

# The Analysis of the Impacts of China's Personal Income Tax System on Labor Supply of Urban Dweller

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Received 2 March 2019; accepted 19 June 2019

Published online 26 July 2019

## Abstract

The impact of taxation on labor supply depends on the income effect and substitution effect after taxation. However, the two effects will be different under various tax systems. This paper intends to analyze the impacts of personal income tax on labor supply of urban dweller under Chinese tax system. This paper use theoretical and empirical analysis method to analyze this problem. We conclude that the income effect is greater than substitution effect under in China, and then we put forward some relevant suggestions.

**Key words:** Personal income tax; Urban dweller; Income effect; Substitution effect

Bai, Y. (2019). The Analysis of the Impacts of China's Personal Income Tax System on Labor Supply of Urban Dweller. *Canadian Social Science*, 15(7), 45-49. Available from: <http://www.cscanada.net/index.php/css/article/view/11160>  
DOI: <http://dx.doi.org/10.3968/11160>

## INTRODUCTION

Fiscal policy and taxation policy is an important means to regulate income distribution, and personal income tax is an important tool for the government to regulate personal income gap. The adjustment of income tax is primarily aimed at balancing fairness and efficiency. On the one hand, the tax burden of different income groups will be more equal by adjusting the tax rate or deduction standard. On the other hand, the change of tax system will cause the change of labor supply. From the point of view of economic theory, the change of personal income tax affects the change of wage, and produces two kinds of

effects on labor supply-- income effect and substitution effect. On September 10, 1980, the Third Session of the Fifth National People's Congress of China promulgated the Personal Income Tax Law of the People's Republic of China. Since then, China's personal income tax system has been formally established. In the course of more than thirty years of implementation, the personal income tax collection system has finished many modifications and adjustments. It has become an important source of tax revenue in China. Since 1994, when China fully implemented personal income tax, its income scale has been increasing year by year. Especially since the beginning of the new century, the income scale of personal income tax has shown a significant growth trend with the increase of personal income level. Based on the two effects, this paper analyses the impact of personal income tax on the labor supply of urban residents in China.

## 1. HYPOTHESIS

Before theoretical analysis, it is necessary to hypothesize the model in order to conduct more rigorous analysis. Assuming that  $Y$  denotes the net income of individual,  $L_0$  denotes the disposable time of individual and  $L$  denotes the working time, it can be seen that  $(L - L_0)$  denotes the leisure time of individual.

The total utility of individual is composed of the direct utility obtained by purchasing goods with net income  $Y$  and the indirect utility obtained by using leisure time  $(L - L_0)$  for other social activities. Therefore, the level of individual utility of workers can be expressed as follows:

$$U = U[Y, (L - L_0)]$$

Among them, the indifference curve of "U" convex to the origin, and continuously differentiable, strictly increasing net income  $Y$ , and strictly decreasing working time  $L$ .

The individual budget constraints of the labor force are as follows:

$$Y = wL + I$$

Among them,  $w$  denotes the pre-tax wage rate and  $I$  denotes the pre-tax income obtained by means other than wages.

After taxation, individual budget constraints are

$$Y = (wL + I)(1 - t_i) = w_1L + M$$

Among them,  $w_1$  represents after-tax wage rate and  $M$  represents other after-tax income.

## 2. THEORETICAL ANALYSIS

Modern tax theory holds that there are two possible effects of Taxation on workers. One effect is the substitution effect, which means that taxation reduces the opportunity cost of individual's leisure (that is, the price of leisure - wages are cheaper than before). Leisure brings more utility to individual, and the demand for leisure increases, thus reducing the labor supply. Another effect is the income effect, which means that taxation reduces the real income of workers, thereby reducing the consumption of leisure and other goods. In order to make up for the decrease in income, workers increase the supply of labor in exchange for income.

According to the above assumptions, through the expression " $Y = w_1L + M$ " of personal restraint after tax, the following conclusions can be obtained through mathematical deduction. Firstly, if other conditions remain unchanged, the revenue effect will be produced if only other income  $M$  is taxed, which can be graphically expressed as the moving of the personal budget line to the lower left and parallel to the pre-tax budget line. That is to say, the budget line only moves in parallel and does not rotate. Secondly, if only income " $w_1L$ " is taxed, and other conditions remain unchanged, it will not only produce income effect, but also produce substitution effect, which can be graphically expressed as not only a translation of the personal budget line, but also a rotation. So, whether the effect of Taxation on individuals is substitution effect

or income effect? This can not be concluded, and we need to do specific analysis.

