JOURNAL OF CHINESE TAX & POLICY

2012 VOLUME 2 ISSUE 2

THE UNIVERSITY OF SYDNEY

JOURNAL OF CHINESE TAX & POLICY

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 interest 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. For Australian authors, this publication satisfies the description as a refereed journal in the current Department of Education, Employment and Workplace Relations (DEEWR) categories.

Months of Distribution: February and August
Current Edition: (2012) Volume 2 Issue 2
ISSN: 1839-065X (Online)

AUTHOR ENQUIRIES

For information relating to the submission of articles, visit the JCTP website at http://sydney.edu.au/business/research/journals/jctp.

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EDITORIAL

In this September 2012 issue of the Journal of Chinese Tax and Policy, we are pleased to provide a preview of some of the papers that will be presented at our annual International Conference of Chinese Tax and Policy, to be held in Guangzhou this November. The overarching theme of this edition is tax fairness and efficiency, and the papers featured in this issue provide a historical account of the development of the tax contract, the effects of levying indirect tax on income inequality, and efficiency concerns regarding the implementation of a carbon tax in China.

The diverse levels of socio-economic development across China's vast landscape predicate a strong role for government in facilitating improvements in income and wealth equality, as well as economic growth of provinces. This edition explores the tax contract as the foundation of public finance in China, the levying of indirect taxes which are regressive and have deteriorative effects on the distribution of income in China, and the levying of a carbon tax as a policy decision for which due consideration must be given to the ideal circumstances and time of implementation in China. Indeed each of these issues is discussed in depth by an article in this edition, identifying some key tax fairness and efficiency issues in practice.

First, Cai's paper 'On The Origin and Evolution of Tax Contract: Types, Functions and Implementation Mechanisms' defines the payment of taxation as part of a social contract, whereby citizens forgo some part of their natural rights to support the formation of the state, and provide the foundation for its economic operations. Cai initially discusses what a tax contract is and its historical origins, next defining basic attributes of the contract, and exploring international research perspectives. Cai then compares the international perspective on the tax contract to the current research ideas in China, concluding that the modern objective of tax was to guard the public rights, limit the public power, promote tax legalism and realise social fairness and justice. Finally, the types of tax contract are defined, and their operational mechanism and function outlined.

Second, Nie & Yue's 'A Study of the Impact of the Indirect Taxes on Income Distribution in Rural and Urban China' examines where the burden of various forms of taxes in China is shifted, and ultimately who bears its costs. Through utilising public data, the authors are able to simulate each round of the VAT burden shifting process, and determine what percentage of the total tax revenue each individual pays corresponding to their income as a percentage of total income. Through this process, the authors are able to determine that indirect taxes such as the VAT are regressive in nature, and therefore lower income individuals pay a higher amount of tax proportionate to their income than higher income individuals. Nie & Yue are able to make recommendations for future reforms on the basis of their findings.

Finally, Jin's comment 'Discussion Paper on China's Carbon Tax' explores the scientific and social consequences of carbon emissions, linking these ramifications to current and previous international and national policy prerogatives. Jin expresses concern regarding China's carbon-based growth model, and suggests that this severely restrains China's ability to prioritise future development and transition to a low-carbon economy. Nonetheless, a carbon tax is on the books in China, with speculation that the tax will be included in the 12th Five-Year Plan. The author goes on to define the nature of the proposed carbon tax, with comparisons to other countries, and determines the likely effect on China's economy. Next, Jin analyses international examples of Carbon Tax Collection Models, and compares these mechanisms to the method of implementation that China will pursue.

Collectively, these articles highlight the historical and modern purposes of taxation, in relation to public finance, and the social tax contract, assess whether fairness and efficiency are present in indirect taxes in China, and the ramifications of this for socio-economic development, and finally highlight the future role of tax in China, as an environmental safeguard.

EVA HUANG
SYDNEY, SEPTEMBER 2012

A Study of the Impact of Indirect Taxes on Income Distribution in Rural and Urban China

HAIFENG NIE & XIMING YUE

We estimate the households' indirect tax incidences in rural and urban China by using microeconomic data. We find that the average ratio of tax to income is 10.6 per cent across the sample. The tax burdens are regressive in rural and urban areas. On average, the rural households' ratios of tax on income are lower than that of urban households. However, the poor pay more tax proportionally than the rich. The total inequality is marginally deteriorated by the indirect tax. The indirect taxes increase the inequality within rural and urban areas and decrease the inequality between rural and urban areas.

INTRODUCTION

The core issue in evaluating the equity of a tax system is who bears the tax burden. With the deterioration in income distribution in recent years, the tax burden issue has been highly topical in media discussions. Indirect taxes contribute the largest share of tax revenue, however its tax burden has gone unnoticed for many years in China. Any study of the welfare or distributional analysis of the tax system in China is incomplete if there is no analysis of indirect incidence.

Usually, income tax and property tax are thought to be direct taxes, including individual income tax, enterprise income tax, house property tax, vehicle acquisition tax, as well as the vehicle and vessel usage tax. Indirect tax is the tax on the consumption of goods and services, and those taxes included in this study are Value-Added tax (VAT), excise tax, business tax, resource tax, urban and township land use tax, city maintenance and construction tax, stamp tax, land appreciation tax, deed tax, slaughter tax, vessel tonnage tax, agriculture specialty tax, and fixed assets investment orientation regulation tax. Although the customs duties are also levied on goods and services, we do not consider its burden due to inadequate available data.

Indirect taxes are typically collected by an intermediary, such as a retailer or producer. However, an intermediary cannot ultimately bear the burden of an indirect tax as it must rest with individuals, either as consumers, recipients of wages or owners of assets. Statutory incidence of tax describes the amount of revenue collected from each industry for each indirect tax. It shows who actually writes the cheque to the government but not who ultimately bears the burden, as each firm may pass on its initial burden to purchasing industries through higher prices and/or to final consumers through lower returns to labor and capital.

In the case of indirect taxes such as personal income taxes, the convention is to assume that the economic (or final) incidence is on the recipient of the income. It enables the economic incidence of personal income taxes to be estimated using survey data on individuals' income. However, determining the final incidence of indirect taxes is complicated. In the presence of an intermediary, how an indirect tax comes to be passed through depends on the economic relationships of industries in the economy. We will use input-output information to model the economic relationships in the economy, and employ the standard assumption that firms fully pass on the incidence of indirect taxes round by round in the buying and selling chain. The burden of indirect taxes is passed on round by round to purchasing businesses and final consumers until the total tax burden is passed on to final consumers. The final consumer absorbs all the indirect tax. We acknowledge the assumption that all indirect taxes are passed on is crude, but it is a realistic approximation. Similar assumptions are commonly employed in relevant disciplinary literature.

Due to the burden shifting of indirect taxes, when evaluating the tax burden of a good, one must take into account not only the indirect taxes imposed in itself but also all the taxes imposed on inputs used in the production of that good, and taxes imposed on the inputs to the inputs and so on. Building on the work of Scutella[1] , we use the input-output tax shifting model to trace the final incidence of indirect taxes.

There are three kinds of tax incidence in the literature: differential incidence, balance budget incidence and absolute incidence. The differential incidence means replacing one tax by another of the same yield; the balance budget incidence is where a tax is reduced and there is similar reduction in government expenditures. The absolute incidence means a tax alone is removed. In this paper, we follow the tradition in the analysis of indirect tax and consider a differential incidence which replaces the whole indirect tax by lump sum taxes calculated proportional to income.

We estimate the households' indirect tax incidences in rural and urban China by using microeconomic data. We find that the average ratio of tax to income is 10.6% across the whole sample. On average, rural households' ratios of tax to income are lower than their counterparts in urban areas. However the low income earners pay a higher percent of tax to income than the rich. Whether in rural or urban areas, the tax burdens are regressive.

We also calculate and decompose the indices of income inequality. The results show that total inequality is marginally deteriorated by indirect taxes. The indirect taxes increase inequality within rural and urban areas and decrease the inequality between rural and urban areas.

In the next section, we review the studies on the incidence of indirect taxes. In section 3, we outline our methodology of calculating the final incidence of indirect tax and data sources. In section 4, we show the indirect tax burden in different income groups in rural and urban samples. The final section contains our conclusions.

