis in 2007 led

to the economic recession in America. The total consumption and saving deposits were reduced, so the external debt was decreased. It keeps rising in the rest years with the breakthrough of US\$16 trillion in 2013. Compared with 2003, the external debt has increased 138%. It is clear that the USA is on the edge of crisis. Moreover it shows that at present the size of American external debt is huge and it is not easy to get it relieved in short term.

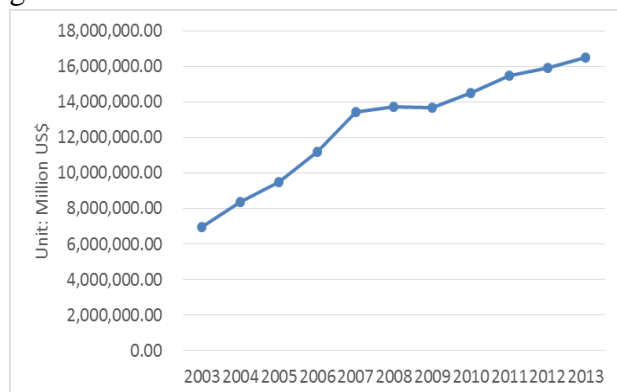


Fig. 1. Stock changes of American external debt gross

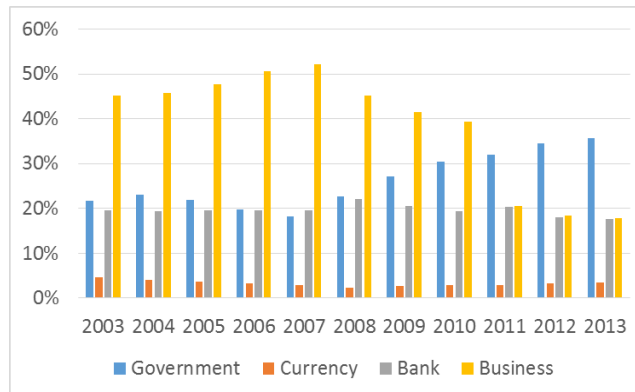


Fig. 2. American external debt structural changes

In the internal composition of American external debt, according to the external debt statistics from American Treasury the debt subject is divided into government sector, monetary authority, banking sector and business enterprise. The agency liability refers to the debt that the federal states and local governments deliver to the non-residents as the form of the government bonds. The debt of monetary authority is the debt that the American Federal Reserve Bank system creates to the non-residents through billing services. The debt of banking sector is that the commercial banking system loans money directly or issues bank bonds to the non-residents so as to form the debt. In Fig. 2 the structure changes of American external debt stock are illustrated and the evolution processes and reasons of American external debt structure are both analyzed.

In 2003-2013, the changes of American external debt structure are as follows: in American external debt, the industrial and commercial enterprises takes up the highest amount, followed by the government sector and banking sector. The debt of the monetary authorities is the least.

a. The share of the external debt from government sector in American external debt has been increased by years. It has been significantly amplified since 2007. In 2003, the sum of the external debt from the government sector is US\$1.500202 trillion, taking up 21.60% of the total while in 2013, the sum of the external debt from the government sector is US\$5.878074 trillion, taking up 35.60%, with 15 percentage points enhanced.

b. The share of the external debt sum from the industrial and commercial enterprises in American external debt has been clearly reduced. In 2003 the external debt from the American industrial and commercial enterprises is US\$3.76434 trillion, possessing 54.19% of American external debt in that year whereas in 2013 the external debt sum from American industrial and commercial enterprises is US\$7.171161 trillion, only taking up 43.43% of the total, with 11 percentage points decreased.

c. The share of the external debt from monetary authorities is small and basically stable, fluctuating between 2.30%~4.58%. The highest share 4.58% appeared in 2003 and then was reduced year by year. In 2007, it was 2.30% and floated around 3.00% afterwards. On average, the share of the external debt from monetary authorities is only about 3.24% which is the smallest one in the four kinds of debt and the fluctuation range is rather small.

d. The share of the external debt from the banking sector is relatively stable in the rest years, sustaining about 20.30%, with little fluctuation except some sliding down in 2007 because of the international economic crisis.

