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## New approaches in analysis of the priority of fiscal income per GDP—a case of China\*

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### Abstract:

The level of the priority of fiscal income *per GDP* has until recently been limited by the availability of economic and econometric data and relative computational capability. At present the constraint is the systematic compilation of detailed and comprehensive economic and econometric data and the ability to manipulate them. The effective use of enhanced data processing capabilities will have to proceed hand in hand with a concerted effort to develop the economic and econometric data and with the shift from analytic approaches based on some case data to those that can take advantage of detailed information.

**Key Words:** *Per GDP*, Three-gap model, The priority of fiscal income, New approaches

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\* Project—“14BGL157&14AZD123” supported by National Social Science Fund of China

## 1. INTRODUCTION

What is the Priority of Fiscal Income *per GDP*? It means the most fiscal income *per GDP* while people lives still better. That is to say, government could not get too much fiscal income from GDP. If government does it, people would suffer from discomfort lives.

Developed countries are playing an important role in transforming fiscal income *per GDP* into a priority condition. The significance of that role is enhanced by the increasing emphasis on measuring and counting as traditional methods of fiscal income and *GDP* are replaced by science-based technologies. With the rapid spread of computerization, detailed factual information about every kind of activity performed in the many different countries of a complex modern or traditional or transform economy has become available. Attempt, however, is not being made to develop an effective method for systematically organizing a comprehensive, fully integrated information system. The coverage in many instances reflects the mission-oriented requirements of different countries rather than the need of attaining a better, detailed understanding of the changing structure of the entire economy. For example, no information is compiled about alternative technologies used in the same country or about the details of fiscal income and *GDP* transactions carried out between countries. The question above, in another word, is also that the phenomenon to increase or decrease the size of the tax burden is the result of economic and social role of states. Analysis of state intervention in the economy led to a new liberal economic thinking that was approached it by the American economist Arthur Laffer, prioritizing individual person. Arthur Laffer developed certain policies that could solve the problems faced by modern economies (Chirculescu and Dobrotă, 2012).

But unfortunately, until now, no one economist whether who is in modern economics or traditional or transitional economics can solve the puzzle question.

This lack of a complete picture results in part from the absence of an effective method. Maybe we could deal with the problem hinted from three-gap model.

The equilibrium of economic growth is one of the important issues studied by macro-economy. Three-gap model (the saving gap, the fiscal gap, and the foreign exchange gap) is very effective tools for many institutes of international and government to analyze the issues of internal-external equilibrium of economic growth, and provide adjustment policies, because it can provide quantity frame and express the relationship between promotion of productivity and capacity utilization rate.

There are more scholars who analyze the constraint of every gap impacting on economic growth using three-gap model in order to offer selecting program of macroeconomic performance (Chenery and Strout, 1966; Bacha, 1990; Ndulu, 1990; Taylor, 1993; Mwangi *et al*, 1994; Sepehri *et al*, 2000; Iqbal *et al*, 2000; Cai, 2003; Ranaweera, 2003; Akram-lodhi and

Sepehri, 2005; Caribe and Sede, 2005; Chen and Zhang, 2007, 2008; He and Zhang, 2011; Chen and Zhang, 2012; Ruan and Zhang, 2013).

## 2. AN EXAMPLE: FROM CHINA'S DATA-A PUZZLE QUESTION IN THREE-GAP MODEL

### 2.1 The process of puzzle question taking place

There are 15 equations in three-gap model (Ruan and Zhang, 2013). Private savings are defined in eq. (1) and are specified in a standard way, according to which savings are assumed to vary positively with the capacity utilization variable ( $u$ ).

$$s_p = \sigma_0 + \sigma_1 u \quad , \sigma_0 > 0 \text{ or } \sigma_0 < 0, 0 < \sigma_1 < 1 \quad (1)$$

The parameter  $\sigma_0$  implicitly includes private foreign interest payments. The marginal saving rate  $\sigma_1$  implicitly includes the effects of taxes transfers. Notice that all literature considers  $0 < \sigma_1 < 1$ . But, in China from 1981 to 2011, the sign of  $\sigma_1$  is negative, see (2).

$$s_p = 0.068 + 0.827s_{p-1} - 0.043u \quad (2)$$

$t$	(1.15)	(4.28)	(-0.91)	$\overline{R^2} = 0.362$
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Eq. (2) was tested and corrected for auto-correlation by *B-G* test.

It should be noticed that the negative sign of  $\sigma_1$  shows that the accumulation of private savings mainly depend on the devotion of its prophase in 1981-2011, the amount is 82.7%. The phenomenon is great difference with traditional beforehand,  $0 < \sigma_1 < 1$ . In order to analyze China's economic structure by way of three-gap model, we have to change the sign of definition of  $\sigma_1$ :  $0 < |\sigma_1| < 1$ .