LITERATURE REVIEW

We first give a brief introduction to the tax system in China. Table 1 presents the tax revenue collected in 2007 for the main Chinese taxes. More than 74 per cent of tax revenue is from the indirect taxes out of all tax collected by State Administration of Tax. The VAT contributes more than half of the revenue collected from all of these indirect taxes and its revenue is also more than that of any of the other indirect taxes. Consumption tax and business tax produce over 31 per cent of indirect tax revenue. Less than 11 per cent of revenue is from the remaining indirect taxes.

TABLE 1: TAX REVENUE BREAKDOWN BY TYPE OF TAXES IN 2007

	REVENUE (In 100 Million Yuan)	PROPORTION OF TOTAL REVENUE (%)	PROPORTION OF GDP (%)
Direct Tax	12859.93	26	5.15
Individual Income Tax	3184.94	6.44	1.28
Enterprise Income Tax	7723.74	15.62	3.10
Foreign Investment Enterprise and Foreign Enterprise Income Tax[a]	1951.25	3.95	0.78
Indirect Tax	36591.87	74	14.66
Value Added Tax[b]	21595.43	43.67	8.65
Consumption Tax[c]	2376.93	4.81	0.95
Business Tax	6582.8	13.31	2.64
Other Tax[d]	5159.84	10.43	2.07
Subtotal	35714.99	72.22	14.31
Vehicle and Vessel Tax	876.88	1.77	0.35
Total	49451.8	100	19.82

Notes

[a] Foreign Investment Enterprise and Foreign Enterprise Income Tax is replaced by Enterprise Income Tax after 2007.

[b] Valued added tax includes the refund for exporters.

[c] Consumption tax includes the refund for exporters.

[d] Other tax includes resource tax, fixed assets investment orientation regulation tax, city maintenance and construction tax, house property tax and urban real estate tax, stamp tax, city and township land use tax, land value appreciation tax.

Source: China Taxation Annual, 2008, China Statistics Annual, 2008.

The revenue of indirect taxes is generated by the revealed purchase behaviours of individuals and firms, it is also considered as the tax on consumption. Warren (2008) reviews the methods and practices of measuring the consumption tax burden in OECD countries. Although there are decades of research literature on indirect tax, the analysis of indirect tax burden is not as standard the analysis of the direct tax burden. Warren uses the Australian case as an example to demonstrate the method and practice of measuring consumption tax burden. He also proposes embedding an input-output price model into the microeconomic simulation model to analyse the effect of an indirect tax. Scutella develops another kind of input-output model to find the final incidence for Australian indirect taxes. Leung and Bowen (1988) use an input-output model to trace the exporting of taxes in Hawaii.

Input-output models are also used to evaluate the distributional effect of tax reform. Hassett simulates the effect of the carbon tax reform on income distribution in the United States André Decoster analyses the effect of replacing direct taxes with indirect taxes on the income distribution for five European countries.

The input-output tax incidence model is also used to analyse the tax incidence in developing countries. Rajemison reanalyses their analysis of indirect tax incidence in Madagascar by using an input-output price model. Their methodology is then adapted by Haughton to analyse the tax burden of rural and urban households in Vietnam.

In Chinese literature, some scholars have begun to pay attention to the tax burden of indirect tax. Liu and Nie use the urban household survey and statutory tax rate to calculate indirect taxes in the household expenditure budget but do not model the shifting process of indirect tax. Ping and Bowen model the shifting process of VAT and business tax to investigate the welfare effect of the two kinds of tax, however they use the statutory tax rate to calculate the effective tax rates. In their model, business tax is only levied in the final round. Nie and Liu build the first input-output price model to study the interaction of VAT, business tax, excise tax and resource tax in the shifting process. They use actual tax revenue to calculate the effective tax rates and combine the final effective tax rates with the expenditure items of urban households to compare the annual income tax burden and life time income tax burden.

There are two shortcomings of the input-output price model in Nie and Liu . One is that all components of

final demand have the same effective tax rate and for the same products whether used for private consumption or exported, they have the same tax burden, however the VAT levied on exports can be refunded. The price model cannot differentiate the two kinds of final consumption. The other shortcoming of the input-output price model is that the actual tax revenue is not equal to what is generated by multiplying the final demand by the effective tax rate. The implied tax revenue is not equal to the actual tax revenue. Therefore, to compartmentalise the tax burden by components of final demand and type of tax, we need to shift all the actual tax revenue on to final demand.

The method used by Scutella to calculate the final incidence of Australian indirect tax can be adapted by shifting the tax to final demand. It uses the actual taxes not the price model to calculate the effective tax rates. We will give a detailed description of Scutella's model in the next section.

METHODOLOGY AND DATA SOURCE

We will adapt the method described in Scutella[12] to calculate the final incidence of indirect taxes. Similar to most of the studies reviewed in Warren[13] , we assume all indirect taxes are shifted forward to the final consumption. The procedure involves several steps: first, we calculate the statutory incidence for every industry. Second, we need to construct an exemption matrix to distribute the statutory tax between intermediate sectors and final demand in the first round. All the tax distributed on intermediate sectors is forwarded to the final demand in subsequent rounds. Third, we will use the original input-output table to construct the relation matrix used to pass all tax levied on business input to final demand. Finally, we calculate the total incidence of the indirect tax by final demand category and get the effective tax rates on final demand and its components in every industry.

The input-output table used in this project is the 2007 input-output table of China published by the National Bureau of Statistics (NBS) in 2010. This is the most recent table which consists of 135 product sectors. The sectors in the input-output table are categorised based on the National Economic Industry Classification (GB/T4754-2002).

The methodology uses the input-output information published in the input-output table. The structure of the input-output matrix is presented in Table 2 which outlines the supply of goods and services absorbed by the intermediate industries and final demand categories at basic values. The supply of goods and services originate from two broad components: intermediate inputs of various commodities (i = 1, . . . , m), and primary inputs such as labour and capital. The column represents the inputs for each good and service. These goods and services are either used as inputs to current production by industries (j = 1, . . . , m) or sold directly to final consumers. The row represents the final usage for intermediate inputs and final demand.

TABLE 2: INPUT-OUTPUT MATRIX

Table 2 Input-Output matrix

to / From	Industry classification (j = 1, . . . , m)	PC_R	PC_U	GC	FC	CI	Expor.	Impor.	Gross output
Commodity classification (i = 1, . . . , m)	(Q_{ij}) Intermediate usage	Final demand							
Primary inputs	Primary inputs to production								
	Total usage								

Notes: PC_R =Rural Household Final Consumption Expenditure,
PC_U= Urban Household Final Consumption Expenditure,
GC=Government Final Consumption Expenditure,
FC=Gross Fixed Capital Formation
CI=Change In Inventories

Calculating the Statutory Incidence Vector
The statutory incidence of indirect taxes is the actual revenue collected due to statutory tax obligations. The disaggregated indirect taxes used in this project, by type and industry, are provided by the State Administration of Taxation. Additionally, the annual yearbook of National tax revenue statistics also publishes the statistics of tax revenue. We will employ the compiling method used by the NBS to match the tax revenue to the input-output sectors.

We use SI_{it} to represent the type *t* indirect tax in industry *i*. Equation (1) shows that the statutory incidence of indirect taxes on industry *i*, SI*i*, comprises the sum of the statutory incidence on industry *i* over type of indirect tax *t*, where there are *m* industries and *s* types of indirect tax.

$$\textbf{(1)} \quad SI_i = \sum_{t=1}^{N} SI_{it} \qquad \text{for } i = 1, \ldots, m \text{ and } t = 1, \ldots, s$$

And $SI = (SI_1, SI_2, \ldots SI_m)'$ is the column statutory tax incidence vector.

Set up the Exemptions Matrix
We use the legal regulations to find the exempt industries. The exemption matrix, E, comprises the full industry-by-industry flow matrix but flows between exempt industries are set at zero. Some industries are exempt from certain types of tax; for example, goods sold to agriculture production are exempt from VAT, therefore the column showing purchases by agriculture production is set to zero.

