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ABOUT THE JOURNAL

The importance of China on the global economic stage cannot be ignored, and its unique legal and tax systems are of great inters to international scholars and business people alike. China's tax system is acquiring western features while remaining entrenched in its rich cultural and historical roots. This makes for interesting study, analysis and comparison as its laws are becoming more accessible.

The Journal of Chinese Tax & Policy focuses on the policy, administrative and compliance aspects of the Chinese tax system. It also welcomes comparative studies between China and other countries. The Journal is an internationally peer-reviewed scholarly publication.

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EDITORIAL

This edition explores a few issues relating to the redistributive impact of tax reform policies.

In Cui and Qin's article, 'Income Tax Reform, Ownership Structure, and Corporate Finance Behaviour', the authors examined how enterprise income tax reform and differing ownership structures influence financing behaviours and structures. Using the difference-in-differences model and multiple regression analysis, one notable result of the study is that ownership concentration plays a significant role in the financing behaviour of enterprises.

Jin and Zhou's article 'Re-perceiving the Tax Allocation Relationship Between Government and Residents in the National Income' examined the tax burden relationship between government and residents. The article explored the various national income distribution trends since the 11th five-year plan. The study explored China's income tax allocation and relationship structure in order to demonstrate the necessity to approach tax reform in the 12th five-year plan period in a gradual and calculated manner, so that the proposed plan goals could be reached in an efficient and lasting way.

Huang and Underwood's paper approaches the effects of tax holidays for green energy by performing a cost-benefit analysis on the investment decisions of renewable energy producers. The different results from calculations performed from a public finance angle, and from a private business's perspective shows that government policies positively impact on investment decisions, where otherwise not viable business decisions may be made. Therefore, the tax holidays received their desired effect.

Wu's article, 'Regressive Effects and Countermeasures of Individual Income Tax Deferred Pension Insurance' examined the regressive effects of the proposed reform of China's personal pension insurance scheme. The analysis of the individual income tax deferral preferential policy and individual income tax deferred pension insurance scheme illustrated how certain regressive effects in both cases could be reformed. The recommendations and analysis in this article, although China specific, provide perspective in the current global debate on pension reform in an environment of population ageing.

Eva Huang

Sydney, August 2013

Income Tax Reform, Ownership Structure, and Corporate Finance Behaviour☆

Zhigang Qin, Jiao Cui ☆☆

Abstract: The paper studies the impact of the enterprise income tax reform on financing behaviour by sampling the listed companies with difference-in-differences model and multiple regression analysis method. Further analysis is made on the different characteristics of ownership structure influence of income tax rate upon financing structure. The study demonstrates that the reform greatly influences the financing structure. After the reform, the enterprise whose tax rate is increased tends to raise the debt scale. On the contrary, the enterprise whose tax rate is decreased tends to reduce the debt scale. Ownership concentration and corporate debt levels is negatively correlated. The more concentrated the equity, the less obvious the influence of tax rate change upon enterprise fixed assets liabilities ratio.

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I. Introduction

On March 16, 2007, the fifth session of the Tenth National People's Congress reviewed and adopted the enterprise income tax law of the People's Republic of China, which was to take effect on January 1, 2008. After the implementation of the new enterprise income tax law, domestic and foreign-invested enterprises are no longer applicable for different tax laws. The law appropriately reduced the corporate income tax rate, from 33% (foreign-funded enterprises and foreign enterprises was 30%) to 25%, unified the pre-tax deduction methods and standards, adjusted the preferential tax policies, and began to implement a new tax system of “industry is favourable, supplemented by regional preferential, and give attention to social progress”.

Many scholars at home and abroad studied the relationship between the tax and the enterprise capital structure, such as Wang Yuetang (2010) directly studied the impact of the tax reform on capital structure, he found a significant positive correlation between the adjustment of corporate capital structure and the tax rate changes. But there are few scholars studied the effect of changes in tax rates on the enterprise financing behaviour from the perspective of the unique ownership structure of listed companies in China.

Based on the enterprise income tax reform in 2008 and using listed companies as samples**,** this paper employs the difference-in-differences model and multiple regression analysis to investigate the influence of the reform upon financing behaviour and the effect brought by ownership structure under the influence of tax law upon financing behaviour. We investigate the issues using yearly observations from China Stock Market & Accounting Research Database during the period 2004-2011.The study demonstrates that the reform greatly influences the financing structure. After the reform, the enterprise whose tax rate is increased tends to raise the debt scale. On the contrary, the enterprise whose tax rate is decreased tends to reduce the debt scale. Ownership concentration and corporate debt levels is negatively correlated. The more concentrated the equity, the less obvious the influence of tax rate change upon enterprise fixed assets liabilities ratio. All of these results are robust to controlling for a variety of potential confounding factors such as allotment of shares and credit policy.

The remainder of the paper is organized as follows. Section II briefly summarizes some theory of the tax rates, ownership structure and capital structure. Section III describes the data we use and defines the variables as well as the models. Section IV presents the empirical test results and robustness tests. Conclusions are presented in the final section.

II. Theory Analysis and **Hypotheses**

II.A. Income tax rate and capital structure

According to the Miller model, we can draw the following equation

$$V_L = V_U + \left\{ 1 - \frac{(1-T_C)(1-T_S)}{(1-T_b)} \right\} \times D$$

Where V_L represents the value of companies with debts, V_U denotes the value of companies without debts, T_C is corporate income tax rate, which equals to 33% (15% for some companies enjoy preferential taxation policies) before the tax reform, and 25% after the tax reform. T_S is personal dividend income tax rate 10%, T_b is personal bond income tax rate 20%. D indexes the companies' debt level. Ignoring the payments of dividends, we could get the equations below by assigning the income rates before and after the reform:

The value of companies before the tax reform: $V_0 = V_U + 0.25D$,$V_2 = V_U + 0.04D$

The value of companies after the tax reform: $V_1 = V_U + 0.16D$

From the formula, we can see that there are always liabilities tax deductible interests under the old and new enterprises income tax system. Comparing V_1 with V_0 and V_2, we observe that V_1 is smaller than V_0 but greater than V_2, after the consolidation of the two taxes, on the basis of considering the individual income tax ,the value of enterprise whose income tax rate was originally 33% (15%) will be decreased (increased) because the tax shield income decreased (increased), even though the capital structure remains unchanged. After the introduction of new income tax rate, for the enterprises whose tax rates are increased, the attempt of improving corporate value using debt tax shield tends to be strengthen, therefore the asset-liability should be raised; the motivation of improving corporate value by debt tax shield for the enterprises whose tax rates are decreased tends to be abated, so the asset-liability should be reduced; as for the enterprises whose income tax rates unchanged, capital structure is likely to remain the same. Based on the above analysis, this paper puts forward the first hypothesis.

Assumption 1: On the basis of controlling other variables which will affect financing structure, after the income tax reform, enterprises whose rate is increased raise the scale of liabilities significantly, on the contrary, the enterprise whose tax rate is decreased reduce the debt scale significantly.

II.B. Ownership structure and capital structure

In China's listed companies, major shareholders generally obtain high economic benefits by virtue of their control, at the same time they hope to be able to distract risk. So they prefer to equity financing, and tend to reduce business risk and increase their income at the expense of diluting the rights and interests of minority shareholders. Also, the largest shareholder is usually state-owned and occupies the absolute or relatively controlling position. But under the current system, state shareholder is actually absent in management; on the other hand, the public shares are minority shareholders, whose interests are continued to be plundered and infracted by the large shareholders and the managers because of their "low voice with little shares", the high costs as well as "rational apathy", and thus lead to a serious insider control, the major decision-making power rests in the hands of the management, they would pursue lower debt levels. So the following assumption is put forward.

Assumption 2: Under the concentration of ownership structure, ownership concentration of listed companies (the percentage of shareholdings by the largest shareholder) is inversely associated with the debt ratio.

II.C. The reform of tax, ownership structure and capital structure

After the income tax reform, for the enterprises with relatively concentration of equity, the value of tax shield is declined with the tax rate. Due to the increased cost of debt, the enterprises might change the existing financing structure. On the contrary, those enterprises with higher ownership concentration usually adopt relatively prudent financial policy because of the large shareholders' financing preference and control ability, although the decline of rate will lead to an increase in corporate debt financing costs, but they would not rush to change financial decisions. Based on the above analysis, we give the following assumptions based on assumptions 1 and 2.

Assumption 3: By controlling the influence of other factors, after the income tax reform, among the enterprises whose tax rates are increased, the increase level in asset-liability ratio of the enterprises with higher ownership concentration is less than the ones with lower ownership concentration; Among the enterprises whose tax rates are decreased, the decline level in asset-liability ratio of the enterprises with higher ownership concentration is also less than the ones with lower ownership concentration. The equity concentration weakens the effect of tax policy. That is, the equity concentration weakens the effect of tax policy.

III. Design of the study

III.A. Sample selection

We tested our hypotheses on annual data collected from Chinese companies that were actively listed in the Shanghai and Shenzhen Stock Exchanges during 2004–2011.At the end of December 31, 2011, there are 2317 companies. We eliminated financial and insurance firms from our sample to enhance the comparison with previous studies. In order to ensure the accuracy and objectivity of the result, we also exclude firms which were listed or delisted between 2005 and 2011, un-normally operating ones such as be special treated or particular transferred during the studied period, and whose long-term liabilities is less than zero, main business income is less than or equal to zero, total profit is less than zero, income tax minus income tax refund is zero or the tax rate is zero, as well as data-missing companies over the 2004–2011 period. After deleting cases with missing data, the final sample consisted of 3,080 firm-year observations of 385 firms, which contains 202 firms whose tax rates are reduced after the reform, 113 firms that bear the same rate before and after the reform, and 70 firms whose tax rates are increased. The panel was identified from Wind financial securities database and China Stock Market & Accounting Research Database, which are comprehensive financial databases on Chinese public companies. The use of panel data with an eight-year window provides us with more robust causal relations than cross-sectional data.

III.B. Definition of variables

The dependent variable, corporate financing structure, is estimated as modified asset-liability ratio[1], which equates to (total of liabilities-accounts payable-notes payable-receipts in advance-dividend payable) / total of assets.

This study contains three key explanatory variables: 1. the impact of tax policy P, a dummy variable taking a value of 1 in the years after the reform in the treated groups and 0 otherwise; 2. time variable T, a time period dummy, which taking a value of 1 in as well as after the reform year, and 0 otherwise; 3. ownership structure SRS, the percentage of a company's shares that is owned by the largest owner. We focused on the largest shareholder, as opposed to the largest five or ten shareholders, because the largest, namely controlling, shareholder is in a unique position to expropriate from other shareholders in the Chinese context.

We controlled for a number of factors that might influence corporate financing behaviour. 1. the scale of financing (SIZE),we use the natural logarithm of total assets as a measure of the scale of financing; 2. profitability(ROA) is measured as the ratio of net profit and total assets; 3. growth of enterprises(GROWTH), we adapt"(total of assets at the end of this year - total of assets at the end of last year)/ total of assets at the end of last year" to measure the growth of enterprises; 4. costs of financial distress(ZPROB),we follow Graham &Altman and measure the Z-score by (3.3* EBIT+ main business income+1.4*retained earnings+1.2*working capital)/total of assets; 5. investment opportunities(TBQ), equal to (price per share*shares outstanding +net assets per share*the number of non-tradable shares+ book value of liabilities)/ book value of assets; 6. non debt tax shield(NDTS), we use (annual depreciation+ annual amortization)/ total of assets as a proxy for NDTS.

III.C. Model construction

Difference-in-differences is one of the most popular and often convincing study designs in finding the effects of a treatment in social sciences. The simplest set up is one where outcomes are observed for two groups for two time periods. One of the groups is exposed to a treatment in the second period but not in the first period. The second group is not exposed to the treatment during either period. In the case where the same units within a group are observed in each time period, the average gain in the second (control) group is subtracted from the average gain in the first (treatment) group. This removes biases in second period comparisons between the treatment and control group that could be the result from permanent differences between those groups, as well as biases from comparisons over time in the treatment group that could be the result of trends.

In order to test the impact of the tax reform policy on corporate finance behaviour, we learn from Zhou Lian and Chen Ye (2005) to construct a difference-in -differences model.

[1] Credit financing bears no interest in china, and dividends payable is paid after tax, thus both of them are not affected by the changes of tax burden. Therefore, this study uses the modified asset-liability ratio as the independent variable.

Because of the enterprise income tax reform in 2008, some of the list companies bear a higher tax rate, some a lower rate, the others have no changes. As a result, on one hand, there are differences for the same listed company before and after the tax reform; on the other hand, it causes the differences of different companies in the same point in time. Thus is similar to "natural experiment", in which companies with tax rate changed are treated as "treatment group" while companies with tax rate unchanged are "control group". If we use the dummy variable P values 1 or 0 to represent "treatment" or "control", and variable T denotes before or after the reform year which taking a value of 1 in the years after the reform, and 0 otherwise. Then suppose ε is an unobserved error term, which on behalf of the other factors affecting the financing structure. We could build a simple difference-in-differences model to learn the impact of tax policy on the structure of corporate finance.

$$\mathrm{LEV}_{it} = \beta_0 + \beta_1 P_i + \beta_2 T_t + \delta P_i T_t + \varepsilon_{it} \tag{3.1}$$

where i, t denote companies and period respectively, LEV_{it} represents the modified asset-liability ratio of the sample firm i at year t. $P_i$is a dummy variable taking a value of 1 in the years after the reform in the treated groups and 0 otherwise(i.e., P_i is 0 in the treated groups before the reform and in the control groups). T_t is a time period dummy, which taking a value of 1 in as well as after the reform year, and 0 otherwise. The cross-term coefficient of the two dummy variables mathematically equals to the difference of the treatment group before and after the event minus that of the control group, which is "difference-in-differences", and it represents the net effect of the tax policy on the company's financing structure.

In order to control other factors, we add some variables which will affect financing structure to the basic model; specific model is as the equation below.

$$LEV_{it} = \beta_0 + \beta_1 P_i + \beta_2 T_t + \delta P_i T_t + \beta_3 SIZE_{it} + \beta_4 ROA_{it} + \beta_5 GROWTH_{it} + \beta_6 ZPROB_{it} + \beta_7 TBQ_{it} + \beta_8 NDTS_{it} + \varepsilon_{it} \tag{3.2}$$

To further analyse the influence of the income tax reform timely, we construct different dummy variables for years after the reform, the regression is as equation (3.3).

$$LEV_{it} = \beta_0 + \beta_1 \sum T_t + \beta_2 SIZE_{it} + \beta_3 ROA_{it} + \beta_4 GROWTH_{it} + \beta_5 ZPROB_{it} + \beta_6 TBQ_{it} + \beta_7 NDTS_{it} + \varepsilon_{it} \tag{3.3}$$

In order to verify the effect of the ownership structure on corporate financing structure and the effect brought by ownership structure under the influence of tax law upon financing behaviour, ownership concentration variable is added to the basic model.

Hypothesis 2 and 3 are to be tested by the following models respectively.

$$LEV_{it} = \beta_0 + \beta_1 SRS_{it} + \beta_2 SIZE_{it} + \beta_3 ROA_{it} + \beta_4 GROWTH_{it} + \beta_5 ZPROB_{it} + \beta_6 TBQ_{it} + \beta_7 NDTS_{it} + \varepsilon_{it} \quad (3.4)$$

$$LEV_{it} = \beta_0 + \beta_1 P_i + \beta_2 SRS_{it} + \delta P_i * SRS_{it} + \beta_3 SIZE_{it} + \beta_4 ROA_{it} + \beta_5 GROWTH_{it} + \beta_6 ZPROB_{it} + \beta_7 TBQ_{it} + \beta_8 NDTS_{it} + \varepsilon_{it} \quad (3.5)$$

Interactive variable $P*SRS$ in equation (3.5) measures the combined effects of tax policy and ownership structure, it is used to test whether the ownership structure of listed companies affect the effects of tax policy.