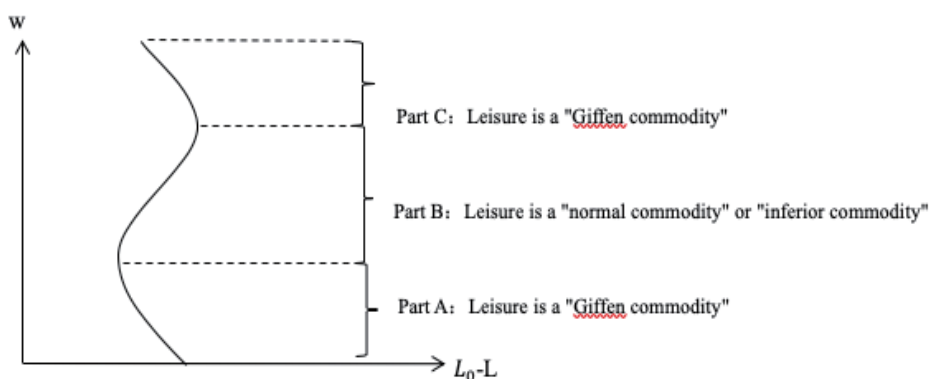
Firstly, leisure is regarded as a commodity, which needs to be classified. Modern economics often divides commodities into three types when analyzing substitution effect and income effect: normal goods, inferior goods and Giffen goods. Among them, the price elasticity of demand of normal goods is greater than 1, the price elasticity of demand of inferior goods and Giffen goods is less than 1, and Giffen goods are special inferior goods. Secondly, leisure is assumed to be normal goods, inferior goods and Giffen goods respectively to analyze the impact of Taxation on workers.

When leisure is a "normal goods", taxation reduces the wage rate  $w$  to  $w_1$ . The sign of substitution effect is negative - contrary to the change direction of the price of leisure (or wage rate), and the sign of income effect is negative, so the total effect is positive. Individuals prefer leisure to work. In other words, taxation reduces the supply of labour.

When leisure is "inferior goods", taxation reduces wage rate, and the sign of substitution effect is negative; the sign of income effect is positive which is consistent with the change direction of the price of leisure (or wage rate). But the substitution effect is greater than the income effect, so the total effect is negative. Individuals prefer leisure. In other words, taxation reduces the supply of labor.

When leisure is a "Giffen goods", the symbols of substitution effect are negative, while the symbols of income effect are positive, but the symbols of substitution effect are less than income effect, so the total effect symbols are positive. People prefer to work rather than leisure. We can get the conclusion that taxation increases the supply of labor.

Summing up the above three points, we can see that when leisure is regarded as a commodity of different nature, the corresponding shape of the labor supply curve is different. More precisely, the corresponding stages of the labor supply curve are different. (See Figure 1)



**Figure 1**  
**Individual labor supply curve**

It can be concluded that theoretically, it is uncertain whether tax promotes or hinders the supply of labor force.

Therefore, empirical analysis is needed based on actual data.

### 3. EMPIRICAL ANALYSIS

Considering the characteristics of China's fiscal and taxation system and the characteristics of labor supply decision-making during the transition period, and based on the existing research results, this paper explores

the impact of changes in China's personal income tax burden on urban residents's labor supply according to the available data. We chooses the data of China Statistical Yearbook from 1995 to 2012 and summarizes the relevant data. (see Table 1)