The total non-exempt sale of commodities or services, TSX_i in industry *i* is the sum of non-exempt intermediate demand and the non-exempt final demand FDX_i. Final demand categories that are exempt (for instance exports are exempted from the VAT) are also excluded when calculating FDX_i. The non-exempt intermediate demand is the sum of sales for all *j* industries of commodity *i* in the exemptions matrix.

$$\textbf{(2)} \quad TSX_i = \sum_{j=1}^{m} E_{ij} + FDX_i \qquad \text{for } i, j = 1, \ldots, m$$

Calculation of the First Round Incidence on Business Inputs In order to calculate the first round incidence of taxes on business inputs, we need to calculate the first round output co-efficients from the exemption matrix. Each element of each row in the exemption matrix is divided by total non-exempt supply for that row to get the first round non-exempt output coefficients matrix with elements OX_{ij}. This matrix expresses industry *i*'s intermediate non-exempt supply of a commodity or service to industry *j* as a proportion of total non-exempt supply of that commodity or service.

$$\textbf{(3)} \quad OX_{ij} = E_{ij} / TSX_i \qquad \text{for } i, j = 1, \ldots, m$$

We assume that all taxes are fully passed forward to purchasing industries or final demand. We use *TIj* to represent the first round incidence on business inputs in industry *j*. So the first round incidence on business inputs of industry *j* is the sum of tax incidences on intermediate non-exempt inputs. It is obtained by multiplying the transposed statutory incidence vector by the first round output coefficients matrix in column *j*.

$$\textbf{(4)} \quad TI_j = \sum_{i=1}^{m} SI_i * OX_{ij}$$

We use row vector TI = ($TI_1, TI_2, \ldots, TI_m$) to represent the first round incidence on business inputs.

First Round Incidence on Final Demand
First round incidence on final demand for commodity i, TAi, is obtained by multiplying statutory tax paid in each industry by non-exempt final demand as a percentage of total non-exempt final supply for each industry.

$$\textbf{(5)} \quad TA_i = SI_i^* (FDX_i / TSX_{i)} \qquad \text{for } i = 1, \ldots, m$$

If an industry does not sell products directly to consumers, there is no first round incidence on final demand in this industry.

Final Incidence of Indirect Taxes
To calculate the final incidence of indirect taxes we need to shift the entire first round incidence on business inputs to the final demand. We use the original industry-by-industry flow matrix to calculate the output coefficients. We don't use the exemption matrix because tax exemption only exists for direct purchases of inputs, not for the tax on inputs to their inputs. Each flow in this matrix is divided by total supply of commodity *i* to obtain the new output coefficients matrix with elements $O_{ij.}$

We assume the taxes on business inputs are passed forward causing the output coefficients matrix to fall on final demand. The final good may use inputs that have been through several stages so it is not possible to shift all of the taxes on business inputs through to final demand in one round. In each round, a portion of an industry's output is purchased at the final demand level. The remainder is used by other industries as an input to their production which they in turn supply to either final demand, or alternatively, it is used as inputs to other industries' production process, and so on. Eventually, after many rounds, all of the inputs end up in final demand and correspondingly all of the taxes on business inputs are forwarded to final demand. In each round, the portion of tax passed onto final demand in each industry, Z_i, is the percentage of the final demand in the total supply:

$$\textbf{(6)} \quad Z_i = FD_i / TS_i \qquad \text{for } i = 1, \ldots, m$$

In this case, no exemptions are made as tax on inputs is borne by all sectors and final demand. We use *Z* to represent the m-dimension column vector with components Z_i . In every round, the tax passed onto final demand is given by

the input taxes from the previous rounds multiplied by the portion of final demand to total demand. In matrix notation, we denote *I* as the identity matrix, the amount of tax remaining on business inputs is **TI × I** in round 2, **TI × O** in round 3, **TI × O²** in round 4 and **TI × O**$^{n-2}$ in round *n*. After *n + 2* rounds, the amount of tax forwarded to final demand is given by the series:

(7) $\mathbf{TB = [TI\ (I + O + O^2 + \ldots + O^n)]' \# Z}$

where the # symbol refers to element-by-element multiplication and is called Hadamard product of matrix multiplication. When *n* approaches infinity, the expression in the round brackets is an infinite geometric series and $\mathbf{O}^n$ become small. By writing $\mathbf{B = (I - O)}^{-1}$ equation (7) can be simplified to:

(8) $\mathbf{TB = (TI \times B)' \# Z}$

Now we can get the total final incidence of indirect taxes of commodity *i*, TF_i. This is the sum of first round incidence on final demand and subsequent rounds' incidence. Thus:

(9) $TF_i = TA_i + TB_i \qquad i = 1, \ldots, m$

Total final incidence represents the dollar amount of tax born by total final demand.

The Effective Tax Rates for Final Demand Component

For every component of the final demand, the final incidence is the sum of incidence from the first round and incidence from other rounds. We can multiply each component's share of the total final demand by both first round incidence on final demand and subsequent rounds' incidence. For example, we use PC to refer to private consumption, the final incidence on private consumption is:

(10)

$$TFIPC_i = TA_i * (PCX_i / FDX_i) + TB_i * (PC_i / FD_i)$$

for $i = 1, \ldots, m$

Where PCX_i and FDX_i are the final non-exempt private consumption and total non-exempt final demand in industry *i*; PC_i and FD_i are the final private consumption and total final demand in industry *i*.

If the component is exempted from the first round, its share is zero. There is no first round VAT incidence on exports as they are exempted from VAT. We can use an equation like (10) to calculate the final incidence on exports and government consumption.

To calculate the effective tax rates for each final demand component, we can divide the final incidence of the tax by the level of each final demand component. For example, the effective tax rate of final private consumption is:

(11) $AERPC_i = TFIPC_i / FD_i \quad$ for $i = 1, \ldots, m$

To find out the tax incidence on households, we use the income and expenditure information in the household survey. The household survey is a national sample from the NBS. For every item in the household budget, we get its effective tax rate from the comparing corresponding household expenditure items and input output sectors.

After summing the tax component of expenditure on every item in the household budget, we get the total tax which a household bears. From this, we can establish how tax burdens are distributed on households.

Results

We report the main findings on the indirect tax burden in China in this section. In the first sub-section, we show that the statutory tax distribution and final tax distribution are entirely different. Then we illustrate the tax burdens in different households in rural and urban China.

The Tax Shifting and Effective Tax Rates in Sectors

In the first two columns in Table 3, we show the actual levy and final tax incidence for every industry. For the convenience of display, we aggregate the 135 sectors into 13 industries. It is clear that there are several patterns in industries. Some industries' final taxes are significantly higher than their actual levy. Although there is only modest tax revenue from the Agriculture industry (just 0.318 billion Yuan), the Agriculture industry absorbs more than 7 billion Yuan. Some industries pass most of their actual levy of tax to other industries. The Mining industry and Production And Supply Of Electric Power, Heat Power and Water industry are heavily taxed and shift most of the tax burden to other industries because their output is mainly used as an input to the production of other goods and services. Some industries' tax burden doesn't change much. For example, the manufacturing industry and real estate industry are both heavily taxed, but they keep most of their tax in the same industry. The outputs of these industries constitute the majority of final consumption. This phenomenon is partly a consequence of aggregation.

We also calculate the effective tax rates based on final demand consumption, which are shown in the last five columns of Table 3. For all industries, the average effective tax rate is 17.69 per cent; the highest effective tax rate is 30.04 per cent in the real estate industry and the lowest effective tax rate is 5.85 per cent in the Agriculture industry. We also break the indirect tax into four types of tax: VAT, Consumption Tax, Business Tax and other taxes. Their average effective tax rates are their shares in total tax revenue. The average effective rate of VAT is the highest, followed by business tax, other tax and consumption tax. The effective tax rate of VAT is the highest of the four types of indirect taxes, in most industries, excluding three industries: Financial Intermediation, Real Estate, Leasing and Business Services. It appears that VAT tax is shifted to

every industry although it is mainly levied on the sales of manufactured goods.