The analysis on the structure of American external debt shows that American external debt comes mainly from the government sectors and the industrial and commercial enterprises. The external debt

from the government sectors is caused by financing gaps while the external debt from the industrial and commercial enterprises is generated by savings-investment gaps. Meanwhile, the external debt from the banking sectors is determined by financing gaps of the government sectors and private savings-investment gaps.

It is revealed that the structure changes of American external debt are spasmodic and saltatory instead of continuous and gradual by comparing the structure of American external debt year by year. Before the international economic crisis (2003-2006), the structure of American external debt was approximately in a stable state. Nothing happened to it until the international economic crisis. Before the international economic crisis, the share of the external debt from the industrial and commercial enterprises in American external debt stabilized around 55%, demonstrating that there are huge private savings-investment gaps in America and that the industrial and commercial enterprises could only depend on offshore funds to make up the gaps. At the same time the national debt of the banking sector didn't expand remarkably. Therefore in this period the external debt of banking sectors was mainly used to compensate the private savings-investment gaps. After the economic crisis the share of the industrial and commercial enterprises was clearly decreased and simultaneously the share of the government sectors increased obviously, showing that the government financing gap was getting larger and larger in this period.

Causes and changes of American external debt

Government sectors and fiscal gap The fiscal gap (financial deficit) is the residual quantity between the fiscal revenue and fiscal expenditure. If the former is larger than the latter, the financing gap is positive, namely capital flow; conversely capital outflow.

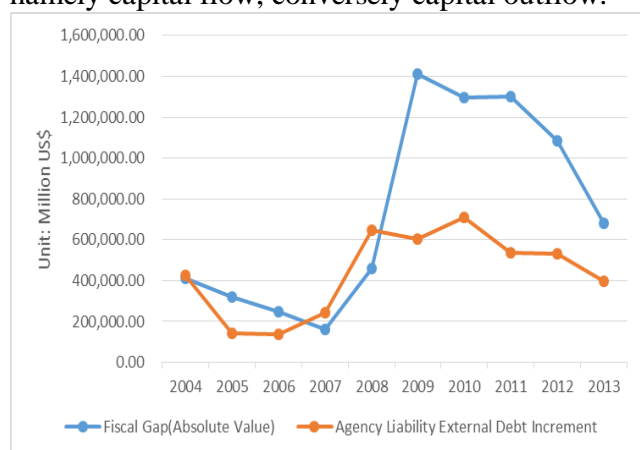


Fig. 3. Fiscal Gap (Absolute Value) and Agency Liability External Debt Increment

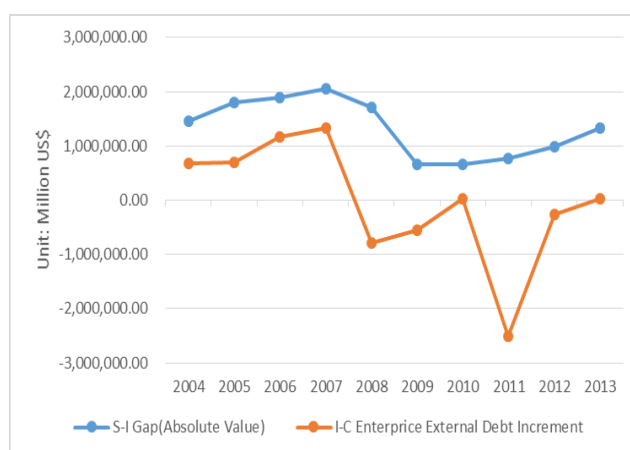


Fig. 4. Private Savings-Investment Gap (Absolute Value) and the Industrial and Commercial Enterprises External Debt Increment

Since 1976, the financial situation of American government sectors has been mostly in the state of financial negative gap. In 2004-2006, the fiscal revenue of the government kept expanding while the fiscal expenditure kept reducing, so the financial negative gap was improved. It shows that the American economy has been growing, the revenue has been increasing and the financial fund of the government has been abundant in this period. Even in the 10 years of reducing the tax reduction, the American revenue continues increasing, showing that without the tax reduction, the American financial capital would increase more rapidly. However, the year of 2007 is a turning point, which means that the growth rate of revenue kept reducing and reached the lowest point in 2009. Owing to carrying out the Economic Incentive Act in 2009, the government revenue was improved. Meanwhile, the growth of the fiscal expenditure remained unchanged and severely surpassed the growth rate of revenue which kept decreased. Therefore, after the economic crisis, American government has experienced a serious period of difficult financial negative gap.