IV. Empirical test and analysis of the result

IV .A. Descriptive statistics

Table 1 represents the descriptive statistics for LEV. The average of modified asset-liability ratio before the tax reform was 0.285, and it had a slightly increase (about5.26%) after the reform. We can also learn from the different enterprises that the three groups had different debt scales; the average of modified asset-liability ratio among the enterprises whose tax rate kept the same was 0.271, while that of the rate-decreased enterprises was 0.309 and the rate-increased enterprises was 0.281.

Table 1 Descriptive Statistics for LEV

	The overall sample	Sub-sample divided by year		Sub-sample divided by the reform		
		Before the tax reform	After the tax reform	Tax rate that increased	Tax rate that remains unchanged	Tax rate that decreased
Mini	0.016	0.016	0.004	0.005	0.016	0.004
Maxi	0.790	0.790	0.738	0.713	0.738	0.790
Mean	0.293	0.285	0.300	0.281	0.271	0.309
Std. Dev.	0.155	0.150	0.160	0.154	0.149	0.158
N	3080	1540	1540	560	904	1616

IV.B. Tax and financing behavior test based on the general theory

1. Comparison of financial structure among different enterprises

Figure 1 plots the modified asset-liability ratio for different groups between 2004 and 2011. Prior to 2008, the tax rate of firms with rate reduced (33%) was significantly higher than that of firms with tax increased (15%). According to the theory analysis before, the debt tax shield of the firms with rate reduced should be higher than that of firms with tax increased. From the average debt level of the three groups during 2004

to 2007, we can see that the debt ratio of firms with rate reduced was higher than that of firms with tax increased, and the difference is significant. This supports the theory.

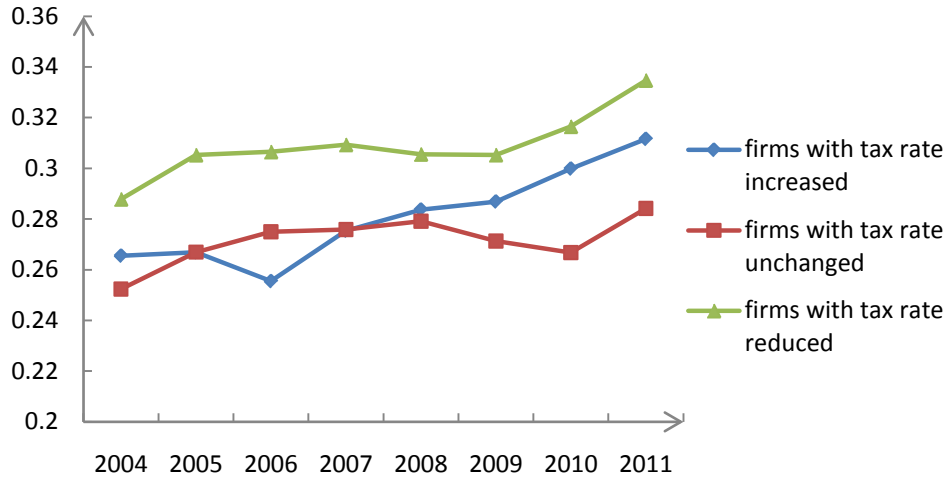

Figure 1 the modified asset-liability ratio of different groups

In 2008, China's Enterprise Income Tax Law was introduced. After the tax reform, the tax rate of firms with rate reduced decreased from 33% to 25%, while the firms with tax increased implement the transitional preferential policies, whose rate would increase from 15% to 18% in 2008, and then would be 20%, 22%, 24% in the next three years. The rates of the three groups would be the same level in 2012. Note the difference in the level of debt between 2007 and 2008, the debt level of firms with rate reduced decreased 0.0038, while the firms with tax increased raised 0.0083; the change is consistent with our hypothesis of "debt tax shield". Moreover, note the debt level of the three groups in 2008, the debt level of firms with rate reduced (0.3055) was still higher than that of the firms with tax increased (0.2837), but the difference between them narrowed gradually. In addition, the debt ratio of listed companies in 2011 was significantly higher than previous years, and tends to be rising. Because the significant growth of the total debts for listed companies is closely related to the macroeconomic and financial policies, and also be affected by the weakness of international and domestic economic development, the business performance declined in some degrees, as a consequence the debt ratio increases. As well as be affected by the control polices for the real estate, monetary is tightening, and corporate finance costs have raised sharply, which also led to the rising of the corporate debt ratio.

2. difference-in-differences regression analysis with panel data

In this section, the impact of the tax reform on the corporate financing behaviour is examined by using difference-in-differences regression analysis with panel data. Table 2 reports the estimation results of difference-in-differences model. The Hausman test (test results are in the below of table 2) rejects the null hypothesis, so fixed effect model is adapted to estimate. Equation (3.1) reports the regression results for the basic model, equation (3.2) reports the regression results controlling for a variety of potential confounding factors.

Comparing the results in equation(3.1) and (3.2) of table 2, we can find that the adjusted R^2 increased after adding a series of control variables that affecting financing behaviour, the model fits better, therefore the selection of variables in the model is appropriate. In Treatment group 1 (firms with tax rate increased), the regression coefficient of interaction variable P*T is positive and significant at 5% level, suggesting that the increase of financing structure for the firms with tax rate changed is more than that for the firms with tax rate unchanged. In Treatment group 2(firms with tax rate reduced), the coefficient of the policy dummy variable P is significantly negative, indicates that tax changes caused the decline of the corporate asset-liability ratio; the regression coefficient of interaction variable P*T is negative and significant at 1% level, suggesting that the decrease of financing structure for the firms with tax rate changed is more than that for the firms with tax rate unchanged. The combination of the two taxes affects the decision-making of the financing structure. The results support the hypotheses 1.

Table 2 difference-in-in differences regression analysis

variable	Treatment group 1		Treatment group 2	
	equation（3.1）	equation（3.2	equation（3.1）	equation（3.2
constant	0.2757***	-0.5280***	0.2750***	-0.0088
P	-0.0231*	-0.0270***	-0.1911***	-0.1932***
T	0.0042	-0.0145*	0.0036	-0.0641
P*T	0.0312*	0.0267**	-0.0825***	-0.0782***
Size	-	0.0432***	-	0.0165***
ROA	-	-0.4812***	-	-0.3427***
Growth	-	0.0438***	-	0.0363***
ZPROB	-	-0.1137***	-	-0.0330***
TBQ	-	0.0052*	-	-0.0007
NDTS	-	0.9128***	-	0.1530
R^2	0.2212	0.4641	0.5167	0.5640
D.W	2.2974	2.1420	2.2823	2.2461
F value	1.8798	7.3948	9.3127	10.8423
Prob (F value)	0.000	0.000	0.000	0.000
N	1464	1464	2520	2520
	Correlated Random Effects - Hausman Test			
Test Summary		Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random		14.7359	6	0.0224

The *, **, and*** indicates the significance levels at 10%, 5%, and 1% respectively. Treatment group 1 contains the firms with tax rate increased; treatment group 2 contains the firms with

tax rate decreased.

With regard to the control variables, the test results are consistent with the theoretical expectations. The debt scale is positively correlated with the firm size and significant at 1% level, suggesting that the larger the scale, the more obvious changes of the debt level; the regression coefficient of the profitability is significantly negative, this supports Pecking Order theory; enterprise asset-liability ratio is positively correlated with the growth of enterprises, the high growth companies are more likely to obtain loans; the lower the bankruptcy risk or the greater the Z value, the more obvious changes of the debt level. In addition, the DW test value in the table also shows that there is no autocorrelation in the disturbance basically, and the estimate is effective.

To further analyse the influence of the income tax reform timely, we construct different dummy variables for years after the reform. Table 3 shows that there is a gradually trend of the debt financing changes for the firms with tax rate reduced caused by the tax reform.

Table 3 the annual analysis

year	variable	Treat group 1		Treat group 2	
		coefficient	T	coefficient	T
2008	Year1	0.0115	0.8001	-0.1759	-15.4731***
2009	Year2	-0.0088	-0.6076	-0.1897	-16.5173***
2010	Year3	0.0043	0.2947	-0.1809	-15.6630***
2011	Year4	0.0144	0.9842	-0.1686	-14.6254***
	constant	-0.5037	-7.0223***	-0.0701	-1.0619
	Size	0.0428	13.3682***	0.0145	4.8157***
	ROA	-0.5244	-6.5424***	-0.2957	-3.4996***
	Growth	0.0319	2.6235***	0.0256	2.8472***
	ZPROB	-0.1217	-22.8356***	-0.0435	-10.6478***
	TBQ	0.0032	1.0968	0.0079	2.5403**
	NDTS	0.5501	2.8623***	-0.3721	-2.1859**
N		1464		2520	
R^2		0.4199		0.2732	

IV.C. Tax and financing behaviour analysis based on ownership structure

The basic characteristics of the ownership structure of listed companies in China are non-tradable shares, ownership concentration and the dominance of state-owned shares. The reality is that China's capital market is immature, the supervision in listed companies is relatively weak, and so it is hard to establish an effective mechanism to ensure the consistency of interests between the large shareholders and minority shareholders. As a consequence, large shareholders are motivated to maximize their

interests at the expense of the interests of minority shareholders by their control on corporate decision.

1. Comparison of financing structure between dominance and dispersed ownership

The percentage of shareholdings by the largest shareholder L1 is usually used to describe ownership concentration in most of the academic research. Generally speaking, if L1>=50%, it means that the equity is highly concentrated, the company has an absolute controlling shareholder; if L1<20%, it means that ownership concentration is low, the ownership and management of the corporate are separated relatively, the major shareholders are difficult to control the company unless they take other technical means; if 20%<=L1<50%, it means that ownership concentration is appropriate, major shareholders relatively control the companies.

Table 4 comparison of financing structure by different ownerships

SRS	2004	2005	2006	2007	2008	2009	2010	2011
>=50%	0.2612	0.2729	0.2796	0.2808	0.2929	0.3086	0.3319	0.3335
20%-50%	0.2864	0.2971	0.2862	0.292	0.2935	0.2885	0.2905	0.317
<20%	0.2474	0.2816	0.3204	0.3291	0.2979	0.2763	0.2825	0.279

Table 4 represents the average modified asset-liability ratio across the percentage of shareholdings by the largest shareholder over the 2004-2011 periods. We can draw from the table that before 2009, the higher the percentage of shareholdings by the largest shareholder, or the more concentrated of the equity, the lower of the debt scale, which is consistent with the theoretical analysis aforementioned. After 2009, there seems to be a general increase in the level of corporate liabilities, this may due to the event that in order to cope with the spread of the international financial crisis, the government implemented a moderately loose monetary policy and repeatedly cut down the deposit and lending rates and catalysed a 4 trillion investment plan launched in November 2008.

2. Multiple regression analysis

Table 5 illustrates the interaction between the ownership structure and corporate financing.

The results of equation (3.4) show that the model is valid in statistics because of the F value is 203.67 and significant at 1% level, also the independent variables are appropriate for the adjusted R^2 is 0.316; the regression coefficient of ownership

concentration is negative and significant at 1% level, suggesting that the more concentrated of the equity, the lower of the debt scale. Hypothesis 3 has been verified. The dominant shareholder prefers equity financing. The percentage of shareholdings by the largest shareholder significantly affect the company's debt ratio, implying that the largest shareholder of the company have a direct impact on debt financing decisions, which further proves the superior control of the largest shareholder on decision making. Meanwhile, it also shows the supervision and liabilities constraints of large shareholders, which could reduce the friction to some extent between the owners and managers, and are substitutes in reducing the agency costs.

Table 5 regression results of the equation (3.4)

variable	coefficient	T
constant	-0.5094	-10.3752***
SRS	-0.0005	-3.4264***
SIZE	0.0432	19.4356***
ROA	-0.7579	-11.7672***
GROWTH	0.0254	3.5025***
ZPROB	-0.0656	-20.3358***
TBQ	-0.0027	-1.1093
NDTS	0.1669	1.2843
R^2	0.3160	
F	203.6670***	

Table 6 shows how ownership structure affects the relationship between income tax and corporate finance structure.

To verify the effect brought by ownership structure under the influence of tax law upon financing behaviour, ownership concentration variable and dummy variable (P*SRS) of tax and ownership structure are added to the basic model. We find that the model is significantly strengthened.

Note the variable coefficient of the regression model, in treatment group 1, the coefficient of P is significantly positive, suggesting that the tax policy does affect the financing behavior of the firms with tax rate increased. firms with tax rate increased raised the debt ratio with respect to the firms with tax rate unchanged; the coefficient of SRS is significantly negative, suggesting that the more concentrated of the equity, the lower of the debt scale; The coefficient of P*SRS is significantly negative at 5% level, which means that the increase in asset-liability ratio of firms with higher concentration is lower than that of firms with lower concentration. In treatment group 2, the coefficient of P*SRS is significantly positive at 1% level, suggesting that the decrease in asset-liability ratio of firms with higher concentration is obviously lower than that of firms with lower concentration. Hypothesis 3 has been verified.

Table 6 regression results of the equation (3.5)

variable	Treatment group1		Treatment group 2	
	coefficient	T	coefficient	T
constant	-0.5138	-7.3996***	0.3340	5.9540***
P	0.0331	1.8742*	-0.2875	-18.8556***
SRS	-0.0005	-2.0435**	-0.0005	-1.6112
P*SRS	-0.0008	-2.0602**	0.0015	4.0825***
SIZE	0.0445	14.3722***	0.0012	0.4659
ROA	-0.4744	-5.9220***	-0.3259	-4.4735***
GROWTH	0.0271	2.2585**	0.0403	5.1983***
ZPROB	-0.1216	-22.8220***	-0.0334	-9.3911***
TBQ	1.15E-05	0.0039	-0.0101	-3.7308***
NDTS	0.5057	2.6232***	0.0584	0.3918
R^2	0.4289		0.4562	

IV.D. Robustness test

In this part we carry on several robustness tests to ensure the preciseness of the conclusions above.

To analyse the stationarily of the data, we take the unit root test. The results of ADF-Fisher Chi-square test and PP-Fisher Chi-square test both reject the null hypothesis that there exists a unit root, so the sequence is smooth.

Then we analyse the colinearity between the main variables by Pearson correlation coefficient to identify the multi-colinearity of the model. Most of the correlation coefficients between variables are less than 0.2. We could infer that the model does not have serious multi-colinearity among variables.

According to the market timing theory put up by Baker and Wurgler (2002), listed companies show significant financing market timing behaviour, that is to say, companies tend to issue shares when the stock price is overestimated, and rely more on debt financing or buy back shares when the price is undervalued. The market timing behaviour not only affects the short-term capital structure of listed companies, but also has long-term effect. The capital structure is the result of the long-term accumulation by its market timing behaviour. The market timing behaviour is common in our capital market. Listed companies are subject to equity financing conditions that set by the government, in order to keep the flexibility of the future financial policies, they prefer to issue shares when the stock price is overestimated, to avoid unable to raise the funds needed in the future because of equity refinancing policy and decline in operating performance or other factors. So the financing policies formulated by regulatory authorities directly affect the number of companies financed and the scale of financing. From the aspect of financing policy, The Issuance of Securities for Listed Companies which formally implemented since May 8, 2006

loosened the limitation of equity refinancing[2]. From the aspect of capital market performance, the stock market ushered a bull market in the year of 2007, and then experienced a slump. The above two aspects would both affect the financing behavior of sample companies in the sample period. To eliminate the effect of that kind of financing behaviour on the empirical results, we add allotment of shares dummy variable (ZP) to control the effect of allotment of shares on corporate financing structure. The results do not change after joining the dummy variable.

Corporate financing behaviour will also be affected by macroeconomic policies. To control the impact of the credit policy on the empirical findings, we draw up the monetary policy sentiment index from 2004 to 2011 according to the quarterly National Bankers Survey Report that released by the People's Bank of China since2004. And then we adapt the proportion of bankers who select "tight" to measure the degree of monetary tightening. We add variables that reflect the elastic of monetary policy to the regression analysis to test the robustness of the results above. Define Mc as a monetary policy dummy variable taking a value of 1 when the monetary tightening proportion is higher than the median, and otherwise 0. We can learn from the regression analysis that after joining the monetary dummy variables the conclusions of the study do not change significantly. Due to the limited space, the test results are not listed.