TABLE 3: REVENUE AND EFFECTIVE TAX RATE BY SECTORS

		REVENUE (In 100 Million Yuan)		EFFECTIVE TAX RATE (%)				
Code	Sector	Actual Levy	After Shifting	Indirect Tax	VAT	Consump-tion Tax	Business Tax	Other Tax
1	Agriculture	3.18	711.27	5.85	3.91	0.29	0.92	0.74
2	Mining	2736.22	113.69	23.05	17.74	0.65	1.94	2.72
3	Manufacture	16303.74	16910.41	19.26	12.82	3.02	1.78	1.64
4	Production & Supply of Electric Power, Heat Power & Water	2457.67	756.43	24.83	19.23	0.82	2.34	2.43
5	Construction	1535.05	245.86	18.39	11.11	0.8	4.55	1.94
6	Traffic, Transport & Storage	601.86	1294.95	16.66	9.34	1.17	4.29	1.85
7	Post & Telecom	310.85	646.81	18.94	10.19	0.81	5.89	2.05
8	Wholesale & Retail Trades	4055.87	2885.02	29.79	23.02	0.89	3.22	2.66
9	Hotels & Catering Services	331.21	1003.06	15.36	8.29	1.39	4.05	1.63
10	Financial Intermediation	1864.57	1039.07	23.14	7.84	0.76	9.03	5.5
11	Real Estate	2362.31	2272.61	30.04	8.58	0.78	15.21	5.47
12	Leasing and Business Services	914.2	924.41	19.28	7.41	0.83	8.69	2.35
13	Other Services	2238.26	6911.42	14.62	7.52	0.63	2.61	3.86
14	Total	35714.99	35714.99	17.69	10.07	1.33	3.49	2.8

NOTES

a) The revenue is total indirect tax.

b) Other tax includes resource tax, fixed assets investment orientation regulation tax, city maintenance and construction tax, house property tax and urban real estate tax, stamp tax, city and township land use tax, land value appreciation tax.

The Tax Burden on the Household

To measure the tax burden of households, the tax burden rate of a household is defined as the ratio of tax in the per capita household disposable income. There are 22306 households in the whole sample, 12942 in the rural sample and 9364 in the urban sample.

We show the summary statistics of tax burden rates in Table 3. On average, the tax burden rate is 11.22 per cent across the whole sample. But the standard deviation of the tax burden rate is 10.19 per cent, which means that there is substantial variation amongst households. The lowest tax burden rate is 0.32 per cent and highest tax burden rate is 446.73 per cent. The lowest rate and highest rate both occur in rural households. The rural average tax burden rate is lower than the urban average tax burden rate, but the standard deviation in the rural sample is higher.

TABLE 3A: THE SUMMARY STATISTICS OF TAX BURDEN RATE (UNIT %)

	Observation Number	Mean	SD	Min	Max
Total	22306	11.22	10.19	0.32	446.73
Rural	12942	10.87	12.59	0.32	446.73
Urban	9364	11.66	6.04	0.89	142.51

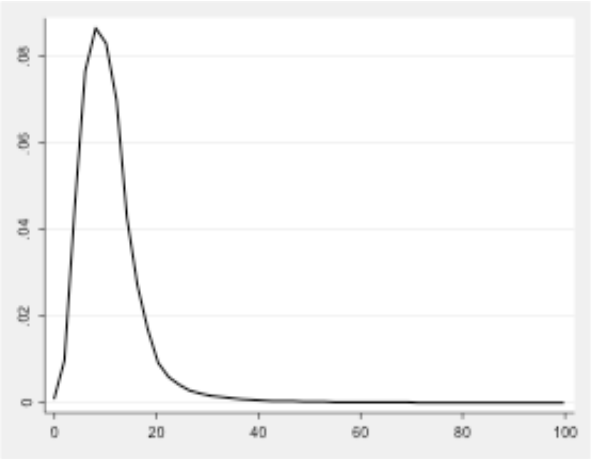

FIG. 1 THE DENSITY DISTRIBUTION OF THE HOUSEHOLD TAX BURDEN RATES IN CHINA

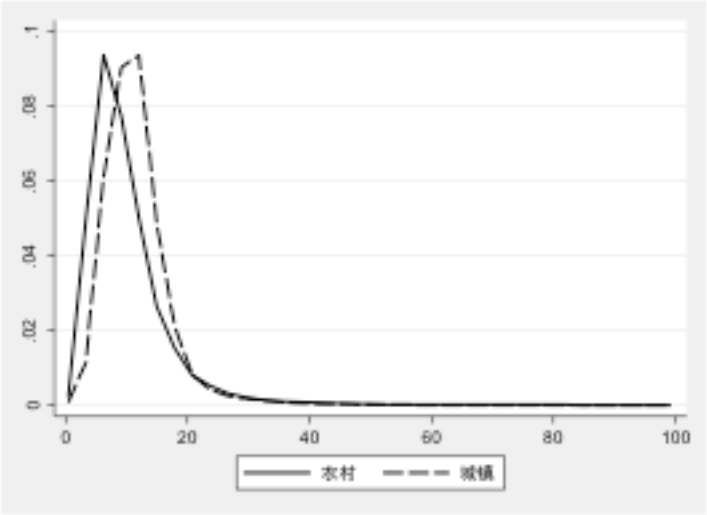

FIG. 2 THE DENSITY DISTRIBUTION OF THE HOUSEHOLD TAX BURDEN RATES IN URBAN AND RURAL CHINA. THE SOLID LINE IS RURAL CHINA; THE DASHED LINE IS URBAN CHINA.

The density distribution curve of the tax burden rate in Figure 1 shows that most of the rate data is concentrated around the average, however it is skewed toward the high end. Figure 2 shows the density curves of tax burden rates in the rural and urban samples. The distribution of the rural sample is more leftward skewed than the distribution of the urban sample. The maximum rate in the urban sample is lower than in the rural sample.

We illustrate the initial relationship between tax burden rate and per capita disposable income in Figure 3. The scatter graph shows that the tax burden rate decreases with the increase of per capita income. We also plot the non-parametric three-dimension polynomial best fit curve of the scatter graph in Figure 3. In the low end of income distribution, the tax burden rate decreases sharply as the per capita income increases. After it reaches a point of inflection, the tax burden rate keeps decreasing steadily. In summary, the tax burdens appear regressive in all households. In comparison with high income individuals, the low income individuals pay a greater portion of their income as indirect tax.

In gathering further information about the distribution of tax and income, we break the whole sample of households into 10 groups according to their per capita disposable income. For each income group, we calculate average per capita disposable income, the average tax burden rate, the share of group income in total income, the share of indirect tax in total tax. In Table 4, the average per capita income in the lowest income group is 1399 Yuan, the tax burden rate (the ratio of total tax to total income in the group) is 14.53 per cent. The lowest income group's share in total income is only 1.24 per cent, but their share in total indirect tax is 1.68 per cent which is higher than their income share.

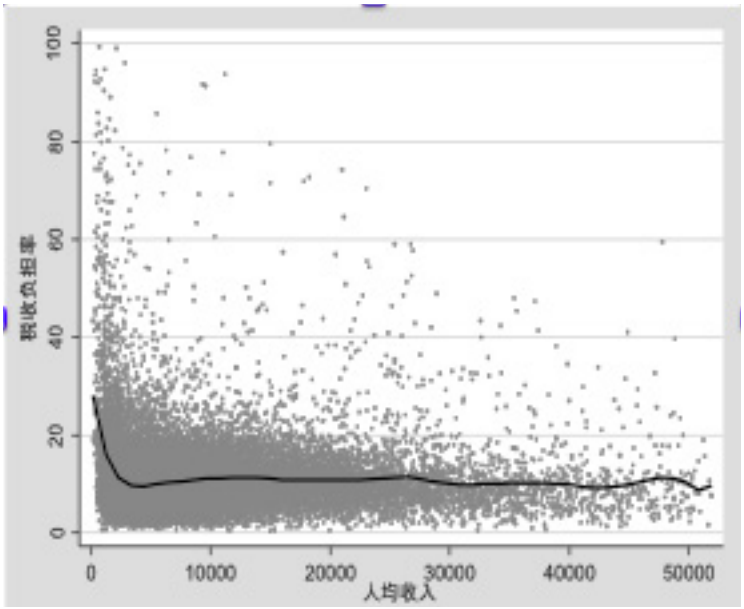

FIG.3 THE RELATIONSHIP OF TAX BURDEN RATE WITH PER CAPITA INCOME

TABLE 4: THE TAX BURDEN RATES IN 10 INCOME GROUPS OF THE TOTAL SAMPLE

Income Group	Per Capita Income in Group (Yuan)	Tax Burden Rate (%)	Income in Proportion to Total Income (%)	Tax in Proportion to Total Tax (%)
1	1399	14.35	1.24	1.68
2	2458	11.07	2.32	2.43
3	3372	10.05	3.31	3.14
4	4425	9.99	4.46	4.21
5	5795	10.4	5.83	5.73
6	7716	10.6	7.67	7.68
7	10234	11.19	10.02	10.59
8	13558	11.18	12.91	13.63
9	18591	10.86	17.91	18.38
10	34667	10.03	34.32	32.51

The top 10 per cent of individuals have average per capita annual income of 34667 Yuan, and its tax burden rate is 10.03 per cent. The income share of the top 10 per cent of individuals is 34.32 per cent and the tax share of the top 10 per cent of individuals is 32.51 per cent. The income share is higher than the tax share for the most affluent individuals. In all 10 income groups, the 4th group has the lowest tax burden rate which is around 9.99 per cent. The top 10 per cent of people have the second lowest tax burden rate. A usual explanation of the regressive nature of indirect tax burden is the marginal propensity to consume. As the income increases, the marginal consumption from the marginal income diminishes. The average consumption in proportion to income is lower for high income individuals than for low income individuals. The low income individuals have to pay more tax in proportion to their income and face a higher rate of tax burden.