Fig. 3 shows the digital comparison between financial gap (absolute value) and the growth of external debt. American financial gap is the same with the changing trend of the synchronous external debt of the government sectors and the variation curve is similar. So there is a necessary correlation between American financial gap and the external debt of the government sectors. American financial gap has led to the external debt of the government sectors and simultaneously, the external debt of the government has made up the financial gap of the government.

Industrial and commercial enterprises and savings-investment gaps Savings-investment gaps reflect the difference value of a nation's the total amounts of savings and investments. If savings are bigger than investments, savings-investment gaps are positive while if savings are smaller than investments, savings-investment gaps are negative. Savings-investment gaps in most developed countries are negative, namely investments are larger than savings, whereas savings-investment gaps in most developing countries are positive.

In history, before 1986, American savings are basically larger than investments, so its savings-investment gaps are positive. In 1986 American savings-investment gaps turned into negative and remain the same till now. In Fig. 4, the data in 2004-2013 shows, in order to stimulate consumption and reduce the influence to destroy the internet bubbles, the Federal Reserve's monetary policy of expansion led to excessive consumption and rapid decrease of residents' savings so as to give rise to the rapid expansion of savings-investment negative gaps. Before the crisis, American savings-investment gaps remained above US\$1 trillion. The explosion of monetary crisis resulted in Americans to change consumption into savings. Meanwhile, the trading profit of the industrial and commercial enterprises has been declined remarkably and the decision-makers put the tighten investment policy into force, so the total saving -investment gaps has been shrank sharply. The reason for this is that the recession of American economy has made the market lose the confidence in American economy.

The external debt of American banking sectors and the double gaps The external debt of banking sectors is the main element of American external debt. It effectively carries the normal operations of government finance with fiscal gaps and private sectors with private savings-investment gaps. The external debt of banking sectors is used to compensate both financial gaps of the government and private savings-investment gaps. More accurately, the external debt of banking sectors is influenced by the total sum of the two rather than by the gaps of one side.

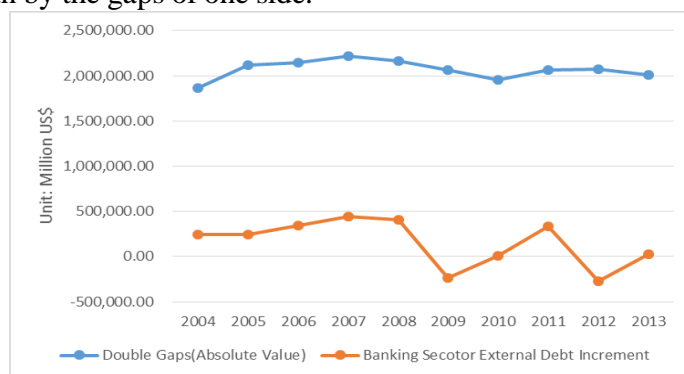


Fig.5. Double Gaps (Absolute Value) and the Banking Sector External Debt Increment

In Fig.5, the external debt of American banking sectors was expanded largely in 2003-2006. The main reason for this is the existence of American private savings-investment gaps. In 2007 the external debt of American banking sectors was contracted sharply. Because of the influence of the international economic crisis, American private savings-investment gaps have dropped markedly. In 2008 the external debt of American banking sectors increased greatly, because American financial gaps in the same year were expanded rapidly. Consequently, the external debt of banking sectors was mainly used to make up the financial gaps of the government. In 2009 the external debt of banking sectors was decreased. Because the international economic crisis brought about environmental deterioration in American financial market, the external financing capacity of American banking sectors dropped sharply. Afterwards, the external

debt of American banking sectors keeps rising. The main reason for this is probably that American economic recovery has behaved well in developed countries. At the same time, after the European debt crisis, the sharp devaluation of Euro has made the US dollars to be the tool of avoiding the risks in order to tackle the problems in banking sectors.

Regression analysis of external debt and double gaps

Modeling. We have chosen 3 important economic variables: def (financial gaps of the government DEF), c (saving-investment gaps CI), and nfd (the ratio between the net gross external debt and GDP), and the regression equation is established as follows:

$$nfd_i = \beta_0 + \beta_1 def_i + \beta_2 c_i + \mu_i \quad (1)$$

β_j is j th partial regression coefficient ($j=1,2,\dots,k$), μ_i is random variable, and n stands for sample size. Multiple linear regression equation is set up and hypothesis is as follows:

(1) $\mu_i \sim N(0, \sigma^2)$.