V. Conclusion

Compared with the previous law, China's Enterprise Income Tax Law enacted in 2008 not only with regard to changes in tax rate but also related to the deductible credit policy changes. These changes provide a rare opportunity for the research on the relationship between the enterprise income tax and financing structure. Based on the western capital structure theory and the enterprise income tax reform in 2008 and using listed companies as samples**,** this paper employs the difference-in- differences model and multiple regression analysis to investigate the influence of the reform upon financing behaviour and then ownership concentration variable is added to study the effect brought by ownership structure under the influence of tax law upon financing behaviour. The study demonstrates that prior to the income tax reform, there is obvious discrepancy between the debt scale of firms with tax rate increased (a lower rate) and decreased (a higher rate), the debt scale of firms with tax rate decreased is significantly higher than that of firms with tax rate increased; After the income tax reform, firms with tax rate increased raised the debt scale, while firms with tax rate decreased reduced the debt scale. The reform greatly influences the financing structure. This is consistent with the western capital structure theory. In addition, ownership concentration can significantly affect the financing behaviour of enterprises, the higher the ownership concentration, the less obvious the influence of tax rate change upon enterprise fixed assets liabilities ratio.

[2] The Issuance of Securities for Listed Companies which formally implemented since May 8, 2006 canceled the limitation that the 3-year average return on net assets before the allotment must be above 6%.

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The Impact of Tax Holidays on Renewable Energy Project Development in China: A cost benefit analysis

Eva Huang and Nicholas Underwood[☆]

Abstract

In recent years the Chinese economy has moved away from a carbon intensive economy towards an economy that relies increasingly on renewable energy. While this has been most evident with respect to hydro development, it can also been seen in increases in energy produced by solar and wind projects. This increase has been largely as a result of government intervention and through the offering of incentives from 2005 through to the present.

This article seeks to assess the influence of the government policy of allowing a 6 year tax holiday for specified high technology renewable energy projects. It will firstly discuss how this tax holiday incentivizes investment when financial managers consider project options before attempting to appreciate some of the wide ranging implications of intervention and distortion in the market.

This is done by analysing the methods of cost benefit analysis used in public finance and showing the impacts of tax holidays on this decision-making process. As a result, this paper shows that there are significant limitations in project evaluation undertaken in public finance due to the common practice of only weighing up prospects from the first five years of a project during its evaluation.

This is problematic as a project may have negative cash flows associated with decommissioning at a later date, which has been seen in early generation wind farms and other renewable projects such as nuclear projects in particular

This paper concludes by discussing the intention of tax holidays and the distortions that occur in an economy as a result of their implementation; this analysis clearly shows that this distortion may be exacerbated by limitations in public finance valuation.

As a result, this paper shows that government intervention boosts investment; however, it distorts rational financial participants and can lead to over-investment if limited financial analysis is undertaken.

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Introduction

In recent years the People's Republic of China (PRC) has been establishing itself as a country that encourages the production of renewable energy in both the domestic and international markets. Since late 2005, the Chinese government has established ambitious and forward thinking goals to encourage the development of the renewable energy industry and create a more efficient economy that promotes a greener environment.[1] With the landmark commitment to environmental reform through the renewable energy law of 2005,[2] and in both the 11th and 12th Five Year blueprints, China has encouraged its domestic renewable energy industry by focusing particularly on the technology that is the most financially viable.[3] Over this time wind electricity generation has expanded 50-fold from its original production of 0.8GW in 2005 toa capacity of 47.7GW at the end of 2010.[4]

The new national taxation policy, effective as of the 1 January 2008,[5] introduced a tax holiday for specified high technology industries. Included in this were all wind farm projects that generate electricity over the capacity of 1.5MW.[6] As a result of this tax holiday, a wind farm project's financial viability has been altered to seem more attractive to potential investors. While this promotes the development of wind farm projects, it also generates investment in a project that may otherwise be unprofitable over a longer period of time.

This paper will undertake a public finance cost-benefit analysis of the impact of a tax holiday on a project, both over the course of the initial 5-year timeframe, as is used in public finance project analysis, as well as the more long-term and later years over the course of the project's duration. Moreover, this paper brings a novel understanding of the impact of this cost benefit analysis on projects that receive a tax holiday. This paper also seeks to understand how this policy will affect the renewable wind power projects that are currently undertaken in China as a result of this new tax legislation. After showing the advantages to a project of improved cash flows that are gained from a tax holiday, this article will then discuss the limitations that are imposed by the common practice of only incorporating a project's initial 5 year lifetime into account. This will lead to a discussion of the impact of a tax holiday on a project that is being assessed using public finance techniques through the use of cost-benefit analysis. Through this analysis, the article will show the impact of a tax holiday on wind farm projects, and their advantages and their limitations.

[1] S F Gale, 'China Targets a Greener Growth' (2012) 26 (2) PM Network, 12.
[2] Wang Zhongying, 'China Renewable Energy Development' (2009) 3 (1) International Journal of Energy Sector Management, 52.
[3] Sara Schuman, 'China's Renewable Energy Law and its impact on renewable power in China: Progress, Challenges and Recommendations for Improving Implementation' (2012) Energy Policy, 3.
[4] X Li, 'Wind Power in China – Dream or Reality' (2012) 37 (1) Energy, 1.
[5] Wang Yinying, 'Research on the Structure of China's Enterprise Income Tax Law System' (2011) 2 (2) Beijing Law Review, 63.
[6] KPMG International, 'Taxes and Incentives for Renewable Energy' (2012) KPMG International

Literature Review

The method of cost-benefit analysis has been used since the 1930's in the United States.[7] While the concept has evolved over time and it has become more wide spread, the fundamental concept remains the same.[8] There exist limitations to this analysis, essentially stemming from the inability of such analyses to appreciate long-term impacts of irreversibility, and intergenerational fairness.[9] Nonetheless, this analysis is still widely appreciated by many economists and financial analysts as being integral and important to project valuation.[10]

The concept of a tax holiday is essentially a short period of low or no tax liabilities for a business project,[11] followed by a return to regular taxation liabilities after this period. While the Chinese government has been using tax holidays to incentivize investment for decades, the introduction of the new tax legislation in 2008 widened the scope of tax holidays to include high technology industries.[12] The reasoning behind such tax holidays is to encourage businesses to choose particular projects and investment over others by increasing the initial cash flows that are created by government supported projects.[13]

Wind power has expanded significantly in the years following the promulgation of the renewable energy law of 2005.[14] Since this time there has been substantial growth in the industry, leading to economies of scale and the decrease in cost of these wind projects. As wind power is the cheapest type of non-hydro renewable energy[15] it has grown to become the second largest type of renewable energy in China, following hydroelectric production. Despite Wen Jiabao arguing in 2012 that the nation was expanding blindly into the industry and that China needed to reduce its growth, there has been stable growth since 2005 that many believe will continue into the future. [16]

Renewable Energy Industry

Although the size and scale of wind energy production in China has changed substantially in the past 15 years, there has been significant investment in wind power since the 1950's. Wind power has been widely used on a non-commercial base as a source of electricity to remote areas with no access to the power grid. This led to the construction of over 140,000 wind generators in rural Chinese areas from 1994 until immediately prior to the recent development of the industry on a commercial scale.[17]

[7] Barry Williams, 'Cost-Benefit Analysis' (2008) 2 (12) Economic and Labour Market Review, 68.
[8] Ibid.
[9] Hansjurgens Bernd, 'Economic valuation through cost benefit analysis- possibilities and limitations' (2004) 205 (3) Taxicology 241.
[10] Greg Harris, 'Cost Benefit Analysis: Its Limitations and Use in Fully Privatised Infrastructure Projects' (2008) 50 (4) Australian Journal of Public Administration, 526.
[11] Peter Van Doren, 'Fuel Tax Holidays' (2011) 34 (4) Regulation, 46.
[12] Michael Ho, 'China FIE's and Tax Holidays' (2008) 19 (3) Journal of International Taxation, 14.
[13] C F Sirmans 'Research on Discounted Cash Flow Models' (1997) 13 (4) Real Estate Finance, 93.
[14] Wang Yinying, 'Research on the Structure of China's Enterprise Income Tax Law System' (2011) 2 (2) Beijing Law Review, 63.
[15] Thomas Casten, 'Finding the Cheapest Clean Power Options' (2009) 22 (10) The Electricity Journal, 72.
[16] Anthony Watts, 'An about face by China on Solar Power' (2012) WOWT.
[17] Zhou Fengqi, 1996. Page 2

Despite this comparatively long history of wind power generation, the development of the industry has rapidly and exponentially evolved over the past 15 years. This is essentially due to government and private sector responses to international and domestic concern of global warming and a deteriorating environment. Understandably these concerns are particularly prevalent in China, as is discussed by Cuiping Liao (2010), who showed that environmental costs would be severe both socially and economically, given that they would equate to $64 billion a year and that 400,000 deaths would be as a result of pollution-related diseases; moreover, 16 of the world's 20 most polluted cities are located in China.[18]

The significant government support for renewable energy in China through low taxation, tax holidays and other favourable regulation therefore resulted both from attempts to increase the value of the Chinese economy as well as a conscious effort to address these issues.

This provides a significant and important reason for why the Chinese government should, and does, provide tax holidays for renewable energy projects,such as large-scale wind farms in this case.

In incentivizing renewable energy production, the Chinese government is able to support the development of a global industry that was previously largely dependent on foreign imports of turbines up and until 2007.[19] Furthermore, through the use of tax incentives, the Chinese government is able to promote the industry with little financial cost, excluding the opportunity cost of revenue collected.

Essentially this creates a situation whereby there are two simultaneous justifications for special treatment of the renewable energy industry. Firstly, China is able to support, grow and develop and industry in which global demand will increase in the coming decades and generations. This increases the value add ability of the Chinese economy. Secondly, China is able to decrease the environmental destruction that many developing nations incur through the process of globalization and economic development. These goals fully justify the special treatment of the industry and provide substantial reasoning for ongoing support.

This leads to a discussion of the reasoning and justification of the use of a tax holiday rather than alternative methods of government support to spur the development of the industry in China.

Renewable energy projects are seen from a corporate finance standpoint As a result, private industries perceive them as an investment in long term infrastructure that will pay similar dividends throughout the life of the project. With this in mind, it is financially similar to a fixed income investment such as a bond. While subsidizing investment in renewable projects is effective at incentivizing project development, it is also fiscally expensive. Thus we can assume a fiscally efficient government will

http://www.sciencedirect.com.ezproxy1.library.usyd.edu.au/science/article/pii/0960148196884783#

[18] Cuiping Liao, 2010- present and future demand
http://www.sciencedirect.com.ezproxy1.library.usyd.edu.au/science/article/pii/S096014810900500X

[19] Wang, Zhongying 2009 – China's renewable energy development- near The status of industrialization of renewable energy technology
http://search.proquest.com.ezproxy1.library.usyd.edu.au/docview/227381134

choose to support development through cost minimization, rather than revenue expansion.

Given that a government would, under these conditions, use preferential tax treatment to develop an industry, the reasoning for a tax holiday is narrowed. In nearly all financial valuations, the value of immediate cash flows is valued as having a greater value than subsequent cash flows at later dates (EVA- I need a corporate finance textbook to reference in relation to this). With this in mind, and given that renewable energy investment is investment in long term infrastructure, it appears more efficient and effective to reduce the taxation on immediate cash flows, as they are of a greater value to a business than subsequent cash flows. This would provide effective reasoning for a government body using such incentives to allow a tax holiday rather than a long term, or permanently reduced, tax rate.

Essentially, given the nature of investment and financial investment flows as a result of this investment, it is beneficial for a government to incentivize infrastructure and project development through a tax holiday rather than a reduced permanent tax rate.

Interestingly, it is important to note that some qualifying renewable energy projects in China are able to be beneficiaries of both a tax holiday and a reduced tax ongoing tax rate if they qualify as 'high technology industries'.

Cost Benefit Analysis as a Valuation Method

Used extensively since the 1930's, cost benefit analysis allows for a comparison of potential investments by using a common scale and denomination when comparing projects through the use of financial costs and benefits,[20] While the field has grown extensively through this time, it essentially rests on several fundamental methods of project valuation. Some of these were originally and historically encountered in corporate finance while others have been encountered in the economic field of public finance.

The importance of cost benefit analysis is its ability to allow an investor or project manager to decide between prospective projects or whether to undertake a project at all. The application of this approach to renewable wind projects is effectively covered in the methodology section of the paper.

The effectiveness and usefulness of cost-benefit analysis (CBA) is in its ability to understand the merits and costs of a project, which allows a manager or investor the ability to fully understand the reasoning behind the decision to undertake a project. While many of the methods of CBA only use financial costs and benefits to decide on whether to undertake a project, these financial justifications allow a much better decision making process and for the making of more logical and financially viable decisions. For a public financier, the planning and forecasting of future cash inflows and outflows is essential to the budgeting of future cash positions and the overall financial makeup of the project. With this in mind, it enables a financier to understand

[20] http://search.proquest.com.ezproxy1.library.usyd.edu.au/docview/233249890

the cash flows that a project will incur and create with greater clarity and detail before they occur.

While there are detailed and effective uses for CBA, there are still limitations to this method of project valuation. There are many assumptions placed on models that value projects. There often is a constant discount factor, which represents the alternative use of money or the 'time value of money'. Not only does this change over time, contrary to the assumptions of its constancy, , but this is also often only an informed estimate of what value it is likely to have. Furthermore, while there is often use in estimating the value of a project, a public project is often financially unviable whilst providing a positive externality. This financial inefficiency can be seen by the undertaking of public transportation that is financially inefficient, but is positive for the community. These factors can be taken into account in a financial estimation, but would again only be estimates and therefore potentially inaccurate. to counter in a non-financial element.

With these advantages and limitations in mind, the use of CBA in understanding the advantages of a tax holiday and its implications can be undertaken. The advantage of undertaking CBA when looking at the use of a tax holiday on a project is seen through its ease of comparison between the state of the project before and after the tax holiday is granted. This would allow us to compare the project's value (if any, or if positive) with and without the additional support of government intervention. This can be used to see if investment would have occurred otherwise, and furthermore if the investment is efficient both with and without the the tax holiday. The main disadvantages of CBA lie in the assumptions that are made with a project, which limits its effectiveness and validity. However, when comparing two projects that have similar assumptions there is an ability to reduce the extent to which these assumptions would adversely affect a project's effectiveness. While CBA might not be perfectly effective at valuing the two projects, it is still highly valuable at making comparisons between two projects with similar underlying assumptions.

Methodology

In the course of planning for a project, whether public or private, a manager must budget for and decide whether the project is financially viable. Under a private project, a manager must appreciate whether the project will create value for the firm.[21] Similarly, for a public project planner, there must be an understanding as to whether a project will increase the public welfare more than it will cost to undertake.

In public finance, a cost-benefit analysis is a set of procedures based on welfare economics for guiding public expenditure decisions.[22] There are three main cost-benefit analysis tools: present value analysis, internal rate of return and benefit-cost ratio.