TABLE 5: THE TAX BURDEN RATE BY TYPE OF TAX IN 10 INCOME GROUPS OF THE TOTAL SAMPLE

Income Group	Indirect Tax	VAT	Consumption Tax	Business Tax	Other Tax
1	14.35	8.71	2.36	1.89	1.39
2	11.07	6.61	1.71	1.64	1.11
3	10.05	6.00	1.48	1.55	1.02
4	9.99	6.02	1.49	1.49	1.00
5	10.40	6.33	1.44	1.59	1.05
6	10.60	6.48	1.43	1.62	1.07
7	11.19	6.94	1.38	1.74	1.13
8	11.18	7.00	1.30	1.76	1.12
9	10.86	6.79	1.17	1.80	1.10
10	10.03	6.34	0.96	1.71	1.02
Average	10.60	6.59	1.22	1.71	1.07
High/ Low Ratio	1.43	1.37	2.46	1.11	1.36

We also break the indirect tax into four types for the 10 income groups in Table 5. We can see that the average tax burden rate is 10.60 per cent for all households. This number is different from the tax burden rate in table 3 because it is weighted with per capita income. The average tax burden rate of VAT is 6.59 per cent, the average tax burden rate of consumption tax is 1.22 per cent, and the average tax burden rate of business tax is 1.71 per cent. In addition to the three main taxes, other taxes' average burden rates are about 1.07 per cent. For all four types of indirect tax, the lowest 10 per cent of individuals have the highest tax burden rates. Although the top 10 per cent of people don't have the lowest tax burden rate for each type of indirect tax, their tax burden rates are lower than the poorest 10 per cent of individuals. The last row in Table 5 shows the ratio of tax burden rate for the poorest to tax burden rate for the richest. The poorest 10 per cent of individuals' indirect tax burden rate is 1.43 times that of the indirect tax burden rate of the top 10 per cent of people.

The Tax Burden on the Household in Rural and Urban China

We plot the relationships of tax burden rate and per capita income for urban and rural sample in Figure 4. Whether in the urban sample or the rural sample, the tax burden rate decreases as the per capita income increases. The pattern of the relationship in rural sample is analogous to the total sample in Figure 3. In contrast to the rural sample, the relationship is a steadily monotonic decreasing in the urban sample.

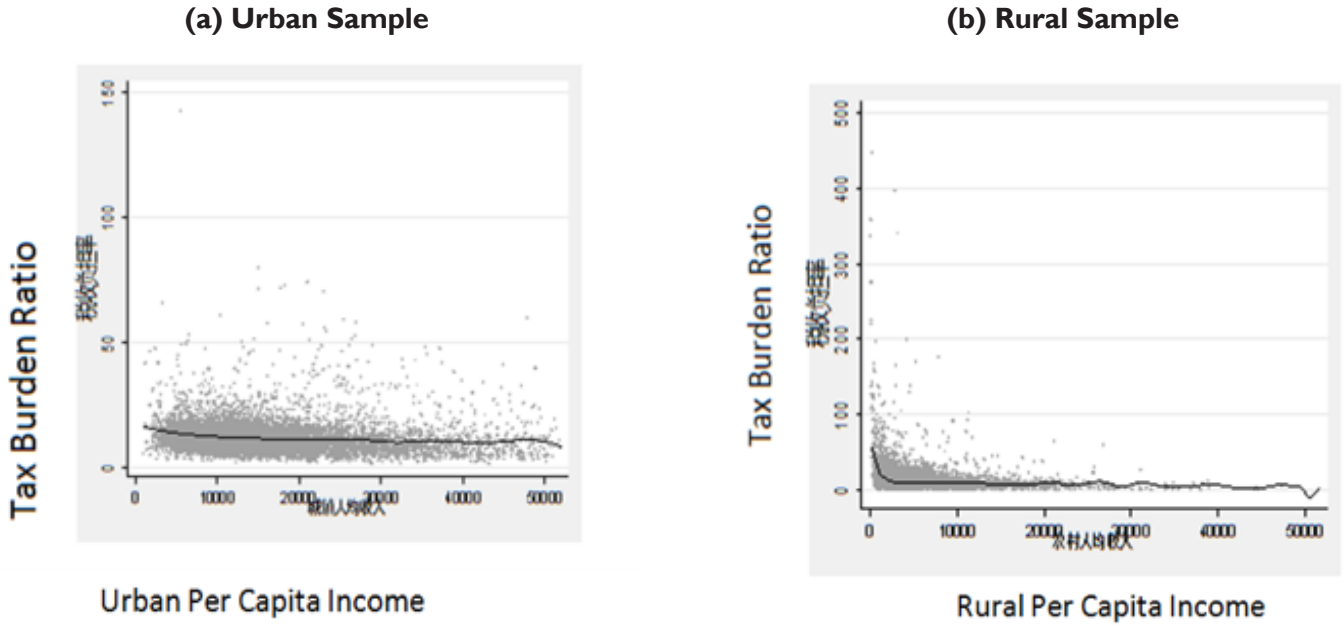

FIG. 4 THE RELATIONSHIP BETWEEN TAX BURDEN RATE AND PER CAPITA INCOME IN URBAN AND RURAL CHINA

We next calculate the tax burden rate distribution for the urban and rural sample respectively. There are average incomes, tax burden rates, income shares and tax shares for 10 income groups in urban and rural households.

In urban households, the lowest 10 per cent of individuals earn, on average, 4739 Yuan, whereas the richest 10 per cent of people earn on average, 44768 Yuan, approximately 10 times of the poorest. The income share of total income for the lowest 10 per cent of individuals is 2.35 per cent and the tax share is 2.96 per cent. The richest have a higher income share and tax share, 27.78 per cent and 24.41 per cent respectively, however the tax burden rate is a monotonically decreasing function of household income. The poorest income group pays 13.78 per cent in their income as indirect tax; the richest income group only pays 9.61 per cent as tax. Excluding the top two income groups, other groups' tax shares are higher than their income shares.

TABLE 6A: THE TAX BURDEN RATES IN 10 INCOME GROUPS IN URBAN SAMPLE

Income Group	Per Capita Income in Group (Yuan)	Tax Burden Rate (%)	Income in Proportion to Total Income (%)	Tax in Proportion to Total Tax (%)
1	4739	13.78	2.35	2.96
2	7418	12.54	3.86	4.42
3	9326	12.09	5.06	5.59
4	11108	12	6.2	6.8
5	12920	11.77	7.23	7.78
6	15007	11.4	8.61	8.98
7	17467	11.02	10.23	10.3
8	20995	11.06	12.53	12.67
9	26453	10.89	16.14	16.07
10	44768	9.61	27.78	24.41

TABLE 6B: THE TAX BURDEN RATE BY TYPE OF TAX IN 10 INCOME GROUPS OF THE URBAN SAMPLE

Income Group	Indirect Tax	VAT	Consumption Tax	Business Tax	Other Tax
1	13.78	8.74	1.65	2.01	1.38
2	12.54	7.87	1.52	1.88	1.26
3	12.09	7.60	1.41	1.87	1.22
4	12.00	7.52	1.39	1.88	1.21
5	11.77	7.40	1.35	1.83	1.18
6	11.40	7.19	1.23	1.82	1.15
7	11.02	6.91	1.20	1.79	1.12
8	11.06	6.96	1.14	1.84	1.12
9	10.89	6.89	1.10	1.81	1.10
10	9.61	6.09	0.86	1.67	0.98
Average	10.99	6.93	1.15	1.80	1.11
High/Low Ratio	1.43	1.43	1.91	1.20	1.41

The average tax burden rate for urban households is 10.99 per cent, the average tax burden rate of VAT is 6.93 per cent, the tax burden rate of consumption tax, business tax and other taxes are 1.15 per cent, 1.80 per cent and 1.11 per cent, respectively. For each type of indirect tax, the lowest income group's tax burden rate is the highest of all income groups. The top 10 per cent of individuals' tax burden rates are lowest for the four kinds of indirect tax.