**Table 1**  
**China's GDP, Employment and Individual Income Tax From 1995 to 2012**

Year	GDP	Total employment	Individual income tax	Social Insurance Fund Income	Labor remuneration	Labor income	Individual income tax/ Labor income
1995	60793.70	68065.00	131.49	1006.00	8055.80	9193.29	1.43
1996	71176.60	68950.00	193.19	1252.40	8964.40	10409.99	1.86
1997	78973.00	69820.00	259.93	1458.20	9602.40	11320.53	2.30
1998	84402.30	70637.00	338.64	1623.10	9540.20	11501.94	2.94
1999	89677.10	71394.00	413.66	2212.80	10155.90	12782.36	3.24
2000	99214.60	72085.00	659.64	2645.90	10954.70	14260.24	4.63
2001	109655.20	73025.00	995.26	3102.90	12205.40	16303.56	6.10
2002	120332.70	73740.00	1211.78	4049.70	13638.10	18899.58	6.41
2003	135822.80	74432.00	1418.03	4883.90	15329.60	21631.53	6.56
2004	159878.30	75200.00	1737.06	5780.30	17615.00	25132.36	6.91
2005	184937.40	75825.00	2094.91	6975.20	20627.10	29697.21	7.05
2006	216314.40	76400.00	2453.71	8643.20	24262.30	35359.21	6.94
2007	265810.30	76990.00	3185.58	10812.30	29471.50	43469.38	7.33
2008	314045.40	75546.00	3722.31	13696.10	35289.50	52707.91	7.06
2009	340902.80	75828.00	3949.35	16115.60	40288.20	60353.15	6.54
2010	401512.80	76105.00	4837.27	18822.80	47269.90	70929.97	6.82
2011	473104.00	76420.00	6054.11	24043.20	59954.70	90052.01	6.72
2012	519470.10	76704.00	5820.28	28909.50	70914.20	105643.98	5.51
2013	592963.20	76977.00	6531.53	35252.90	93064.30	134848.73	4.84
2014	641280.60	77253.00	7376.61	39827.70	102817.20	150021.51	4.92
2015	685992.90	77451.00	8617.27	46012.10	112007.80	166637.17	5.17
2016	740060.80	77603.00	10088.98	53562.70	120074.80	183726.48	5.49
2017	820754.30	77640.00	11966.37	67154.20	129889.10	209009.67	5.73

Sources: Chinese National Bureau of Statistics.

Assuming that other conditions remain unchanged, the supply of urban labor mainly depends on economic development and the level of tax burden on individuals, the linear relationship between the three is assumed to be:

$$Y = c + \alpha_1 X_1 + \alpha_2 X_2 + \mu$$

Among them, Y indicates the level of labor supply of urban residents, this paper chooses the number of employed urban residents as an indicator; c is a constant; indicates the level of economic development, and GDP is used to replace the level of economic development; indicates the level of tax burden of urban workers, where the ratio of "personal income tax/labor income" is used to express, in which labor income equals labor. Remuneration + income tax + income from social insurance fund.

The equation is logarithmically processed:

$$\ln Y = c + \alpha_1 \ln X_1 + \alpha_2 \ln X_2 + \mu$$

By using OLS regression analysis with Eviews

software, the relationship between personal income tax and urban residents' labor supply is obtained as follows:

$$\ln Y = 10.826 + 0.026 \ln X_1 + 0.047 \ln X_2$$

(0.039)    (0.004)    (0.005)

$$t = (275.305) \quad (6.919) \quad (9.474)$$

$$= 0.972 \quad = 0.968 \quad F = 256.313 \quad DF = 1.093$$

From the results obtained, the fitting degree is good, which is in line with the actual economic significance. The fitting results are analyzed below.

When GDP changes by 1%, the labor supply of urban residents changes by 0.026% in the same direction, which is in line with the reality. The development of economy promotes the supply of labor force, which shows that with the development of economy, the number of jobs available by society increases, the living standard of residents improves, and personal consumption increases. In order to make up for the burden of increased consumption, more labor force is willing to enter the labor market.

When the “personal income tax/labor income” changes by 1%, the labor supply of urban residents changes by 0.047%. Then it can be concluded that the change of personal income tax is proportional to the supply of labor. Theoretically, the income effect of taxation is greater than that of substitution, and the income effect is positive. From the labor supply curve, the individual labor supply curve of urban residents in China is generally located in Part A (see Figure 1). This is also fit the current situation of China. Although the economy is in the rising stage, it is still in the ranks of developing countries. Compared with developed countries, the national income level is still at a low level. The tax rate increases, which makes the disposable income of residents lower. In addition, the current price level remains high. In order to maintain the established income level and consumption level, people have to enter the labor market. Essentially, the reason for this result can be attributed to the fact that China's economic development level is still not high. Although China's total economic output has ranked in the forefront of the world, the per capita GDP is still at a very low level.