A present value analysis compares the costs and benefits of a project from different time periods. Money has a different value over the course of time; as time passes

[21] R W Chan, 'Discounted Cash Flow: The Nuts and Bolts' (2012) 61 (6) Better Investing, 29.
[22] Barry Williams, above n7.

inflation and opportunity cost deflate the value of money, so that present cash flows are worth more than future cash flows,[23]

The present value of a project is calculated as follows:

$$PV = -C_0 + \frac{C_1}{(1+r)^1} + \frac{C_2}{(1+r)^2} + \frac{C_3}{(1+r)^3} + \cdots + \frac{C_{n-1}}{(1+r)^{n-1}} + \frac{C_n}{(1+r)^n}$$

A slight deviation of this present value technique is the internal rate of return analysis. This analysis creates the discount rate that would lead the present value of a project to be zero. With this in mind, this method is used when the costs and benefits of the project are known, over a timeframe that is known. With the use of the internal rate of return the business can clarify as to whether the project obtains a higher rate of return than the discount rate, and can choose to undertake the project accordingly,[24]

The IRR formula is calculated as follows:

$$PV = 0$$

As a result,

$$0 = -C_0 + \frac{C_1}{(1+IRR)^1} + \frac{C_2}{(1+IRR)^2} + \frac{C_3}{(1+IRR)^3} + \cdots + \frac{C_n}{(1+IRR)^n}$$

The third method that can be used in cost-benefit analysis is the Benefit-Cost Ratio. This is calculated as the present value of the stream of benefits associated with the project divided by the present value of the costs associated with the project,[25] The result of this equation will lead to a number. If this number exceeds one, it would indicate that the project should be undertaken; conversely, if this number is less than one, it would suggest that the project should be dismissed.

The Benefit Cost Ratio formula is as follows:

$$Benefit\ Cost\ Ratio = \frac{B}{C}$$

Given,

$$\sum Cost = C_0 + \frac{C_1}{(1+r)^1} + \frac{C_2}{(1+r)^2} + \frac{C_3}{(1+r)^3} + \cdots + \frac{C_n}{(1+r)^n}$$

And,

$$\sum Benefit = -B_0 + \frac{B_1}{(1+r)^1} + \frac{B_2}{(1+r)^2} + \frac{B_3}{(1+r)^3} + \cdots + \frac{B_n}{(1+r)^n}$$

[23] Hanafizadeh Payam, 'Robust Net Present Value' (2011) 54 (1-2) Mathematical Computer Modeling, 2.
[24] E B Storey, 'Rates of Return Refresher' (2011) 76 (4) Journal of Property Management, 19.
[25] Linn Mott, 'Cost-Benefit Analysis: Examples' (2011) 24 (1) The Bottom Line, 68.

It is important to consider that while in some contexts the tax liability is factored into the discount rate, the wind farm projects in China are undertaken by partially or fully owned government corporations. These government owned businesses act as independent and profit maximizing agents in the market[26] and consider tax liability to be a cost to the business, The author will treat this accordingly. Notably, this differs from other contexts, such as tax law, where the tax liability is not considered an expense.

To gain a better understanding of the impact we will compare the cost benefit analysis under each of the two cash flow scenarios using both the traditional public finance present value method as well as the corporate finance method of valuing a project.

The formulae for these different projects will be the same; however, the time frame for the two projects will differ. The use of a traditional 5 year timeframe will exist for the public finance formula,[27] while an extended timeframe will exist for the project that will continue into perpetuity.

Under the public finance method the cash flows will be:

$$PV = -CF_0 + \frac{CF_1}{(1+r)^1} + \frac{CF_2}{(1+r)^2} + \frac{CF_3}{(1+r)^3} + \frac{CF_4}{(1+r)^4} + \frac{CF_5}{(1+r)^5}$$

However, there will be a reduction of the cash flows to take tax into account.

This leads to the following equations for taxed cash flows for five years (3 years of no tax, 2 years of half tax) and the fully taxed 5 year window:

$$PV = -CF_0 + \frac{CF_1}{(1+r)^1} + \frac{CF_2}{(1+r)^2} + \frac{CF_3}{(1+r)^3} + \frac{CF_4 - \frac{T}{2}}{(1+r)^4} + \frac{CF_5 - \frac{T}{2}}{(1+r)^5}$$

$$PV = -CF_0 + \frac{CF_1 - T}{(1+r)^1} + \frac{CF_2 - T}{(1+r)^2} + \frac{CF_3 - T}{(1+r)^3} + \frac{CF_4 - T}{(1+r)^4} + \frac{CF_5 - T}{(1+r)^5}$$

This equals the present value of a project for both the discounted cash flow method as well as the internal rate of return.

This will be compared with the corporate finance model for valuing a project.

Under this, the cash flows will be as follows.

[26] Wenhui Zhao, (2011) 'Game Analysis of the China Wind-Farm Investment Market', 4 (2) Journal of Sustainable Development 167.
[27] H S Rosen, 'Public Finance' (2008) 8.

Cash flows formula:

$$PV = \sum_{1}^{n} \frac{CF_n}{(1+r)^n}$$

$$PV = -CF_0 + \frac{CF_1}{(1+r)^1} + \frac{CF_2}{(1+r)^2} + \frac{CF_3}{(1+r)^3} + \frac{CF_4}{(1+r)^4} + \frac{CF_5}{(1+r)^5} + \frac{CF_6}{(1+r)^6} + \frac{CF_7}{(1+r)^7} + \cdots + \frac{CF_{n-1}}{(1+r)^{n-1}} + \frac{CF_n}{(1+r)^n}$$

However, after the sixth year there will be equal cash flows until perpetuity and this is represented by a perpetual annuity, as indicated by this equation

$$PV = -CF_0 + \frac{CF_1}{(1+r)^1} + \frac{CF_2}{(1+r)^2} + \frac{CF_3}{(1+r)^3} + \frac{CF_4}{(1+r)^4} + \frac{CF_5}{(1+r)^5} + \frac{CF_6}{(1+r)^6} + CF\left[\frac{1-(1-r)^{-n}}{r}\right]$$

However, these will be taxed differently, leading to the equations for the tax holiday project and the fully taxed model respectively:

Tax holiday project:

$$PV = -CF_0 + \frac{CF_1}{(1+r)^1} + \frac{CF_2}{(1+r)^2} + \frac{CF_3}{(1+r)^3} + \frac{CF_4 - \frac{T}{2}}{(1+r)^4} + \frac{CF_5 - \frac{T}{2}}{(1+r)^5} + \frac{CF_6 - \frac{T}{2}}{(1+r)^6} + CF - T\left[\frac{1-(1-r)^{-n}}{r}\right]$$

Fully taxed model:

$$PV = -CF_0 + \frac{CF_1 - T}{(1+r)^1} + \frac{CF_2 - T}{(1+r)^2} + \frac{CF_3 - T}{(1+r)^3} + \frac{CF_4 - T}{(1+r)^4} + \frac{CF_5 - T}{(1+r)^5} + \frac{CF_6 - T}{(1+r)^6} + CF - T\left[\frac{1-(1-r)^{-n}}{r}\right]$$

This will equal the present value of the project.

For the cost-benefit analysis the two models will differ: as the only difference to the models is the tax rate, we will assume the financial benefits will be the same (as revenue remains unchanged)although the costs will be significantly different.

As a result we will compare two separate cost models.

As the first equation yields a tax holiday cost figure, it will be compared with the second equation for a fully taxed model:

$$\sum Cost = C_0 + \frac{C_1 - \frac{T}{2}}{(1+r)^1} + \frac{C_2 - \frac{T}{2}}{(1+r)^2} + \frac{C_3 - \frac{T}{2}}{(1+r)^3} + \frac{C_4 - T}{(1+r)^4} + \frac{C_5 - T}{(1+r)^5}$$

$$\sum Cost = C_0 + \frac{C_1 - T}{(1+r)^1} + \frac{C_2 - T}{(1+r)^2} + \frac{C_3 - T}{(1+r)^3} + \frac{C_4 - T}{(1+r)^4} + \frac{C_5 - T}{(1+r)^5}$$

Using these three different methods of cost benefit analysis we will compare the fully taxed models against a tax holiday model to understand the impact and ramifications of the tax holiday on investment given public finance methodology. Both models will have an initial outlay of $100, a tax rate of 15% and a discount rate of 10%.

One project (Project A) will be undertaken in a location where there is no tax holiday. It will have cash flows of $30 a year. It will have no favourable taxation conditions although it will be a more profitable investment for an investor.

The other project (Project B) will be undertaken in a location that has a tax holiday of no tax for 3 years and half tax for 3 years. It will have cash flows of $28 a year. Essentially it will have favourable taxation conditions although it will have lower profitability given its original investment.

Results

The cost-benefit analysis provides mixed results in relation to investment decisions by potential investors through the use of a tax holiday. The differing outcomes of the discounted cash flows show that the tax holiday is successful at making an investment opportunity more profitable on paper than it would otherwise be. With this in mind, its use as a public finance method of incentivizing a project is both successful and appropriate for a business. However, there are definitive and important implications for a project manager of this method of incentivisation.

Despite the fact that there was a definitively better project for the business to invest in, as the project had higher cash flows throughout the period, the mixture of cost-benefit analysis limitations and the tax holiday distorted the final outcome of the analysis.

Project A had cash flows of $30, a 7.1% improvement on project B, which only had cash flows over the course of the projects lifetime of $28. However, despite this clearly beneficial project in terms of returns, there were different supporting project results for the two projects.

Project A had a higher full corporate finance discounted cash flow over the period. This reflected the ongoing higher returns that the project generated. In contrast, Project B had a higher Public Finance 5 year window present value. This represented the fact that there was higher return immediately because of the tax holiday, whilst having lower cash flows over the extended lifetime of the project.

The results were predictable and supportive of government intervention through incentivizing a project with a tax holiday.[28] However, the level of distortion in the cost-benefit analysis shows that this method of government intervention is not only used to create a more profitable project, but may also lead to financially irresponsible decisions by a potential investor.[29]

If a potential investor chose to use only the public finance cost-benefit analysis, they would choose to invest in a project that had lower returns over the course of the project but would have substantially higher returns over the short term. Project B which benefited from the tax holiday had a return over 5 years of $12. This was 140% higher than then Project A, which had returns of $5 over the 5 year period. The $7 difference in returns represents a significant difference as a result of the low base return. Furthermore, this also represents a 7% difference on the initial investment in the project and would be a substantial difference to a potential investors return.

While this project would still only be undertaken if it would provide value to the firm[30], in a world of opportunity cost where investors have limited funds and have to make choices about their investment decisions,[31] this would distort the investment in firms from projects that would be more profitable and beneficial over the course of the investment horizon to projects that would be less profitable and would otherwise not be undertaken.

Essentially this test shows the significant limitations of a cost-benefit analysis over a five year horizon. The method of valuing a firm with this discounted cash flow analysis is widely used[32] and is regarded as an effective and efficient way of valuing a project for a firm, although clearly it is not without its own limitations.[33]

However, despite the effectiveness of the present value method, using a 5 year window on a project that may be undertaken over a longer time period would be highly dangerous and would lead to an investment climate that would foster the wrong investment decisions. This method is inadequate for the two essential reasonsof both undervaluing and overvaluing a project.

In undervaluation of a project, this 5 year window would not appreciate investment in a project which would have increasing returns. As a project is undertaken it may initially have low returns, but this would increase over the course of the project, taking into account both inflation and the discount rate[34]. As a result, this window would value a project that would generate immediate returns, and disadvantage long term investment.

[28] John B Arnold, 'Indonesia: Tax holidays' (1997) 25 (Oct) World Tax Report,193.
[29] Yu-Hong Liu, 'Influence of investor subjective judgements in investor decision making', 24, International Review of Economics and Finance, 129-142.
[30] R W Chan, 'Discounted Cash Flow: The Nuts and Bolts' (2012) 61 (6) Better Investing, 29.
[31] Yu-Hong Liu, above n29.
[32] P J Klumpes, 'Managerial Use of Discounted Cash-Flow or Accounting Performance Measures: Evidence from the U.K. Life Insurance Industry', (2005) 30 (1) Geneva Papers on Risk and Insurance, p16.
[33] H H Bauer, 'Customer-based corporate valuation: Integrating the concepts of customer equity and shareholder value', (1967).
[34] R W Chan, above n 30.

Secondly, an investment project could have negative returns later in the project, and positive investment returns over its initial project lifetime. This would be the case of a rare earth mineral mine that would initially generate significant positive returns, but would require a cleanup period after the initial cash flow generating period of the project – this has been seen recently in the Lynas Minerals rare earth development in Malaysia[35]. If the investor did not understand the ongoing costs of such a project, they would significantly overvalue the project initially and undervalue the cash outflow that would be generated at the end of the project.

In both situations, an investor would be making a significantly costly investment decision that would be inefficient and ineffective for the firm, either in real terms or in terms of opportunity cost.

The former undervaluation of a project is made specifically significant in relation to a tax holiday. If an investor is only undertaking a project over the first five years of a project they will assume there is a substantially lower cost to the business through the tax liability. If a 5 year window is used, the investor would essentially only appreciate and assume a much lower tax holiday over the course of the project than would otherwise be the case. Despite this, the latter issue of overvaluation of a project is less important as a tax concession on net profit would be insignificant or non-existent on a project that was generating negative returns.[36]

Essentially, the tax holiday exacerbates the limitations of a public finance method of cost-benefit analysis that a potential investor would undertake before the implementation of a project.

This leads to both a benefit and a cost of a tax holiday when using a public finance method of valuing a project. When a 5 year timeframe is used, the tax holiday would be substantially more effective than a full discounted cash flow method. It is important to note that this is the intention of a tax holiday which is created to distort invested funds and create projects that would otherwise not be undertaken by business. However, it is important to understand that while this is the exact reason for creating such a method of government intervention, this distortion property of a tax holiday leads to the undertaking of investment decisions that would encourage inefficient use of capital. Essentially, a business should always undertake a project that would generate the highest rate of return over the course of the future, and this would not occur through the use of a public finance 5 year present value valuation of a project.

Conclusion

The results of the discounted cash flow and the cost-benefit analysis have significant and important implications on the outcome of financial analysis for Chinese businesses that are considering renewable energy projects.

There is a skewing of the returns and costs that are associated with a wind farm project. While in the results we saw that investment would have occurred in both cases

[35] Isaac Leung, 'Lynas' rare earth facility faces more difficulties', Electronics News (March 2012)
[36] James Boatsman Et al, 'The Economic Implications of Proposed Changes in the Accounting for Nuclear Decommissioning Costs', (2000) 14 (2) Accounting Horizons, 211-233

and that both projects, A and B, were financially viable, the implications of the results caused inefficient allocation of resources between the projects.

As a result of the short term benefit and boost to the present value of a wind farm that was able to obtain a tax holiday, there would be investment in wind farms that have a lower potential cash flow. This could be seen in a wind farm that would have a lower potential power usage, or that would have a higher degree of lost electricity between generation and usage resulting from distance[37].

It is unnecessary to compare wind farms that have a tax holiday in China with wind farms that do how have a tax holiday, as the tax holiday is a piece of national tax legislation. However, there are wind farm projects in China that would have no associated tax holiday due to their size. For a wind farm project to qualify for the tax holiday they would need to have an electricity capacity of over 1.5 MWwhich is the opportunity cost associated with a tax holiday.

This would lead to diseconomies of scale as larger wind farms would not be in as efficient locations to capture wind energy and would have a lower proportional income to the investment that would be required. As a result, the distortionary influence of the tax holiday would be significant and lead to underinvestment in potentially lucrative small scale wind farms to the advantage of large scale wind farms. Essentially the result of this investment would be poor allocative efficiency and lead to a higher opportunity cost that would be inefficient in the economy.

This leads to a conclusion that government intervention is required - the distortion of the free market is exactly what the government intends. This leads to the key question: 'Should the tax holiday be used?'. It is important to fully understand that this government intervention is legislated precisely to intervene in the free market to decrease the incidence of market failure and negative externalities. While it is a negative implication that small scale firms are undervalued in place of larger firms, this would actually lead to more significant renewable energy generation over time. As a result, although this leads to inefficient allocation of resources, it does lead to the exact outcomes that the government is attempting to create in the market. Essentially, this outcome does not change the government's position and has no effect on the outcome for the Chinese government.

For the private sector, the implication of the research done is that a firm must have several valuation techniques to appropriately value a project. Few potential investors would only undertake one valuation method for a project; however this 5 year window does still come with significant implications to public finance as a method of valuation. This leads to a conclusion that a private firm should use a variety of methods to value a project, and would be best suited to use a full discounted cash flow analysis, rather than a 5 year window that is used in public finance theory.