The income gap between the poor and the rich is wider in rural households than in urban households. We can observe that the poorest 10 per centof individuals' average per capita income is 1093 Yuan whereas the richest 10 per cent of individuals' average per capita income is 13083 Yuan. The gap is twelvefold between the poorest and the richest in rural households and the gap in urban households is less than tenfold. In Table 7, we can also see the tax burden rates, income shares and tax shares for 10 income groups in rural households.

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The rural income group earns less than their urban counterpart, but does not bear more tax burden than their urban counterpart. The rural middle income group's tax burden rate is 9.43 per cent, which is lower than the tax burden rate of urban middle income group (11.77 per cent). The bottom 10 per cent of rural households bear the highest tax burden rate (17.01 per cent), its income share is only 1.88 per cent and its tax share is 3.44 per cent. The richest 10 per cent of rural households bear the lowest tax burden rate among all rural households, with 31.85 per cent of total income but, incongruously, are only liable to pay 28.28 per cent of total tax.

TABLE 7A: THE TAX BURDEN RATES IN 10 INCOME GROUPS IN RURAL SAMPLE

Income Group	Per Capita Income in Group (Yuan)	Tax Burden Rate (%)	Income in Proportion to Total Income (%)	Tax in Proportion to Total Tax (%)
1	1093	17.01	1.88	3.44
2	1832	12.12	3.25	4.24
3	2362	10.75	4.32	4.99
4	2864	11.13	5.46	6.53
5	3404	9.43	6.66	6.75
6	4003	9.42	7.99	8.1
7	4752	9.26	9.89	9.86
8	5752	9.25	12.28	12.23
9	7357	8.81	16.42	15.57
10	13083	8.25	31.85	28.28

TABLE 7B: THE TAX BURDEN RATE BY TYPE OF TAX IN 10 INCOME GROUPS OF THE RURAL SAMPLE

Income Group	Indirect Tax	VAT	Consumption Tax	Business Tax	Other Tax
1	17.01	10.38	2.77	2.22	1.64
2	12.12	7.32	2.01	1.61	1.17
3	10.75	6.48	1.75	1.47	1.05
4	11.13	6.49	1.59	1.88	1.17
5	9.43	5.64	1.41	1.43	0.95
6	9.42	5.61	1.47	1.41	0.94
7	9.26	5.52	1.43	1.38	0.92
8	9.25	5.46	1.39	1.46	0.94
9	8.81	5.20	1.37	1.35	0.88
10	8.25	4.84	1.23	1.34	0.84
Average	9.42	5.58	1.44	1.45	0.95
High/low ratio	2.06	2.14	2.24	1.66	1.95

Across the four types of tax, the rural households bear more VAT tax than the other types of tax. In Table 7b we can see that the bottom 10 per cent of individuals in rural households bear the highest tax burden rates and the top 10 per cent in rural households bear the lowest tax burden rates. From the last row in Table 7b, we can see that the VAT tax burden rate and consumption tax burden rate of the bottom 10 per cent of rural households are more than twice that of the tax burden rates of the top 10 per cent of households.

Comparing the tax burden rate distribution in urban and rural households, it is evident that the gap between the poor and the rich is wider in rural households than in urban households. This may be the result of income distribution differences between rural households and urban households. The income gap is wider in the rural than in the urban areas, therefore the tax burden is more regressive in rural than in urban areas.

The Effect of Indirect Tax on Income Distribution

Next, we calculate the income inequality indices to attain an overview of the effect of indirect tax on income distribution. The Gini coefficient of income before the tax is 0.4823, the Gini coefficient of income after tax is 0.4855. The change of Gini coefficient is the output from the Musgrave-Thin index, which indicates the effect of tax on income distribution. If the change is negative, it implies that the levying of the tax leads to a deterioration in income distribution. We can see in Table 8 that whether in rural or in urban areas, the Gini coefficient after tax is higher than the Gini coefficients before tax. The tax burden is born more substantially by the low income group than the high income group.

TABLE 8: GINI COEFFICIENT AND SUITS INDEX

	GINI COEFFICIENT		SUITS INDEX	
	Before Tax	After Tax	Change	
Total	0.4823	0.4855	-0.0032	-0.0221
Rural	0.3737	0.3849	-0.0112	-0.0737
Urban	0.3439	0.3518	-0.0079	-0.0528

The Suits index in Table 8 also suggests that the indirect tax burden is regressive. The Suits index is a number between -1 and 1, which indicates the relationship between the cumulative tax share and the cumulative income share. As income increases, if the cumulative tax share is higher than the cumulative income share, the poor bear more tax than the rich. In this instance, The Suits index is negative and the tax burden is therefore found to be regressive. If the cumulative tax shares are lower than the cumulative income share, the rich bear more tax in income than the poor relatively. In this instance, the Suits index is positive and the tax burden is found to be progressive. The Suits index for the whole sample is -0.0221, which indicates that the indirect tax burden is regressive. The Suits index in rural areas is less than the Suits index in urban areas, which provides evidence that the tax burden in rural households is more regressive than in urban households.

TABLE 9: THE DECOMPOSITION OF THE GENERAL ENTROPY INDEX OF INCOME INEQUALITY BETWEEN URBAN AND RURAL CHINA

PER CAPITA INCOME BEFORE TAX				
	GE(-1)	GE(0)	GE(1)	GE(2)
Total	0.69795	0.42606	0.40093	0.55406
Between Urban and Rural	0.45866	0.22285	0.21544	0.37278
Within Urban and Rural	0.23929	0.20321	0.18549	0.18128
PER CAPITA INCOME AFTER TAX				
	GE(-1)	GE(0)	GE(1)	GE(2)
Total	0.81244	0.43374	0.40704	0.57382
Between Urban and Rural	0.58178	0.23683	0.2268	0.39754
Within Urban and Rural	0.23066	0.19691	0.18025	0.17628

We use the Generalized Entropy index (GE (a)) to measure inequality by group. An advantage of the Generalized Entropy index is that it can be decomposed into the inequality within the groups and the inequality between the groups. The parameter of the Generalized Entropy index measures the sensitivity of the index based on income inequality. The range of results starts at -1. When the parameter is lower, the index is sensitive to inequality in the low end of the income distribution. When the parameter is higher, the index is sensitive to the inequality in the high end of the income distribution. We can see in Table 9 that the GE index after tax is higher than the GE index before tax for all the choices of parameters. When we decompose the inequality between the rural and urban groups, we can see that the increases of inequality mainly come from the between groups inequality. It is most evident when the parameter a=-1, the total GE index increases more than other parameters and the source of the increase is the between groups' inequality. This also corroborates our findings that the indirect tax burden is regressive and it affects the poorest more than the richest.

CONCLUSION

The tax incidence of indirect taxes is very important for the discussion of tax policy in China. This project provides a quantitative analysis of the incidence of indirect tax to compare the difference of statutory incidence and economic incidence. We can calculate the effective tax rates for every industry to find the industry with the heaviest tax burden. Furthermore, incorporating the rural and urban household expenditure survey data, we find the indirect tax burden of households in different income groups and the average tax burden rate is about 10 per cent. On average, the rural households pay less tax than the urban households. However, the poorest household in rural areas has the highest tax burden rate among all households.