It arise other serious question. Is the source of private savings not from the growth of productivity utilization? It is not in accord with people experience. In order to resolve the contradiction, we calculate the sample data from 1981-2010, find the sign of  $\sigma_1$  is positive, see (3),  $0 < \sigma_1 < 1$ , the residual test of eq. (3) as Fig. 1.

$$s_p = 0.268 + 0.017u \quad (3)$$

$t$	(8.97)	(0.37)	$R^2 = 0.005, D - W = 1.10$
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Date: 03/31/13 Time: 08:08  
Sample: 1981 2010  
Included observations: 30

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob	
		1	0.072	0.072	0.1731	0.677
		2	0.039	0.034	0.2260	0.893
		3	-0.039	-0.045	0.2814	0.963
		4	-0.061	-0.057	0.4204	0.981
		5	-0.061	-0.050	0.5641	0.990
		6	-0.068	-0.058	0.7468	0.993
		7	-0.021	-0.014	0.7659	0.998
		8	0.017	0.017	0.7789	0.999
		9	0.052	0.041	0.9043	1.000
		10	0.020	0.002	0.9244	1.000
		11	-0.034	-0.047	0.9843	1.000
		12	-0.071	-0.069	1.2559	1.000
		13	-0.102	-0.087	1.8396	1.000
		14	-0.087	-0.069	2.2972	1.000
		15	-0.084	-0.074	2.7487	1.000
		16	-0.113	-0.121	3.6213	0.999

**Fig. 1 The residual test of eq. (3).**

Compare the results of (2) and (3), we know that China's economic structure is disadvantage to private savings accumulation from 2010 to 2011. The cause is that the growth rate of fiscal income is 20% which much greater than 13% of the growth rate of private savings. Why the great increase of fiscal income in 2011 had changed the sign of  $\sigma_1$ ? The ratio of amount from 2010 to 2011 by 1981 to 2010 is 16.3%. It arise a great serious question: how many growth rate of fiscal income relative to private savings is a normal threshold in accord with eq. (1)? It seems to me to find the method dealing with the problem: calculate (1) by adjusting the growth rate of fiscal income in 2011, until the sign of  $\sigma_1$  is positive. That is also to say, we increase private savings until the sign of  $\sigma_1$  is positive. Or find the convenient ratio of private savings by fiscal income. But it is impossible for us to solve the question only depending on eq. (1) or eq. (2) by adjusting data of fiscal income in 2011. The reason is that:

There is a continuous function,  $y = f(x)$ , if having a  $[a, b]$ , satisfying condition:  $f(a) \cdot f(b) < 0$ , it means that the sign value of  $f(a)$  is opposite to the sign value of  $f(b)$ . Thus, there must be a point,  $x_0 \in (a, b)$ , satisfying the condition of  $f(x_0) = 0$ .

But, the function of eq. (1) or eq. (2) is not continuous a function due to the data are econometric data.

There is a possible way dealing with the problem. Set up a function with many terms,  $u=f(y)$ , such as

$$u = \alpha_0 + a_1 y + a_2 y^2 \quad (4)$$

$u$  means capacity utilization,  $y$  means fiscal income. Maybe we can find the priority of fiscal income relative to priority capacity utilization.

How to use the above results?

Firstly, it seems to me to find one of causes which induce a developing country can not reach developed country. Maybe their government gets too much fiscal income relative to private savings.

Secondly, maybe get innovation of economic theorem, such as developing economy, fiscal theorem, macro economy, etc.

## 2.2 The sustainable range between priority and most of fiscal income *per GDP*

Make (4) a derivative, and make it equal to 0 using the data 1981-2011, get:

$$y = -a_1 / (2a_2) \quad (5)$$

$$u = 0.180 - 0.391 * y - 21.904 * y^2 + 0.789 * u_{(-1)} \quad (6)$$

$a_0 = 0.180$ ,  $a_1 = -0.391$ ,  $a_2 = -21.904$ ,  $y = -0.0089$ , in fact, in 2001,  $y = -0.0087$ , near the priority  $y$ .

In 2001, fiscal income/*GDP* = 14.95%.

In 2011, fiscal income/*GDP* = 21.97%.

Get the sustainable range between priority and most of fiscal income by *GDP*: [15%, 22%).

## 2.3 The range of $s_p$ per fiscal income in 2001 and 2011

In 2001, the value of  $s_p$ /fiscal income = 2.6, but, in 2011, the value = 0.02.

Get the sustainable range between priority and most of  $s_p$  by fiscal income: [2.6, 0.02).

## 3. AGENDA FOR FUTURE WORK

Second directions for future work naturally come to mind. The first is how much of fiscal income *per GDP* is the most amounts or the highest threshold in order to satisfy the normal condition:  $0 < \sigma_1 < 1$ ? The second is what is the priority of China's fiscal regime?

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