In conclusion, there are positive and negative implications to investment that is undertaken using the public finance 5 year window. From the public sector point of view, the outcome has no influence on the market, other than a mild misallocation of

[37] J M Corera, 'Using Archon - 2. Electricity transportation management', (1996) 11 (6) IEEE Expert, 71-79.

funds over the long term. Reducing the minimum wind farm capacity that is required to obtain a tax holiday could solve this issue. However, this legislation does still encourage large-scale farms, and is beneficial in that regard. In contrast, the private sector is financially hindered by using this 5 year window, and would be missing out on a more profitable project if it only used this method of valuation. Still, it would be naïve, and a representation of a poor financial manager, for a business to only undertake a single financial valuation technique. Essentially a business should use this method in conjunction with a wider appreciation of the long-term financial viability of the project before undertaking construction. In its very essence, the limitations of this form of financial valuation are significant and cause a distortionary business environment for the undertaking of renewable projects; however this would be insignificant or actually beneficial for the public sector, while only being an issue for a poor financial manager for any energy business undertaking a project.

Appendix

No Tax Holiday- Income Generates $30 Annually

- 5 and 20 year progress

Year		0	1	2	3	4	5
Gross Income		-$100	$30	$30	$30	$30	$30
Net Income		0	25.5	25.5	25.5	25.5	25.5
Discounted Cashflows		-$100	23.8317757	22.27268757	20.81559586	19.45382791	18.18114758
Net Present Value		-$100	-$76	-$54	-$33	-$14	$5
Net present Value over 5 years	**$5**						

Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Gross Income	-$100	$30	$30	$30	$30	$30	$30	$30	$30	$30	$30	$30	$30	$30	$30	$30	$30	$30	$30	$30	$30
Net Income	0	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5
Discounted Cashflows	-$100	23.8317757	22.27268757	20.81559586	19.45382791	18.18114758	16.99173	15.88012	14.84123	13.87031	12.96291	12.11487	11.3223	10.58159	9.88934	9.242374	8.637732	8.072647	7.54453	7.050962	6.589685
Net Present Value	-$100	-$76	-$54	-$33	-$14	$5	$22	$37	$52	$66	$79	$91	$103	$113	$123	$132	$141	$149	$157	$164	$170
Net present Value over 5 years	**$170**																				

Project B Tax Holiday Project- Income Generated of $28 annually

- 5 and 20 years progress

Year	0	1	2	3	4	5
Gross Income	-$100	$28	$28	$28	$28	$28
Net Income	0	28	28	28	25.9	25.9
Discounted Cashflows	-$100	26.1682243	24.45628439	22.85634055	19.75898599	18.46634205
Net Present Value	-$100	-$74	-$49	-$27	-$7	$12
Net present Value over 5 years	**$12**					

Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Gross Income	-$100	$28	$28	$28	$28	$28	$28	$28	$28	$28	$28	$28	$28	$28	$28	$28	$28	$28	$28	$28	$28
Net Income	0	28	28	28	25.9	25.9	25.9	23.8	23.8	23.8	23.8	23.8	23.8	23.8	23.8	23.8	23.8	23.8	23.8	23.8	23.8
Discounted Cashflows	-$100	26.1682243	24.45628439	22.85634055	19.75898599	18.46634205	17.25826	14.82144	13.85182	12.94562	12.09871	11.30721	10.56748	9.876154	9.23005	8.626215	8.061883	7.53447	7.041561	6.580898	6.150372
Net Present Value	-$100	-$74	-$49	-$27	-$7	$12	$29	$44	$58	$71	$83	$94	$105	$114	$124	$132	$140	$148	$155	$162	$168
Net present Value over 12 years	**$168**																				

Regressive Effects and Countermeasures of individual income tax deferred pension insurance

Xiangyou Wu ☆

Abstract: In order to reduce the society's dependence on the first pillar of endowment insurance and improve its flexibility, it is imperative for China to develop personal pension insurance. Deferring individual income tax is a type of tax incentive that can stimulate middle and high income earners to participate in personal pension insurance, but it also creates the regressive effect of income reverse regulation, because middle and high income earners can enjoy a larger decline in current period's tax rate, more tax exemptions for capital gains, and greater gap between inter-period tax rates . Regressive effects originate from the regressive tax system in relation to personal income tax, this tax system's design can be optimised such that its incentive function can be taken advantage of, while its regressive effect is suppressed. By shifting part of the retirement responsibility to middle and high income earners' themselves, the government can concentrate its financial resources on providing elderly support to low income earners, thereby making these individuals the real beneficiaries of the individual income tax deferral preferential policy. The first pillar of the social security system is to seek fairness, while the third pillar is to pursue efficiency. The presence of regressive effect of individual income tax deferral should be accepted by society as long as it can be controlled within a tolerable extent.

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1. Introduction

Since the 1980s, in order to address the global aging population crisis, countries all over the world initiated a wave of global pension reform, which up to now has no sign of ending. The European crisis has once again put forward such reform agenda in front of countries all over the world.[1] In the past few decades, both developed nations and developing countries are actively engaged in the reform of the pension insurance system; some countries had to pay a high price during this process. The experiences and lessons learnt from the pension system reforms of various countries lead to the conclusion that the reform of China's pension insurance system must take place.

The great dispute caused by China's two most recent proposals to the reform of the pension insurance system – 'merging pension and insurance' and 'increasing the pension age to 65' – fully reflect the difficulty of such reform. Although increasing the retirement age is already the most popular and most common approach to the global pension reform, only six out of 34 OECD member countries have yet to increase the retirement age,[2] and the reason for not doing so is because these member countries have already raised the retirement age half a century ago. However, it is imperative for China to carry out necessary or partial reforms to the pension insurance system. Increasing the retirement age is the most desirable option for this reform under current circumstances where it is difficult to adjust the replacement rate and the payment rate. Yet, this proposal put forward by Tsinghua University was unanimously condemned in speech and in writing as 'highly unrealistic' and 'overly economically rational, lacking humanistic care', and was advised that 'delaying the retirement age should not be part of the discussion'. Few scholars publicly supported Tsinghua University's proposal. Yet, from both international experiences and China's current conditions, this proposal is an accurate and inevitable option, though without any support (He Ping, 2012; Zheng Bingwen, 2012). Nevertheless, the prospects of the 'merging' orientation and the 'Tsinghua University Proposal' are not the focus of this paper. This paper is concerned with why '94.5% of the individuals surveyed disagree with the retirement deferral'. Why is the reform of China's pension insurance system so difficult? This paper seeks to investigate how the society's tolerance of this reform is increased and how a smooth transition of the two systems should take place to reduce the impact on society. (Hu Xiaoyi, 2013)

[1]郑秉文 [Zheng Bingwen], 欧债危机下的养老金制度改革—从福利国家到高债国家的教训 ['European debt crisis calling for reform: experiences from welfare state to debt state'] (2011) 5 中国人口科学 [Chinese Journal of Population Science] 2.

[2]郑秉文 [Zheng Bingwen], 欧债危机对养老金改革的启示：中国应如何深化改革养老保险制度 ['Revelation of the European debt crisis on pension reform: how should China deepen its pension insurance system reform'] (2012) 2 中国社会保障 [China Social Security] 30.

When summarising the lessons learnt from the European crisis, scholars found that a pension crisis is hidden under the debt crisis (Li Kaisheng, Zhang Donglin, 2012). The out-of-balance pension insurance system was the 'hidden cause' that 'directly led' to the break out of the huge fiscal deficit (Zheng Bingwen, 2012; Zhang Xiuling, 2012). In comparison to south European countries, the development of China's old-age security system is even more imbalanced. The first pillar of the social security system, the society's basic pension insurance, bears the retirement pressure of the entire society, with high replacement rate and large funding gaps; The second pillar of the social security system, the corporate pension, has a very small scale and thus does not serve the functions of a pillar; The third pillar of the social security system, the personal pension insurance, has development that is lagging behind the most and therefore cannot form an independent pillar. The retirement pressure on the entire society is highly concentrated on the first pillar. Not only does it restrain the development of the second and the third pillar, it also makes the system more fragile by enhancing the inflexibility of the system. On the one hand, the public believes that their retirement life is fully secured, as the replacement rate of basic pension insurance is relatively high, therefore gradually forming a reliance on the basic pension insurance. Moreover, the public lacks the impetus to create corporate pension and purchase personal pension insurance. On the other hand, since the second and third pillars are not well-developed, the retirement burden on the first pillar cannot be shared and individuals' rigid expectation of welfare forces the first pillar to maintain a relatively high replacement rate. As a consequence, the development paradox that the first pillar and the second, third pillars mutually inhibit each other is formed, causing the basic insurance and supplementary insurance to fall into a quagmire. Under the restraint of individuals' rigid expectation of welfare, the more imbalanced the retirement system is, the more difficult it is to adjust this system. As the retirement pressure is excessively concentrated, the huge reliance on the first pillar abated the society's tolerance of this reform, increased the public's sensitivity to this reform, and increased the resistance to this reform. Therefore, a small-scaled reform could cause turbulence to the overall situation, and the high costs prevent this necessary reform from progressing (He Yang, Zhu Zikai, 2012). It can be seen that the reform of China's pension insurance system cannot take place mainly because of the imbalanced development of the old-age security system's pillars and the lack of flexibility of the system, not because the Chinese are less willing to bear the pain of reform than the Greeks. Under the restraint of the single pillar's high replacement rate, the public elderly security system lacks a viable second option. The public is willing to, but cannot bear the pain of reform. Although the current system is difficult to maintain and reform is the only option, the public is evidently not prepared to bear the pain of this reform. Yet, it is not realistic to expect that the level of rationality of the public will reach a point where the public will take initiative of bearing the pain of this reform.

Thus, China should develop supplementary pension insurance, especially the personal pension insurance, in order to lower the entire society's reliance on the first pillar, reduce the retirement pressure on the first pillar, improve the flexibility of the system and enhance its sustainability.[3] Provided that the replacement rate of the entire system is stable, conditions for this reform should be created to achieve more room for development. From international experiences, tax incentives are a major driving force that promotes the development of the pension system's third pillar and stimulates individuals to participate in personal pension insurance. Individual income tax deferred personal tax is the optimal form of personal pension insurance that effectively promotes the development of the pension insurance system's third pillar.[4] The implementation of the individual income tax deferred pension insurance aims to use the benefit of the income tax deferred to stimulate middle and high income earners to participate in personal pension insurance and to engage in retirement savings planning, thus offsetting the deficiencies of public pension and corporate pension. Before retirement, middle and high income earners would prepare for themselves a supplementary pension, subsequently enhancing their self-support ability during retirement and bear responsibility of their retirement. Consequently, reliance on the first pillar will be lowered and the financial pressures on the public pension will be reduced, improving the multi-pillar elderly security system.[5] Although the individual income tax deferred pension insurance is widely used globally, China is still at the stage where it is being politically discussed and theoretically studied. A major reason is that the individual income tax deferred pension insurance provides high-income earners a simple and effective way to evade tax. Low income earners benefits little or do not benefit from the individual income tax deferred pension, which may lead to regressive effect of reverse income redistribution, widening the gap between the rich and the poor, damaging the benefits of low income earners and is not beneficial to the stability of the economy and overall society. In order to ensure the successful initiation and development of the individual income tax deferred pension insurance, there is high theoretical and practical value in recognising its regressive effect, analysing its formation and offering effective measures to address this issue so as to take full advantage of its stimulus effect on middle and high income earners participating in the personal pension insurance and to suppress its regressive effect.

[3]李晓晟 [Li Xiaosheng], 基于税收优惠的我国个税递延型养老保险研究 ['Research based on the tax benefits of China's individual income tax deferred pension insurance'] (2011) 10 武汉金融 [Wuhan Finance Monthly] 24.

[4]柴玉珂 [Chai Yuke], 基于绩效视角对我国个税递延型养老保险的思考 ['Reflection on China's individual income tax deferred pension insurance from the performance perspective'] (2013) 3 财会研究 [Research of Finance and Accounting] 28.

[5]邹馨 [Zou Xin], 关于我国推行个税递延型养老保险的探讨 ['Investigations on the individual income tax deferred pension insurance introduced by China'] (2012) 4 保险职业学院学报 [Journal of Insurance Professional College] 62.

2. The effect of individual income tax deferred pension insurance on the benefits of policyholders

(i) The tax collection mode of the individual income tax deferred pension insurance

The individual income tax deferred pension insurance is a type of pension insurance where the premium can be deducted before tax from a portion of the policyholder's income or within a certain amount; the personal income tax will be paid when the pension is received. It is also a type of individual supplementary pension insurance that enjoys the benefit of tax deferral.[6]

The government can levy tax on the three stages of the pension insurance's operation: during payment, when returns on investment are obtained and when pension is received.[7] The 'individual income tax deferred' method of the individual income tax deferred pension insurance also relates to these three stages: whether payment can be deducted from taxable income, whether capital gains tax should be collected when returns on investment are earned and whether personal income tax should be levied when pension is received during retirement. According to these three stages, if T represents taxed, E represents exempted, the tax collection mode for pension insurance can be represented by the following eight combinations: EEE, TEE, ETE, EET, ETT, TET, TTE, TTT. The current practice used internationally is to implement the individual income tax deferred EET tax collection mode on personal pension insurance, i.e. tax is exempted during payment and when returns on investment are received while tax is levied when pension is collected.

The current tax collection mode for personal pension insurance used in China is the non-deferred TEE method, i.e. payment cannot be deducted from taxable income, while tax is not levied on returns on investment received and personal income tax is not collected when pension is obtained. For China to implement the individual income tax deferred pension insurance and to stimulate individuals to participate in personal pension insurance by utilising tax incentives, the aim is to change the current TEE tax collection mode into the internationally used EET tax collection mode.

(ii) The effect of the change in personal pension insurance tax collection mode on policyholders

[6]许栩 [Xu Xu], 个税递延型养老保险方案设计公平性问题刍议 ['Discussions on the fairness of the design of individual income tax deferred pension insurance'] (2011) 2 上海保险 [Shanghai Insurance] 11.

[7]李良 [Li Liang], 对我国试行个税递延型养老保险的思考 ['Investigations on China's individual income tax deferred pension insurance pilot'] (2012) 11 学术论坛 [Academic Forum] 133.

Under the TEE mode, personal income tax must be paid during the premium payment stage when individuals participate in the personal pension insurance, i.e. premiums can be paid only using after-tax income, while personal income tax is not levied during principal accruement and pension collection stages. Under the EET mode, when individuals participate in personal pension insurance, personal income tax is not levied during premium payment and principal accruement stages, but is collected during the pension collection stage. To implement individual income tax deferral, changing tax collection mode from TEE to EET will create a relatively large impact on policyholders' benefits. Properly assessing and accurately estimating this effect on welfare will be advantageous in analysing the roots of the creation of regressive effect and in finding the optimal method to address this issue.

The change in tax collection mode from TEE to EET will bring an increase in welfare to policyholders from three aspects: larger decline in current tax rate, greater gap between inter-period tax rates and more tax exemptions for capital gains. In terms of larger decline in current tax rate, personal income tax adopts a progressive tax rate, the applicable tax rate is positively correlated with income, meaning the higher the income, the higher the tax rate.[8] To launch the individual income tax deferred pension insurance, policyholders can enjoy current period's tax incentives as premiums are tax-deductible; therefore, policyholders' current period's pre-tax income will decrease, the applicable tax rates will subsequently decline, and thus the tax burden is reduced. With regards to tax exemptions for capital gains, the returns on investment from funds in the individual income tax deferred pension insurance account are tax-exempt, resulting in excess tax-exempt capital gains for policyholders. For the gap between interperiod tax rates, the applicable tax rates are different because income levels differ for various stages of an individual's life. Policyholders' income during retirement is usually lower relative to their income while working. Under the current tax system, the marginal tax rate of pension collection stage is lower than that of the payment stage. Moreover, a lower tax rate applies to the lower income earned during retirement, and therefore tax deferral brings policyholders the benefits of lower tax rate for intervening periods.[9] If the total income earned during retirement, including pensions, do not reach the individual income tax levy threshold, policyholders can enjoy the benefit of tax exemption.