From our study, we are able to extract knowledge of what roles the direct tax and indirect tax play in the redistribution achieved through the tax system. The indirect tax burden is regressive and it deteriorates the distribution of income. Across all indirect taxes, the value-added tax has the highest tax burden rate, and therefore a reduction in the rate of the value-added tax is a potential option to decrease the household tax burden and address the regressive nature of the tax system.

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On the Origin and Evolution of Tax Contracts: Types, Functions and Implementation Mechanisms[1]

CAI CHANG

In terms of social contract theory, tax is essentially one type of contractual relationship. This paper focuses on the origin and evolution of tax contract, taking its connotation and essence as a breakthrough point. Through scientific classification of tax contracts into statutory tax contracts and transactional ones, and intensive study into the functions and implementation mechanisms of both, this paper aims to explore theoretical values of tax contracts and establish the theoretical basis for tax contracts optimisation.

THE CONNOTATION AND ESSENCE OF TAX CONTRACTS

The Connotation of Tax Contracts

The word 'contract' was originally a legal term. Due to carving text on wood and tying ropes as an agreement in ancient times, people regarded the agreement among them as 'contract'. Later generations regarded the 'contract' as an agreement which was based on the freedom to contract and equality. The contract itself embodies the spirit of liberty, equality and justice. The essence of the contract is a rule of operation which supports economic relations behind the social economic phenomenon. Adam Smith spoke highly of it (contract) as 'one of the best means so far discovered (not created) to construct inter-personal relationships, to restrain conflicts and to eliminate differences'[2]. Later, the contract was interpreted by economists as a transaction of rights between parties. Modern contract and its social contract connotations are applicable and influential. It involves economic transaction and private law, thereby extending to every level of social economic life.

Tax contract thought was derived from the theory of social contract from which the State stemmed. Hobbes, Rousseau and Montesquieu extended the thought of contract from the private to the public sphere, developing it into the thought of social contract. The theory of the social contract dictates that in line with their wishes to safeguard and develop their rights, citizens' relinquished parts of their natural rights, which led to the formation of the State. The state originated from the contract among people, from the social contract[3]. The state has a social contractual nature that reflects that the State's rights resulted from citizens forfeiting some of their rights. The State's rights and citizens' rights are equal.

That the State is socially contractual in nature makes tax contractual in essence. Tax is the main source of revenue for expenditure undertaken by the State. Tax is derived from citizens ceding certain property rights in exchange for the enjoyment of public goods. Only with taxpayers' consent can a country levy taxes. As the party that benefits from this transfer of property rights, commonly in the form of money, the State is an abstract entity and thus needs an organisation to utilise this revenue. The organisation that undertakes this role is what we commonly call a 'government'. Therefore, the contractual relationship between the state and citizens essentially becomes a relationship where citizens give the government revenue by transferring certain property rights in exchange for the provision of public goods.

Basic Attributes of Tax Contracts

Market economics is contractual economics. Without a contractual relationship, the 'invisible hand' of the market economy would hardly have a role to play. As a public contract, taxation has all the basic characteristics of a contract. From a legal perspective, the contractual parties (the country and the taxpayers) in the relationship of tax contract are equal. The tax contract must also abide by the principles of social justice and good faith. Consequently, the tax contract inevitably supports the development of social democracy.

A contract can be referred to as either a rule or a system. North theorised that a system is a contractual arrangement between the principal and the agent for wealth maximisation. Williamson believed that the contract was both a complete system and a micro-system. The contract is the micro-regulation foundation of exchange. The manifestation of a tax contract is essentially the legal system that governs taxation. Through a multi-level game between the country and the taxpayers, a relatively stable tax allocation and management relationship is developed and sustained. Hence, we can surmise that the evolution of the tax system is actually the accumulation of the evolution of the tax contractual relationship and its external form.

Governments as the representatives of the State have interests that are independent of the taxpayer. Despite this, both taxpayer interests and those of the State should be protected by law. Thus, once the tax contract is agreed upon, it is protected by the law. The tax contract not only requires taxpayers to pay tax in accordance with the law but it also requires taxpayers not to deliberately evade tax. The tax contract also relies upon taxpayers to hold governments accountable in their attempts to levy taxes and ensure that governments are adhering to the constitution. The tax contract ensures that the government's and the taxpayers' legitimate rights are both protected under law without bias or prejudice. This ensures that the tax contract makes a positive contribution to the development of the economy and society.

The tax contract should not only conform to the principle of social justice but it should strive to achieve this goal. 'Righteousness' in the spirit of tax contract requires the government to stick to fairness and equality and a highly efficient tax administration that is not devoid of a human touch. This kind of justice assumes that tax should be neutral and realise both the vertical equity and the horizontal equity in tax burden. All in all, the establishment of the tax contract must be just and embody the principles of social fairness as a fundamental value.

The tax contract must adhere to the principle of good faith. Good faith is the cornerstone of the tax contract. 'Integrity' in the spirit of the tax contract requires taxpayers to act in good faith when they pay their taxes. It is also this same 'integrity' that requires the government to collect tax in accordance with the law, ensure transparency in the process and provide spending budgets for the State. The tax contract is conducive to building credibility in the tax system. The optimisation of the tax contract and confidence in the tax system have been important issues during the construction of a balanced society in China.

THE ORIGIN, EVOLUTION AND DEVELOPMENT OF TAX CONTRACT IDEAS

The Research Routes of Tax Contract Ideas From Abroad

Western scholars inherited two different ways of studying the tax contract idea:

The first method was to research the tax contract from the perspective of the tax right relationship between the government and the citizens. Locke held that the State's contractual nature made the payment of tax the transfer of a civil property right. A government cannot levy taxes without consent and representation from the people. If there is a suggestion that levying taxes does not require the consent of the people, that suggestion violates the basic rules of property rights, thereby frustrating a government's purpose[4]. This idea has influenced the position of the public and the government in the relationship of distribution of property rights and tax revenue, becoming the theoretical basis of the modern theory of limited government. Rousseau thought that there was a principal-agent relationship between the citizens and the government. The State was created from the establishment of the social contract between the citizens and the government. The government is the executor of a State's powers, it has no direct contract with citizens, thereby making this a principal-agent relationship.

When the government acts as the agent to execute the property rights of the State, it leaves the government in a situation where it is in charge of what is broadcasted and general publicity. This control may tempt governments to misuse public funds.

Consequently, the government's power to levy taxes and spend revenue should be restrained by law, and should be scrutinised by the people[5]. Brennan and Buchanan contended that public finance can be constrained by the Constitution, thereby directly constraining the government's right to levy and spend tax revenue[6].

Posner[7] demonstrated from an economic and legal perspective that it was necessary to instill the tax constitutional spirit into tax administration and the legal system design. This kind of thinking has exerted great influence on the understanding of the rights and relationship between the government and the public in income distribution and promoting the development of laws relating to the tax system.

The second method was to research the tax contract from the angle of optimisation of the tax distribution relationship. By using a cyclical diagram, Musgrave had researched the multi-dimensional 'tax impact point' in the private sector — the point at which the tax burden is revealed. These points demonstrated a tax contract relationship, inspiring the research on tax contract from the point of view of the value cycle.

MM Theory, founded by Franco Modigliani and Mertor Miller, revealed the difference of tax effect in different financing proposals, the interest deduction effect that they uncovered and established a foundation to research the tax contract relationship between the corporation and its creditors.

In terms of the relationship between lobbyists and tax allocation, Becker (1983) noted that these interest groups would influence the way governments levy taxes, thus leaving vulnerable groups bearing a larger tax burden[8]. James Mirrlees (1971), a Nobel laureate in economics, creatively put forward the theory of optimal taxation[9], settling some economic incentive problems such as the optimal income taxation and without precedent taking the information asymmetry view to study tax contract. Myron S Scholes (2002), another Nobel Prize-winning economist, systematically researched the relationship between stakeholders' tax strategy and the tax contract during enterprise operation in 'the Tax and Enterprise Strategy'[10]. Stiglitz (1988), who also won the Nobel Prize for economics, studied the relationship among optimal taxation, tax allocation and social welfare from a Pareto efficiency perspective[11]. From then on, taking the view of optimal taxation to research the tax contract, many scholars have been part of an increase or 'boom' in the study of taxation from the optimal taxation and social welfare maximisation approach. This area is now considered a hotspot for tax, and research in the area is closely followed by governments and economic organisations.