(2) Random variables μ_i and μ_j are mutual independent.

(3) Independent variable is definite variable but they are not related to each other.

(4) There is a clear linear relation between dependent variable nfd and independent variable def and c . From the above hypothesis, it can be deduced:

$$nfd_i \sim N(\beta_0 + \beta_1 def_i + \beta_2 c_i + \mu_i, \sigma^2) \quad (2)$$

So the multiple linear regression equation is available:

$$E(nfd_i) = \beta_0 + \beta_1 def_i + \beta_2 c_i + \mu_i \quad (3)$$

The total partial regression coefficient $\beta_0, \beta_1, \beta_2$ can be estimated by sample data b_0, b_1, b_2 . The equation of sample linear regression is set up from the above estimated value.

$$\hat{nfd} = b_0 + b_1 def_i + b_2 c_i \quad (4)$$

The estimated value of the partial regression coefficient is solved by least square method.

F test. Set the hypothesis as:

$$H_0 : \beta_1 = \beta_2 = 0$$

$$H_1 : \beta_1 \beta_2 \neq 0$$

According to Table 1., statistics of is 48.913, and Sig. is lesser than 0.001 (equal to actual measuring significance level P-value). Given α equal to 0.05, obviously p is lesser than α , (the null hypothesis) is rejected, thus regression equation is significant.

Table 1. ANOVA

Model	quadratic sum	df	mean square	F	Sig.
1 regression	6.503E9	2	3.252E9	48.913	.000a
residual error	3.989E8	6	66476760.13		
total	6.902E9	8			

Note: a. predictive variable (constant variable), savings-investment gaps, financial gaps

T test. Set the hypothesis as:

$$H_0 : \beta_1 = \beta_2 = 0$$

$$H_1 : \beta_1 \beta_2 \neq 0$$

According to Table 2.,estimated regression coefficient of equals to -16.569, Standardized Error of is 1.834, and t equals to 9.034, the division of two value above. Sig. is lesser than 0.001. Given α equal to 0.05, obviously p is lesser than α , and regression coefficient of is highly significant.

Table 2. Regression Coefficient

Model	Unstandardize d Coefficient	Standardize d Error	Standardize d Coefficient	t	Sig.	confidence interval	
1 (constant)	-147790.19	33375.532		-4.428	0.004	-229457.17 6	-66123.20 5
<i>def</i>	-16.569	1.834	-2.746	-9.035	0	-21.056	-12.082
<i>c</i>	-13.472	1.858	-2.204	-7.252	0	-18.017	-8.926

Note: a. dependent variable: the gross external debt

Similarly, estimated regression coefficient of *c* equals to -13.472,Standardized Error of *c* is 1.8341.858, and t equals to 7.251. Sig. is lesser than 0.001, and p is lesser than α with given α equal to 0.05, regression coefficient of is highly significant.

Conclusion

It can be concluded from the above analysis:

a. According to the regression analysis and test results, it is known that there is a strong correlation between the financial gaps of American government and the private savings-investment gaps. That is the constant growth of the total sum of American external debt is the coefficient result of the expansion of the government financial negative gaps and the increase of the private savings-investment negative gaps.

b. In the analysis of regression, the less important influence factors, such as the rate of the monetary authorities, the changes of exchange rate are ignored. It also turns out that the financial gaps of government and the private savings-investment gaps are two factors with great influence on American external debt.

c. It is concluded that owing to the imbalance of the savings and investment, America has to borrow money from the foreign countries to make up for savings-investment negative gaps, so the phenomenon of frequently expanding external debt comes into being.

d. The influence coefficient of the government financial gaps to American external debt is smaller than that of the private savings-investment gaps. Consequently, if American economic conditions can be improved, financial deficit can stimulate the private investment to make the savings-investment gaps turn into positive, then the influence of the double gaps on the external debt will be improved. However, from the long run, the expansion of both the government financial deficit and the private investment will intensify the savings-investment gaps, so the influence of the long-term double gaps on American external debt is synclastic.

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