[8]香伶 [Xiang Ling], 关于养老保险体制中再分配累退效应的几个问题 ['Questions on the redistribution regressive effect of pension insurance system'] (2007) 1 福建论坛(人文社会科学版) [Fujian Tribune (The Humanities and Social Sciences Bimonthly)] 31.

[9]杨燕绥, 闫俊, 刘方涛 [Yang Yansui, Yan Jun and Liu Fangtao], 中国延税型养老储蓄政策的路径选择 ['The pathway selection of China's tax deferred retirement savings policy'] (2012) 8 武汉金融 [Wuhan Finance Monthly] 8.

It can be seen that implementing individual income tax deferred pension insurance will bring great tax advantages to policyholders. As the personal income tax adopts the progressive tax system, implementing individual income tax deferral is equivalent to establishing a legal tax-exempt account for policyholders. Policyholders can transfer a portion of its taxable income into this account, thus lowering current period's tax base and tax rate and gain the benefit of low tax rate in current period. At the same time, policyholders can obtain a wealth management product with returns on investment that is tax-exempt and a personal supplementary pension insurance that improves the quality of life after retirement, as well as enjoy the benefits brought by the differences in tax rates in various stages of life.

3. The cause of the formation of the regressive effects of individual income tax deferred pension insurance

(i) The cause of the formation of regressive effects

Personal income tax is a type of income regulation tax, and the means of regulation is the progressive tax rate that is aimed at implementing the principle "Leistungsfähigkeitsprinzip" that tax burden should be based on individual's taxability [10]Income is highly reflective of the taxpayers' ability to bear tax burdens. High income earners have greater ability and thus should bear heavier tax burden, while lower income earners have weaker ability and thus should bear lighter tax burden or do not have to pay tax at all. Under the progressive tax system, the tax rate and income are positively correlated, and therefore high-income earners bear heavier tax burden. Through progressive tax and the the principle "Leistungsfähigkeitsprinzip", personal income tax can adjust the amount of income earned by high income earners, facilitate the rationalization of income distribution, prevent the disparity between the rich and the poor from widening and promote social harmony. Tax incentives as a type of special provision in taxation law, give specific taxpayers and object of taxation encouragement and consideration, and in essence do not levy tax on individuals who have the ability to bear tax; therefore, tax incentives violate the the principle "Leistungsfähigkeitsprinzip" (Kitano Hirohisa 1996). Personal income tax follows the this principle and adopts the progressive tax rate, while the tax incentive of the individual income tax deferred pension insurance is a 'special provision' that opposes such principles. Hence, the 'tax deferral' preferential policy implemented for personal income tax will inevitably produce regressive effects, causing reverse income

[10]余显财, 徐晔[Yu Xiancai and Xu Ye], 税收递延型养老储蓄设计及其对投资行为的影响 ['The devise of tax deferred retirement savings and its effect on investment behaviour'] (2010) 3 改革 [Reform] 54.

redistribution.[11] This means that the personal income tax system itself determines that any preferential policy will produce regressive effect, and thus the regressive effect of individual income tax deferral is not the original sin of individual income tax deferred pension insurance.

Therefore, granting policyholders who participate in personal pension insurance deferral benefits becomes a variant of 'regressive tax': the higher the income, the greater the reduction in tax and thus the better the effect of tax deferral. High-income earners, especially those whose income is within the mid-high range will obtain greater benefits. Yet, low-income earners only enjoy relatively low benefits, while those with an income level near or below the individual income tax levy threshold do not obtain any benefits at all. According to the ability-to-pay principle, high-income earners should be the main objects of tax levy for personal income tax. However, by participating in the individual income tax deferred pension insurance, high-income earners will own a legal tax-exempt account and gain a simple and effective tool to avoid tax. High-income earners can transfer a portion of their income in the form of premium into this account. Under the condition that real income is constant, their taxable income will be lowered and thus the benefit of low tax rate in the current period can be obtained. At the same time, high income earners can enjoy the benefits of tax exemptions for returns on investment and low tax rate for pensions. In theory, low-income earners can also enjoy the individual income tax deferral benefits. However, as their income is near the individual income tax levy threshold, the tax rate is very low or equals to zero in the first place. Therefore, the room for decline is very small. Moreover, under the condition of low income, it is already difficult to maintain the current living standards, not to mention savings for retirement. Thus, the introduction of the individual income tax preferential policy will widen, instead of narrow, the disparity between the rich and the poor. By extending the income gap one step further to the period after retirement, the interest of low income earners are indirectly damaged, causing greater distribution inequity, deviating from the established objectives of personal income tax.

(ii) Analysis of the sources of regressive effects

The taxation benefits of the individual income tax deferred pension insurance is reflected in three aspects: larger decline in current period's tax rate, greater gap between interperiod tax rates and more tax exemptions for capital gains. The regressive effects of individual income tax deferral are also formed by these three constituents.

[11]王亚柯, 吕惠娟 [Wang Yake and Lu Huijuan], 资产规模、覆盖率与替代率:国际视野的我国企业年金现状 ['Asset size, coverage rate and substitution rate: the current situation of China's corporate pension from an international perspective'] (2012) 8 改革 [Reform] 141.

First, there is a greater decline in current period's tax rate for high income earners. High income earners are the main objects of tax levy for personal income tax, and initially face a relatively high tax rate. To implement individual income tax deferral, whether it is to defer a fixed amount or a fixed proportion, to permit premiums to be tax deductible will decrease the current taxable income of high-income earners and significantly reduce their applicable tax rate, thus they can enjoy a considerable amount of current tax incentives. Low income earners initially face lower tax rates, therefore the individual income tax deferral will also decrease their current pre-tax income and applicable tax rate. However, this reduction will be very limited and low-income earners can only enjoy a relatively low amount of current tax incentives. Those with an income level near or below the individual income tax levy threshold will not be able to enjoy any benefits.

Second, there is greater tax exemption on capital gains for high income earners. The amount of individual income tax deferred proportion is mostly restrained on the basis of proportional limit. For high income earners, the amount deferred is greater and the accumulated funds in their accounts are larger. Hence, the corresponding return on investment is high. Relative to low income earners, tax-exempt returns on investment brings greater benefits to high income earners.

Third, the gap between interperiod tax rates is greater for high income earners. Under normal circumstances, high-income earners or low-income earners do not have any other sources of income besides pensions after retirement. Yet, during working life, the tax rate faced by high income earners is much higher than low income earners. Thus, the degree of difference in tax rate will vary when they pay premiums and receive their pensions. High-income earners can usually enjoy a greater gap between interperiod tax rates.

4. Optimising the design of the system to suppress regressive effects

As the individual income tax adopts the progressive tax rate, individual income tax deferral will inevitably produce regressive effects, i.e. 'reverse regulation' effect of income distribution. The design of the system must be optimised in order to take advantage of the individual tax deferral's incentive function, to promote the development of the pension insurance's third pillar and to keep the reverse regulation effect minimal. This will form an endogenous system that suppresses regressive effects, that preserves the system's fairness.[12]

(i) Implementation of the double limitation in proportion and fixed amount

[12]钟华欣, 赵瑞娟, 张雄潮 [Zhong Huaxin, Zhao Ruijuan and Zhang Xiongchao], 试论我国建立个税递延型养老保险制度的可行性 ['On the possibility of establishing an individual income tax deferred pension insurance system in China'] (2011) 2 现代经济信息 [Modern Economic Information] 204.

As high income earners form the largest group of beneficiaries of individual income tax deferral, they have strong motivation to participate in the individual income tax deferred pension insurance, and may even take this opportunity to achieve their tax avoidance objectives. However, at the same time high income earners are the main object of the tax levy, and thus granting them tax incentives will create a great impact on government revenue. The tax rate for high-income earners is higher due to higher income, and if a relatively large deferral amount is granted to them, the regressive effects will be aggravated. To address the issues of the deferral amount, implementing the double limitation in fixed portion and in fixed amount will keep the difference in the pension insurance received and in the quality of retirement life controlled to a certain extent.

In terms of setting the deferral limit, the U.S. 401k plan is the most successful. As high income earners are more willing to transfer current period's income into their personal retirement account to achieve the tax avoidance objective, the U.S. not only set a proportional limit for the deferral amount, but also placed a cap on the total amount to stabilize its tax income in the current period. Individuals cannot pay more than 25% of their monthly income and cannot exceed the set limit every year. However, this limit is linked with the consumer price index and will be adjusted periodically. Since 2000, the limit has risen from USD$10500 in 2001 to USD$17000 in 2012. China should refer to the experience of the 401K plan and set a limit to the deferral amount to ensure its tax income and suppress the regressive effect. However, to ensure the quality of life after retirement, the deferral limit should be set reasonably (Wang Guojun 2012). Moreover, this limit should be linked with the consumer price index and adjusted dynamically to stimulate personal coverage and to stabilise government revenue.

(ii) Implement a system to phase out the deferral preferential policy for high income earners

As personal income tax adopts the progressive tax rate, individual income tax deferral will inevitably possess regressive effect. To suppress this type of regressive effect, a mechanism where the preferential policy phases out as income rises must be implemented, to link the deferral amount and income. As income rises, the deferral amount will be less or completely phased out. Therefore, the targets of the preferential policy will be those below a certain income level. The emphasis will be to stimulate middle to high income earners and to avoid giving high income earners excessive benefits.

On the basis of the proportion and fixed amount double limitation, the U.S. IRA plan specifically implemented a preferential policy phase out mechanism. Under the traditional IRA, if an unmarried employee participates in another pension scheme with tax incentives annual income exceeds USD$55000, and when his or her income

reaches USD$65000, the deferral amount will be zero. If the total household income of a married individual exceeds USD$89000, the deferral amount in IRA will start to decrease and reaches zero when his or her total household income exceeds USD$109000. If an unmarried employee does not participate in another pension scheme with tax incentives at the same time, the deferral amount in IRA will not decrease as his or her income increases. This is to reflect the system's fairness and to protect stimulus of personal coverage. Not only can this phase out system, in which the deferral amount and income are negatively correlated within a certain income range, alleviate the regressive effect of individual income tax deferral to a certain extent, it can also apply the principle "Leistungsfähigkeitsprinzip" more strictly.

(iii) Direct provision of subsidies to low income earners

As personal income tax adopts the progressive tax rate system, high-income earners will gain greater benefits from individual income tax deferral while low-income earners will gain less or no benefits at all. This will create a Matthew effect on income distribution. For low income earners with income below the individual income tax levy threshold, the individual income tax deferral preferential policy performs no practical function. Stimulating low income earners to participate in personal pension insurance and to improve their self-support during retirement should be the core of the design of the individual income tax deferred pension insurance system.[13]

By offering every citizen two benefit options in the form of tax cuts and direct subsidies at the same time, Germany's Riester reform not only maintained the stimulus of tax incentives, but also controlled its regressive effect within a reasonable range. Furthermore, low income earners have been provided relief and their ability and enthusiasm to participate in the Riester pension have been improved, therefore reflecting the fairness of the system. In 2008, German citizens who chose tax cuts can gain the highest exemption amount of 2100 Euros per annum, which is used to pay the Riester pension. German citizens who chose direct subsidies can obtain an allowance of 154 Euros; however, employees must use 4% of their wages to pay for the Riester pension.[14] In addition, German citizens who participate in the Riester pension will receive an allowance of 185 Euros per annum for their children. Generally speaking, low-income earners will gain more benefits by choosing the direct subsidy, while high income earners can gain more benefits by choosing tax cuts. By providing two options, the Riester reform not only exploited the stimulus function of individual

[13]周建再, 胡炳志, 代宝珍 [Zhou Jianzai, Hu Bingzhi and Dai Baozheng], 我国商业养老保险个税递延研究—以江苏省为例 ['Research on China's commercial pension insurance – case study on Jiangsu Province'] (2012) 11 保险研究 [Insurance Studies] 3.

[14]李俊飞 [Li Junfei], 德国个税递延型养老保险改革及评述—以里斯特改革为例 ['Review of Germany's individual income tax deferred pension insurance – case study on Riester reform'] (2012) 3 武汉金融 [Wuhan Finance Monthly] 34.

income tax deferral aimed at middle to high income earners, but also used direct subsidies to suppress the regressive effect of individual income tax deferral, thereby achieving social equity.

Owing to different conditions, China's social structure is far from the optimal 'olive-shape'. With relatively greater social heterogeneity, large disparity between the rich and the poor, a smaller proportion of middle-income earners and a larger proportion of low-income earners, the potential regressive effect of individual income tax deferral will be significant. Therefore, when devising individual income tax deferral policies, China should refer to experiences of the Riester reform and allow middle to high-income earners bear more retirement responsibilities through tax incentives, thereby using more of the limited financial resources on low-income earners. Through direct subsidies, low income earners will be incentivised to participate in person pension insurance, thus assisting them in enhancing their self-support abilities and suppressing the regressive effect of individual income tax deferral.

(iv) Offering different deferral amounts to different groups

The regressive effect of individual income tax deferral not only exists among different income groups, it also appears within different age groups and occupation groups.

The demand for pension insurance will vary between individuals of different ages, and hence the regressive effect of individual income tax deferral will exist among different age groups. As retirement pressure is immediate and pressing, older workers, relative to younger workers, will have weaker ability to bear tax. If the deferral amount for different age brackets is the same, then relative to the potential demand for pensions, young people with stronger ability to bear the tax burden will receive greater security, while elderly people with weaker ability to bear the tax burden can only obtain minimal support. Owing to limited rationality, the employed are often inclined to seriously consider retirement issues as they approach retirement. Therefore, individual income tax deferral preferential policies should consider limited rationality of the public, and increase the deferral amount for older workers appropriately in order to provide them an opportunity to improve their self-support ability. For those above the age of 50, the U.S IRA permits an extra USD$1000 in addition to the tax exemption limit for those below the age of 50, to achieve fairness among insurants of different age groups. When enacting the individual income tax deferral policy, China should learn from IRA's practices and offer relatively high deferral amounts to older workers. During the transition period, individuals who are still working but are about to retire should be offered a relatively high deferral amount in order to increase the accumulation in these individuals' personal accounts, thereby achieving the expected replacement rate and ensure their security after retirement.

Furthermore, the regressive effect of individual income tax deferral exists among different occupation groups, especially among the employed, unemployed and self-

employed. Restricted by the tax system and the power to levy taxes, the Chinese government cannot obtain information relating to the income status of individuals and households. Therefore, although individual income tax deferred pension insurance is categorised as a commercial pension insurance, individuals cannot participate independently and can only operate under the model where their individual participations are arranged collectively into a group by their companies or organisations,[15] i.e. all policyholders must participate in groups separated according to the different enterprises or institutions. As such, individuals with high and stable income will enjoy the benefits of individual income tax deferral, while individuals with low and unstable income, such as the unemployed, self-employed etc., cannot enjoy such tax incentives. Yet, individuals with low and unstable income lack endowment insurance the most and form the group that most needs insurance products with tax incentives to plan retirement. Likewise, as China's personal income tax adopts the classified income tax system, the individual income tax deferral policy currently can only be implemented for wage earners. Hence, large groups of individuals whose main sources of income are not wages, such as sole-proprietors and other self-employed individuals are excluded from the preferential policy. The U.S. IRA designed various IRA plans for different regional and occupation groups to choose from, in order to overcome the inequity among different occupation groups. When devising individual income tax deferred pension insurance, China should focus on wage earners. Simultaneously, other groups should be offered tax incentives through tax credits and introduction of accounts with multiple functions to suppress the regressive effect of individual income tax deferral across occupations.