#### **4. CONCLUSION AND SUGGESTION**

The above analysis reveals that there is a significant correlation between the personal income tax and the labor supply of urban residents in China. We can get the conclusion that it is feasible to solve the problem of labor supply and even employment in cities and towns by improving the personal income tax system in China. There are some suggestions to put forward on how to improve the personal income tax system and improve the labor supply of urban residents.

##### **4.1 Promoting China's Macroeconomic Development and Raising the Per Capita National Income Level**

The reform of personal income tax can promote the supply of urban labor force in China, which is based on the premise that the income level of labor force reaches a certain level. The most important reason why the labor force decides whether to enter the labor market is its net income. That is to say, the premise for the workers to consider whether to enter the labor market is whether their basic living standard can be satisfied. When the basic living standard is satisfied, even the income is far greater than the standard of meeting the basic living standard, the labor force will choose between work and leisure time. Therefore, improving the per capita income level is a major prerequisite for solving the problem. The focus of policy should be on the tertiary industry, which can absorb more labor force. The development of tertiary industry can effectively increase employment opportunities while achieving high economic growth. The government should choose labor intensive economic policies that can expand employment in policy guidance. At the same

time, different economic development modes should be matched according to the resource endowment of different regions.

##### **4.2 The Reform of Individual Income Tax Should Pay Attention to Closing the Income Gap of All Income Classes of People**

As a developing country, most of the workers in China are at a relatively low level of wage income. The marginal utility of income is generally large. Wage income is still the main source of increasing family income. At the same time, due to China's huge population base, the present situation of labor supply exceeding demand will not change much in the next twenty or thirty years. The elasticity of labor supply is very low, and the low income makes the ability of workers to choose between work and leisure extremely limited. Therefore, the substitution effect of tax on labor supply is not significant, which is the reason why the income effect is greater than the substitution effect. According to the results calculated by the Ministry of Finance, the adjustment of China's personal income tax policy in 2011 has reduced the tax rate of wage of salary earners from about 28% to about 7.7%. And the number of taxpayers has been reduced from about 84 million to about 24 million after the adjustment. This means that after the implementation of the New Deal, about 60 million taxpayers of the original salary need not pay a tax. This can increase the income level of the middle and low income groups, play a role in stimulating economic growth, and at the same time may have a certain substitution effect on some high-income people. To a certain extent, it narrows the income gap between different classes and plays a guiding role in the direction of individual tax policy adjustment in the future.

##### **4.3 Scientific Design of Tax Rate Model to Ensure Tax Policy to Promote Employment Growth**

Through the above model analysis, we can find that when taxing the labor factors of Chinese urban residents, the income effect is greater than the substitution effect. Tax policy can promote employment. From the taxation of urban residents, individual income tax accounts for the largest proportion. Therefore, the policy of individual income tax will play a key role in the decision-making of individual labor supply. In the future, the design of tax rate pattern should be more unscientific. Firstly, we should adopt a tax structure with excess progressive tax rate as the main factor, and parallel excess progressive tax rate with proportional tax rate. Secondly, the excess progressive tax rate must be controlled within a reasonable range for wages and salaries that apply excess progressive tax rate, and should not exceed the proportional tax rate in order to ensure tax fairness. Thirdly, we should reduce the tax rate grade appropriately and reduce the highest marginal tax rate.

#### 4.4 Strengthen the Propaganda and Collection of Tax Revenue

The current tax system of our country still has some system defects compared with the developed countries. At the same time, the citizens' tax consciousness is not strong, and the psychology of tax evasion is widespread. Therefore, the government should strengthen the publicity of citizens' tax obligations. At the same time, it is necessary to strengthen tax collection and management and establish an effective tax collection and management system to improve the personal income tax system. First, we should fully mobilize the enthusiasm of tax authorities and relevant departments and adopt advanced network communication technology. Establish a professional and modern network system among different departments to monitor the process of individual income tax collection and management in an all-round way. Secondly, we should strengthen the professional training of tax staff to improve their professional ability and adaptability. Thirdly, we should improve the legislation and clarify the legal liability of tax evaders. In the Law of the People's Republic of China on Tax Collection and Management, we should clarify the main position of tax inspection in law enforcement, establish and improve unified working procedures for tax inspection with legal effects, and clarify the crime of malfeasance and accepting bribes of

tax personnel, and impose the same punishment as the relevant taxpayers.

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