(v) Enforcement of measures to restrict pension collection

Owing to limited rationality, the possibility of high income earners exploiting individual income tax deferral to avoid tax and other reasons, the successful implementation of individual income tax deferral preferential policy requires enforcement of strict measures to restrict pension collection, and the key is to restrict improper collection of funds or pension from their personal account.

As the aim of developing individual income tax deferred pension insurance is to stimulate individuals to participate in personal pension insurance through tax incentives and to save for retirement in advance, policyholders and their beneficiaries can only withdraw funds from their personal account in advance under exceptional circumstances, such as death and serious disability; otherwise, additional penalties

[15]朱文君, 王裕明, 张宵临 [Zhu Wenjun, Wang Yuming and Zhang Xiaolin], 上海个税递延型养老保险的方案设计 ['The project design of Shanghai's individual income tax deferred pension insurance'] (2011) 9 劳动保障世界 [Labour Security World] 12.

apply.[16] Individuals who need to withdraw in advance due to death or serious disability are required to provide certification issued by relevant public security departments to prove the condition of the insured, and the insured must verify this. Additional penalties should apply to other situations where funds are withdrawn in advance, and the insurers should fulfill their withholding obligations. Moreover, those who enjoyed tax incentives must give up their right to cancellation. The aim of enforcing restrictions on withdrawals in advance is to prevent the participation in pension insurance for the purpose of tax avoidance. Furthermore, a minimum age to start collecting pensions must be set to prevent policyholders from succeeding their pensions to beneficiaries, thereby achieving their aim to avoid tax.[17]

5. Conclusion and recommendations

First, the existence of the regressive effect is inevitable. As personal income tax adopts the progressive tax rate, regressive effect will inevitably occur when the individual income tax deferral preferential policy is implemented, i.e. the reverse system to progressive tax rate. Both are two sides of the same coin. Under the conditions of the regressive tax rate, abandoning the individual income tax deferral preferential policy is the only way to completely remove the regressive effect. However, as the marginal tax rate of progressive tax rate is greater than the average tax rate and the substitution effect of taxation is notable, even if the benefit of deferring individual income tax is non-existent, high-income earners will use other measures to avoid tax. Hence, the regressive effect originates from progressive tax rate rather than the individual income tax deferral policy.

Secondly, the policy objectives of the individual income tax deferred pension insurance and the personal income tax are different. Every system has its own design goals. The aim of the personal tax is to regulate income distribution in order to prevent the widening of the income gap. Progressive tax rate is a major tool used to achieve this aim. The objective of the individual income tax deferred pension insurance is to motivate middle to high income earners to participate in personal pension insurance and to encourage them to enhance their self-support ability so that they can bear their own retirement responsibilities, thereby promoting the development of the third pillar of pension insurance and improving the multi-pillar elderly security system. Therefore, the individual income tax deferred pension insurance and the policy objectives of personal income tax are not completely compatible: the former cannot and does not

[16]柯甫榕, 涂东阳, 钱敏 [Ke Furong and Tu Dongyang, Qian Min], 推进个税递延型养老保险试点 ['Promote the individual income tax deferred pension insurance pilot program'] (2012) 19 中国金融 [China Finance] 59.

[17]李超, 魏巧琴 [Li Chao and Wei Qiaoqin], 我国延税型个人养老保险相关问题的探讨 ['Investigation on issues related to China's individual income tax deferred pension insurance'] (2010) 6 上海保险 [Shanghai Insurance] 8.

need to contribute to accomplishing the goal of the latter. Likewise, although a function of the social security system is to regulate income distribution, this is not the main purpose of the system. The principal goal of social security system is to provide effective elderly security to all members of the society and to control regressive effects within a tolerable range. The task of regulating income distribution should be completed through the personal income tax.

Thirdly, the target group of individual income tax deferral preferential policy is middle to high income groups instead of low income groups, which need social security the most. Through tax incentives, middle to high income earners have the enthusiasm and the ability to participate in personal pension insurance, thereby bearing a portion of their own retirement responsibility. Due to low income, individual income tax deferral cannot stimulate low income earners to participate in personal pension insurance. Therefore, demanding individual income tax deferral to directly 'benefit low income earners who need elderly security the most' is evidently a wrong interpretation of this policy. Low income earners are not the target group of individual income tax deferral preferential policy. However, this does not imply that low income earners cannot become the final beneficiaries of this preferential policy. Through using tax incentives to stimulate middle to high income earners to transfer a portion of their retirement responsibilities to themselves, China can concentrate its financial resources to achieve the 'full coverage' of basic pension insurance. Provide basic support', or even directly offer low income earners subsidies to counter the regressive effect of individual income tax deferral. Hence, low-income earners can directly benefit from subsidies, instead of enjoying benefits from the individual income tax deferral, which they do not have the ability to take advantage of. Undoubtedly, the fact that the individual income tax deferral preferential policy is termed as 'preferential' implies that not all social groups can become beneficiaries. Otherwise, the term 'preferential' should not exist.

Fourthly, individual income tax deferred pension insurance is conducive to improving, rather than lowering, the support level of low income earners. The elderly security system possesses the redistribution function and does not require or imply that every pillar of the elderly security system have the redistribution function. The first pillar, 'full coverage and basic support', aims to provide every member of the society with elderly support and to seek fairness in the elderly security system. It has the characteristics of public goods and can only be provided by the government. The second and third pillars belong to the supplementary pension insurance system, and are aimed at linking the pensions received by individuals and their contributions. This is to stimulate companies and individuals to bear a portion of their retirement responsibility and to decrease the retirement pressure on the first pillar, thereby reducing the retirement burden on public finances. These two pillars can 'facilitate workers to gain societal benefit under the principle of equity' (Xiang Ling, 2007), because 'equity' itself does not refute the positive correlation between pensions received and individuals' contributions. The establishment of the second and third

pillars is aimed at utilising the market mechanism to improve the security level of participants and to improve living standards after retirement. These pillars have characteristics of private goods, and should prioritise efficiency while taking into account equity, instead of pursuing equity as the sole objective. As long as the regressive effect of individual income tax deferral can be controlled within a tolerable range, the public should bear the existence of such effect and pass on the 'basics' that middle to high income earners require which the Chinese government cannot guarantee. Therefore, the limited financial resources can be used to concentrate on providing 'basics' required by low income earners and to achieve 'full coverage' of basic pension insurance as soon as possible, thereby completing the 'merger' of two pension systems, enhancing overall planning and facilitating labour circulation. Therefore, while the introduction of individual income tax deferral pension insurance appears to create regressive effect, it is conducive to improving the benefits of middle to high-income earners. By transferring a portion of the retirement responsibility of middle to high-income earners to themselves, China can focus its efforts on supporting the retirement of low-income earners. In the long term, this will benefit rather than harm the improvement of low income earners' welfare. Hence, workers should receive relatively equal preferential treatment. Moreover, the design of the system should promote efficiency, fairness and harmony, but the efficiency of every pillar need not be sacrificed to ensure fairness. In short, fairness is the core issue that pension insurance seeks to resolve, while efficiency is a problem that needs to be solved by individual income tax deferred pension insurance. Fairness and efficiency are interdependent rather than contradictory.

Finally, individual income tax deferral has its advantages and disadvantages, its advantages should be utilised while its disadvantages should be restrained. In practice, the accomplishment of any policy objective will have corresponding costs. Therefore, costs must be paid for the Chinese society to achieve the policy objectives of the individual income tax deferred pension insurance. China needs to give up some tax levy power and a part of its tax revenue if it intends to transfer a portion of middle to high income earners' retirement responsibility to themselves, rather than having the government bear the entire retirement burden. This means that China wishes to provide less elderly security and retirement responsibility. The tax incentive of individual income tax deferral is this type of 'tax expenditure', 'hidden cost' and 'indirect subsidy'. Owing to the acceleration of the aging population, it is imperative for China to improve its pension insurance system. Under the constraints of a disparity between the rich and the poor and a low income per capita, middle to high income earners are a possible group that can enhance the personal supplementary pension insurance. Individual income tax deferred pension insurance aims at incentivising middle to high income earners to participate in personal pension insurance, thereby creating a relatively great stimulus effect on middle to high income earners and increasing middle to high income earners' demand for individual income tax pension insurance. This is the initial objective when devising the individual income tax

deferred pension insurance system. However, the actualisation of this objective will inevitably lead to the regressive effect of income redistribution reverse regulation. In fact, under the condition of great social heterogeneity, any preferential policy will improve the welfare of some group, but at the same time harm the interest of another group (Wang Guojun 2012). Yet, compared to tax fairness, China faces greater pressure to improve its pension insurance system. The society needs to utilize the tax benefits of individual income tax deferral to promote the development of the third pillar of pension insurance, and while regressive effects cannot be removed, measures can be taken to suppress the influence of regressive effects (Kitano Hirohisa 1996). From an international perspective, there is no strong evidence to suggest that individual income tax deferral will cause a widening of the gap between the rich and the poor (Yang Yansui 2012). Hence, to tackle the aging population crisis through enhancing the social security system, the regressive effect of individual income tax deferral should be tolerated to a certain extent (Tang Yun 2012). In addition, the regressive effect of individual income tax deferral should be treated dynamically. Although China's social heterogeneity is relatively great and the size of the middle-income earners is comparatively small, the size of the middle-income earners will increase along with economic development and increase in income per capita. Consequently, the regressive effect of the individual income tax deferred pension insurance preferential policy will be reduced and the social security level will increase steadily due to this policy.

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Re-perceiving the tax allocation relationship between government and residents in the national income

Dongsheng Jin and Huawei Zhou

The tax allocation relationship between government and residents in national income is a crucial problem. It directly concerns the economic interests of both the state and individuals, and is relevant to economic development and social stability, as well as national security. The report of the Eeighteenth NCCPC (National Congress of the Communist Party of China) clearly states 'Two Synchronizations and Two Increases which are first 'to achieve the synchronization of people's income growth and national economic development and the synchronization of labour remuneration increase and labour productivity growth, and second to increase the proportion of household income in the national income distribution and to increase the proportion of labor remuneration in primary distribution'. The report of the Eighteenth NCCPC also paves the way for future research on the income distribution issue and deepens our awareness of the significance of the relationship between government and residents' tax distribution.

I. A basic understanding of the tax allocation relationship between government and residents

A discussion of this issue requires some background information. In general, the government, enterprises, non-governmental organisations (NGOs) and residents are the parties involved in national income allocation. The government and residents both participate in the distribution of national income and are connected with each other to a certain extent. Therefore, eight basic features of the relationship between the government and residents' tax allocation are as follows:

First, the legal system is essential. The basic assumption underpinning tax levying is tax law. Governments must follow the form of regulated legislation and the permission of laws to determine what and how much tax they are going to levy. Tax law also rules the objectives, scope and range of tax levying.

Second, the tax system is foundationally structured by several components. Generally, due to the varying objectives of tax levying, the tax system's structure can be divided,

amongst others, into tax on goods and labour services, income tax, tax on property and tax on behaviour. Further, the tax system determines the scale and level of tax collected from residents.

Third, a vital feature is the economic and social role that government plays as society determines the scope of income government should receive from it. The Chinese government manages more and thus ought to receive proportionally greater income. The scope of governments' involvement in social and economic affairs varies between countries so their tax income may also not be the same across the board. However, the income of different governments cannot be measured with reference to only one metric. For instance, Norway is a generous welfare state, and the more income the government receives, the better social security it provides for residents. However, this ought to be only one factor against which the Norwegian government's income is assessed.

Fourth, the government takes part in the primary distribution and redistribution of national income, which are both included in social productivity. Moreover, the government affects the assignment of national income through participating in these two processes.

Fifth, tax is the main but not only form of government income. The diversity of government revenue is much more prominent in China government income also includes collected fees, fines, and enterprise profits. Nevertheless. tax revenue still accounts for over 70 per cent of the government's financial income even though the proportion of tax revenue is decreasing.

Sixth, resident tax, whilst not the only channel of government revenue, is also a significant source of it. This form mainly consists of individual tax, partnership enterprises tax, wholly owned enterprises tax, individual industrial and commercial tax, etc.. In addition to resident tax, the government's income is also comprised of non-resident tax, company tax and other non-tax revenue.

Seventh, the government collects tax from people and uses it to help people. This is unquestionable, and determined by the origin of public finance. There are two areas in which the government spends the tax: one is its own consumption, and the other is the provision of public goods Through the provision of public goods the government aims to improve residents' welfare, close the gap between the rich and the poor, and support undeveloped areas and vulnerable groups. We all expect in an ideal state that the government would spend less on itself and more on public goods. However, due to the diverse functions of government, its own consumption and expenses can amount to comparatively higher expenditure, which can elicit doubts from society.

Eighth, tax levying is an important means for the government to adjust the income and distribution gap. According to the principle of tax fairness, residents who share the

same level of income pay the same amount of tax, and residents with different levels of income pay correspondingly different amounts of tax. Under the principle of responsibility-sharing, residents with a higher income pay more tax. Hence, through tax levying and adjustment, the government alleviates the income margin and minimizes social disparity.

The background information above forms the groundwork for a discussion of the relationship between the government and residents' tax distribution.

II. An analysis of the tax distribution relationship between the Chinese government and residents

A basic overview of China's current situation provides useful contextual information when conducting research on the tax distribution relationship between the Chinese government and residents. By reflecting and comparing particular time durations the dynamic changes of this relationship can be analyzed (see table 1).

Table 1: The Proportion of Tax Income in Gross Domestic Product (GDP) and Gross National Income (GNI) in China 2000 - 2011

Unit: 100 million Renminbi (￥)

Time	GNI	GDP	Tax Income		
			Total	Proportion in GNI (%)	Proportion in GDP (%)
2000	98000.45	99214.55	12665.80	12.9	12.8
2001	108068.22	109655.17	15165.47	14.0	13.8
2002	119095.69	120332.69	16996.56	14.3	14.1
2003	135173.98	135822.76	20466.14	15.1	15.1
2004	159586.75	159878.34	25723.48	16.1	16.1

2005	185808.56	184937.37	30867.03	16.6	16.7
2006	217522.67	216314.43	37637.04	17.3	17.4
2007	267763.66	265810.31	49451.80	18.5	18.6
2008	316228.82	314045.43	57861.80	18.3	18.4
2009	343464.69	340506.87	63103.60	18.4	18.5
2010	399759.54	401512.80	66862.00	16.7	16.7
2011	472115.04	472881.56	82122.00	17.4	17.4

Source: *China Statistical Yearbook,* China Statistical Publisher.

In recent years, the amount of tax revenue as a proportion of China's gross national income and gross domestic product (GDP) has increased from around 13 per cent in 2000 to around 18 per cent in 2009. This suggests that the Chinese government's tax revenue is growing synchronously with its gross national income and the gross domestic product (GDP) whilst its tax income is also growing at a higher speed after more than a decade's efforts. Generally, the improvement based on the 'two proportions' strategic aims raised by the Central Party Committee has been achieved. [1]

In order to present the relationship between China's tax and economic gross more intuitively, we can compare tax revenue and gross national income diagrammatically (see figure 1).

Figure 1: The Proportion of Tax Income in Gross National Income in China 2000-2011

[1] "Two Proportions" refer to increasing the proportion of fiscal revenue in GDP and the proportion of central fiscal revenue in national fiscal revenue.

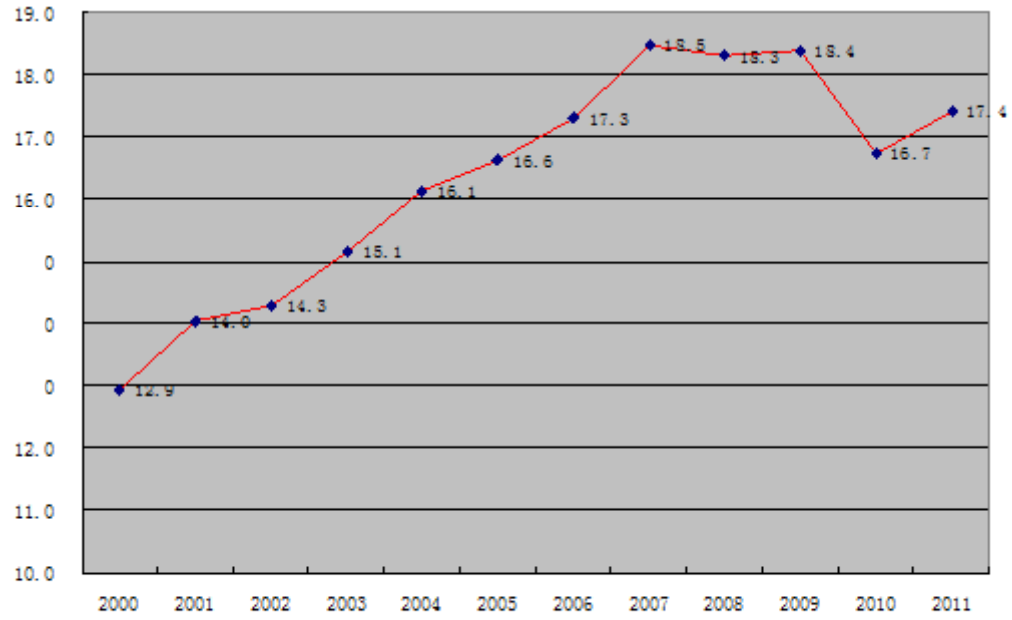


Figure 1: Proportion of China's Tax Revenue in GDP

As Figure 1 demonstrates, the proportion of tax revenue in gross national income has increased gradually from 2000 to 2007 - from 12.9 per cent to 18.5 per cent - and then remained stable for 3 years. This has since been followed by a 1 per cent decrease - from 18.4 per cent to 17.4 per cent – between 2009 and 2011. In conclusion, recent years have witnessed a somewhat stable decrease in the proportion of tax revenue in gross national income.

To facilitate this analysis and comparison, we take a look at the proportion of tax revenue in GDP in other countries (excluding transitional income) (see table 2).

Table 2: Proportion of Tax Income in GDP in Some Countries

Country/Region	Year	Proportion (%)
Australia	2010	23.6
Austria	2010	36.4
Brazil	2010	26.2

Canada	2010	17.2
Chile	2010	21.6
Czech Republic	2010	28.7
Denmark	2010	38.2
Finland	2010	36.7
France	2010	42.9
Germany	2010	28.6
Greece	2010	38.1
Hongkong China	2010	22.7
Hungary	2010	39.4
Iceland	2010	30.2
India	2010	11.7
Ireland	2010	32.5
Italy	2010	37.8
Japan	2010	11.2

South Korea	2010	22.7
Luxembourg	2010	38.5
Macao	2010	36.5
Malaysia	2010	20.8
Netherlands	2010	41.3
New Zealand	2010	33.1
Norway	2010	47.7
Pakistan	2011	12.4
Portugal	2010	37.4
Philippines	2010	13.4
Poland	2010	30.0
Russia Federation	2010	26.7
Singapore	2010	17.7
South Africa	2010	28.6
Spain	2010	25.2

Thailand	2010	20.3
Sweden	2010	33.2
Turkey	2010	24.5
United Kingdom	2010	36.2
United States	2011	17.1

Source: The World Bank, *the World Development Indicators (WDI) 2012*," Revenue, excluding grants (% of GDP)".

http://data.worldbank.org/indicator/GC.REV.XGRT.GD.ZS

Table 2 shows that, in 2010, Norway had the highest ratio of tax income in GDP with a figure of 47.7 per cent. Comparatively, Japan had the lowest ratio with a figure of 11.2 per cent. The data also shows that the Chinese government's tax income, which accounts for only 17.4 per cent of GDP is 30 per cent lowerthan Norway's tax income. However, in considering the differences across various countries, the concept of 'government income' is specifically essential when studying the relationship between tax revenue and GDP in China. If we take in account the proportion of total government total income in relation to GDP, China is on the same level as the other countries. This is because charges and other forms of income, in particular income from land transfer, constitute a significant component of government income in China.

In assessing the structural changes of national income distribution, the three departments of government, enterprises and residents each illustrate dramatically different trends over the past 20 years (see table 3).

Table 3：Changes in the Structure of National Income Distribution **1995-2009**

Unit：%

Primary distribution	**Final Distribution**

Time	Government	Enterprises	Residents	Time	Government	Enterprises	Residents
1995	15.1	20.1	64.7	**1995**	16.5	16.7	66.8
1996	15.5	17.2	67.2	**1996**	17.1	13.6	69.3
1997	16.2	18.1	65.7	**1997**	17.5	14.4	68.1
1998	16.9	17.5	65.6	**1998**	17.5	14.3	68.1
1999	16.9	18.1	65.0	**1999**	18.6	14.3	67.1
2000	16.7	18.9	64.4	**2000**	19.5	15.6	64.8
2001	18.4	18.1	63.5	**2001**	21.1	15.1	63.8
2002	17.5	17.2	65.3	**2002**	20.5	14.3	65.2
2003	18.0	18.8	63.2	**2003**	21.8	15.5	62.7
2004	16.9	23.5	59.6	**2004**	19.3	20.9	59.8
2005	17.4	23.2	59.4	**2005**	20.0	20.8	59.2
2006	17.9	23.1	59.0	**2006**	21.4	19.9	58.7
2007	18.3	23.6	58.1	**2007**	21.9	20.2	57.9
2008	14.7	26.6	58.7	**2008**	19.0	22.7	58.3
2009	14.6	24.7	60.7	**2009**	18.3	21.2	60.5

Sources: The data for 1995-2003 was calculated based on ‘cash flow chart (trade)’ in *China Statistical Yearbook*; the data for 2004-2007 was calculated based on ‘cash flow chart (trade)’ in *China Statistical Yearbook 2010* (National Bureau of Statistics revised cash flow chart for 2004-2007 referring to the Second Economic Census outcomes); the data for 2008-2009 was calculated

based on ‘cash flow chart (trade)’ in *China Statistical Yearbook 2012.*

Note: Due to the current statistical caliber, social organizations (non-governmental organizations) are included in either government or enterprises departments.

The data in Table 3 suggests several conclusions: firstthe proportion of government in national income has risen constantly but lightly in the last decade. In comparison with other developed countries, it remains a relatively low level; second, enterprises income initially decreased but has since increased with the result that now it has stabilised at a relatively higher proportion; third, residents income has generally tended to decrease, although the amount of reduction is not significant. Consequently, it was a suggestion of the 12th five-year plan that the proportion of residents income in national income ought to be improved.

III. Analysis of the structure of Chinese government’s income

The structure of the Chinese government’s income reflects the characteristics of developing countries. Faced with many problems and challenges, constant reform and adjustment is required (see table 4).

Table 4：structure of Chinese government’s income 1994-2011

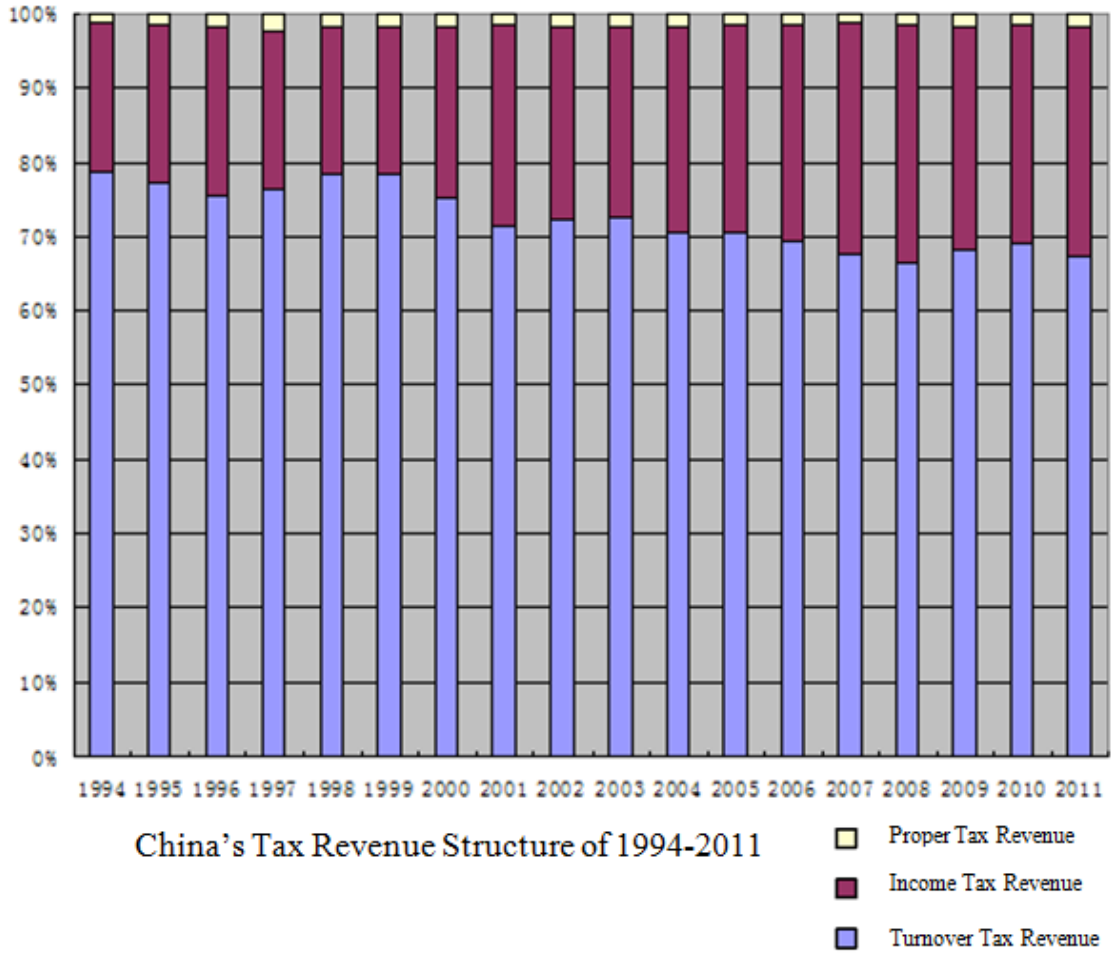
Year	Proportion of transitional tax income（%）	Proportion of income tax（%）	Proportion of property tax income（%）
1994	75.2	18.9	1.4
1995	73.3	20.2	1.6
1996	71.2	21.3	1.7
1997	74.5	20.8	2.4
1998	74.7	18.7	1.9
1999	73.3	18.5	1.9

2000	73.2	22.1	1.9
2001	68.8	25.9	1.7
2002	67.8	24.5	1.8
2003	70.4	25.0	1.8
2004	65.3	25.5	1.7
2005	68.9	27.1	1.7
2006	67.1	28.1	1.6
2007	63.0	29.1	1.4
2008	62.7	30.3	1.5
2009	63.9	28.3	1.7
2010	61.9	25.9	1.6
2011	60.0	27.7	1.6

Source: *China Statistical Yearbook,* China Statistical Publisher.

The proportion of turnover tax revenue as a percentage of total tax income is as large as 75.2 per cent in 1994, which is characteristic of many developing countries. After over a decade, it has decreased to approximately 60 per cent in 2011. There has also been a significant increase in income tax since 1994, with the figure in 2011 being 27.7 per cent. Property tax accounted for only 1.7% of the tax revenue in 2011. According to the twelfth five-year plan, the structure of tax income is supposed to have been adjusted so that the percentage of property income could be increased (see figure 2).

Figure 2: The structure of China's tax income 1994-2011



Top to bottom: property tax - income tax - transitional tax income

Individual income tax is an economic strategy that is directly linked to personal income distribution, and therefore directly affects the income allocation relationship between the government and residents. Therefore, it is necessary to also analyze the structure of individual income tax (see table 5).

Table 5: Chart of Structure of Individual Income Tax in China 2011

(Unit: 100 million Renminbi)

Section	Tax Income	Proportion (%)
Individual Income Tax	6054.08	—

China's Tax Revenue Structure of 1994-2011

1.Wages, salaries	3901.84	64.4
2.Individual industrial and commercial income from production and trade	684.01	11.3
3.Rent, contract, and trade income from enterprises	82.43	1.4
4.Remuneration from labor work	137.84	2.3
5.Remuneration from authorship	3.45	0.1
6.Disclosure fee loyalties	1.68	0.0
7.Interest, dividend, bonus	660.36	10.9
8.Property rent	19.80	0.3
9.Property transfer income	464.25	7.7
10.Occasional income	67.70	1.1
11.Others	21.26	0.4

Note: 1. The income from wages and salaries which are more than 20% tax rate applicable (more than 60,000 Renminbi annual income) accounts for 48.4 per cent of total tax revenue. This means that wages and salaries which are less than 20% tax rate applicable (less than 60,000 Renminbi annual income) account for 51.6 per cent.

The tax from labour income (including salary income, rent, contract, and trade income from enterprises, remuneration from labour work and authorship) accounts for over 67.1 per cent of individual income tax. This proportion would increase to 70 per cent if individual industrial and commercial income from production and trade were also considered.

The income from property (including disclosure fee loyalties, interest, dividend, bonus, property rent, and property transfer income) accounts for 18.7 per cent of individual income tax.

The current individual income tax system is comprised of several categories and sections. Taxes are charged according to respective monthly tax rates. This is significantly different from many other countries where the annual total is the reference for tax levying. Under this situation, it is hardly possible to meet the requirements of the principle "Leistungsfähigkeitsprinzip" that tax burden should be based on individual's taxability. First, most of the individual income tax comes from taxpayers' wages and salaries - overall, they contribute 64.4 per cent; secondly, labour income tax accounts for over 70 per cent of total individual income tax, which is overly high; third, capital tax income accounts only for 10 per cent; fourth, the proportion of tax income from property reaches as low as approximately 8 per cent; fifth, there is a lack of fairness both in the system and structure of tax levying. Due to the establishment and gradual completion of China's socialist market economic system, a range of reforms in the economic and social system are also taking place to create significant changes in the socio-economic environment. Although some adjustments and reforms have been implemented, the drawbacks of the current individual income tax are relatively more obvious when compared with the system in 1994. There is an imperative for a thorough reform in line with the requirements of the 12th five-year plan.

IV. Thoughts on Improving the Tax Distribution Relationship between the Chinese Government and Residents

The 12th five-year plan outline proposed that primary distribution and redistribution should both emphasize the unity of fairness and efficiency. Through the above analysis, we have concluded that in order to adjust the tax distribution relationship, standardize the discipline of income distribution, and to achieve the goal of doubling GDP and resident's average income by 2020, the following five outcomes should be achieved:

The first is to establish a fair and balanced tax burden system, which alleviates the tax burden for residents and the labour force and increase the proportion of tax income from capital and property. The idea of fairness and sharing responsibility will be presented in the future plan.

The second is to suppress the growth of the macro tax burden. Currently the government incurs expenses on social security and many other things. To cope with the pressure on public spending, the level of government income still needs to be increased. Further, the party's 18th report has indicated that both the proportion of residents' income in national income distribution and the proportion of labour

remuneration in primary distribution need to be raised. Thus, the excessive growth of government's income in GDP is to be suppressed by taking effective measurements.

The third is to adjust the structure of the tax system. By reforming the tax system and implementing strategic tax cuts, the proportion of transitional tax can be reduced and proportion of income tax increased. Further reforms should include an emphasis on tax on property, and more tax on the property-owning class.

The fourth is to banish certain types of government fees, which still contribute highly to gross government income.

The fifth is to further reform and improve the systems of value added tax, housing property tax and individual income tax. These are the urgent commissions of tax reform in the 12th five-year plan period. The 11th five-year plan had achieved massive success in tax reform and therefore it has become harder to carry out the other improvements. In conclusion, we must stick to the directional ideology that implementing tax reform must occur step by step through a gradual reorganisation of the entire framework and prioritising the easy problems before the difficult challenges.. Following the rules of the 12th five-year plan the modernized tax system which China is currently in need of can be gradually established.

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