The Research Perspectives on Tax Contract Ideas in China

Referring to the social contract theory in the West, Chinese scholars re-evaluated the balance of the relationship between the public and the government during tax allocation, forming some basic points as follows:

The first viewpoint is that tax law, in light of contract equality, is a contractual agreement between the government and taxpayers, there being a voluntary exchange of rights and obligations between the government's levying and the public's paying. In order to receive the public goods supplied by the government, the public should accordingly pay the tax. In essence, there is a relationship of equal exchange, akin to that of a market relationship between the provision of public goods and the payment of taxes. In 'Tax Price Theory: Re-Evaluation and Application', Zhangxin (2001) proposed that the establishment of tax law is the determination of tax price, which is the signing of a contract that reflects that the public is willing to pay for the prices of public goods. This tax contract presented an equal relationship, suggesting the constitutional fairness of the tax contract, ie. the constitution reflected rights and obligations between the government and the public. Zhang Shouwen (2004) also argued for the tax contract being a legal tax relationship that should reflect the principle of fairness.

The second viewpoint is the research on the types of tax contract. Liao Chuhui and Cui Yafei (2005)[12] argued that a complete tax contract not only included the agreements written on public needs between the state and the taxpayers, but also covered principal-agent contracts between the State and the tax administration. The principal-agent contracts were derived from the contract between the state and the taxpayers. The State should supervise and motivate its agent's behaviour to reduce rent-seeking behaviour.

The third viewpoint is the research around the notion of the incomplete tax contract and the protection of the taxpayers' rights in terms of information asymmetry. Ding Manjuan (2006)[13] presented that the tax contract is an incomplete contract, where the taxpayers are disadvantaged. As the taxpayers could not sufficiently obtain efficient information and foresee the development of contract in the future, it was difficult to develop a long-run contractual relationship between the nation and the taxpayers. The information asymmetry between them brought about a result that the nation's public power was over the taxpayers' private power, and led to the mismatching between the taxpayers' burden and their enjoyed public goods. In reality, the fact that the tax contract is incomplete could easily result in the pursuit of revenue maximisation and even the trend of officials' making use of the public power to promote their personal power[14]. Therefore, she held that it was essential to protect the taxpayers through 'tax constitutionalism'. Zhang Meizhong (2007) argued that 'the proposition of tax contract was of great significance to clarify the interest pattern between the government and the taxpayers'. Based on a tax contract theory, a new relationship between the government and the people is created which is able to protect the tax base within the framework of tax laws, lead to a situation where taxes would not be misused or used inefficiently whilst also providing public goods and services to tax payer needs[15].

The last viewpoint is the research of the tax contract in terms of tax constitutionalism. Wu Zhengrong (2005)[16] wrote that the relationship of tax distribution between the state (the government) and the public or the taxpayers was the foundation of constitutionalism. The constitutional spirit advocated that it was necessary to regulate the fiscal system and rules, to confine the government's power of levy and expenditure as stated in the constitution. The essence of tax is, to tax according to the law, and to ensure that the tax contract is based on social contracts. The objective of the constitutional spirit of tax was to share the social and economic prosperity and to realise social fairness and justice through community members' rationally sharing the tax burden. Taxation is first and foremost a political system, then it is an economic system. From the point of view of development, the constitutional spirit of modern tax was to guard the public rights, to limit the public power, to promote tax legalism and to realise social fairness and justice. Liu Jianwen (2007)[17] maintained that it was critical to strengthen the protection to the taxpayers through tax constitutionalism. He believed tax law in China inadequately protects the taxpayers' rights in China and does not reflect the principle of tax equity. There is a need to implement the principle of tax legalism and to take the holistic tax power seriously. An Jingqiu (2007)[18] also studied tax contract from the point of view of tax legalism.

THE DISTINCTION OF TYPES AND FUNCTIONS OF TAX CONTRACT

From the theory of contract, enterprise is a series of inter-connected contracts. The tax contract is an important component of a company's contract, it is the focal point of the different interests in a network of contractual relations. On the basis of analysing the origin and evolution of tax contract both in China and the West, there are two distinct types of tax contract in the enterprise contract: one is the statutory tax contract between the government and taxpayers, and the other is the transactional tax contract between taxpayers and stakeholders. These two types play a significant role in the economic development and impose an effect on the efficiency of resource allocation and the interests of taxpayers.

The Statutory Tax Contract and Its Functions

The Connotation of the Statutory Tax Contract

As an exchange of private property rights, tax in essence is a contractual relationship, citizens necessarily have to receive public goods supplied by the government. In this contract, the public good is the consideration in the public contract, its exchange gives rise to the characteristics of that contract.

The government has the monopoly of political power. In order to avoid the misuse of this power, it is necessary to have a contract between the government and the taxpayers through the written means of the law. Since the tax contract between them is an unavoidable responsibility to the taxpayers for the government, who becomes a natural party of this contract, thereby making it a statutory tax contract. For example, the Tax Administration Law of the People's Republic of China, as the tax procedural law, along with the Enterprise Income Tax Law of the People's Republic of China and the Individual Income Tax Law of the People's Republic of China, as the tax substantive law, are typical forms of statutory tax contract. The concept of statutory tax contract has been widely recognised, spread and applied in studies of economics and law. Statutory tax contract is actually an avenue used to advance the taxpayers' interests by utilising the political power to provide public service by the government. When conducting a statutory tax contract, the government and the taxpayers are equals and respectively enjoy their own legal rights. This equity in rights presents the essence of contractual spirit, existing in each level of their relationship. However, in performing their consideration, any amount of taxes collected by governments that exceeds the amount provided for by the tax laws could be compared to the act of theft in the private sphere.

The Effects of the Statutory Tax Contract

The statutory tax contract is mandatory. Its functions are not only rooted in the political power of the government, but stem from the mechanisms and procedures of public election during the course of the tax contract. The community's collective will is thus represented through the election of public officials by the public. After the election of public officials, these officials are tasked with passing legislation to reflect this collective will of the people by codifying it into law. The tax contract then becomes mandatory law and is then abided by the public and the government. If the taxpayers and the government or the tax authority violate the tax law — one kind of statutory tax contract, they should assume the consequences of such action. For example, the Tax Collection and Administration Law in China has made some regulations about government's tax rights and interests such as tax audit, tax debt collecting, tax penalties, tax guarantees, tax base preservation and tax amnesties. Similarly, the government or the tax authority should be to blame when infringing the taxpayers' rights. The government should bear corresponding liabilities of compensation when causing losses to taxpayers because of improper law enforcement: make tax compensation to the taxpayers for the improper tax preservation; return the over-levied tax as well as the interests to the taxpayers. The statutory tax contract also has made some rules of prohibition and punishment over the tax law enforcers' malpractice. Apart from being mandatory, the statutory tax contract also comprises the drive of government's interest on behalf of the social interests.

The Transactional Tax Contract and Its Functions

The contract is one type of relationship of rights and obligations among transactional parties in the process of market exchange. The essence of transaction is a contractual arrangement about property rights agreed by transactional parties, with its aim to realise reasonable disposition and effective use of resources in time and space. Enterprise is 'the joint of a series of contracts', in which lies all kinds of stakeholders such as shareholders, creditors, suppliers, agents, end customers, professional managers, employees and so on. Though the relationship between enterprise and stakeholders is a pure market relationship, their conclusion of transaction contract does have a delicate effect on the enterprise's taxpaying and tax burden.[19]

The Connotation of the Transactional Tax Contract

The relationship of tax between enterprise and stakeholders is one kind of relationship of rights and obligations established by transactional parties, I term this tax relationship caused by their transaction as 'transactional tax contract'. The transactional tax contract, being a subordinate contract in a series of contracts, could be defined as a tax agreement or contract on circulation of property rights generated in the transaction between business entity and its stakeholders. Svetozar Pejovich (1990) stated that the contract was a tool to search for, distinguish and collaborate opportunities of transaction.[20] This understanding of the functions of the contract is applicable to a transactional tax contract. Concluding a transactional tax contract aimed at searching for transactional opportunities and obtaining economic benefits. By establishing the transactional tax contract, each party could reasonably plan for their tax activities and conduct tax management strategies and finally realise the maximisation of tax interests and economic benefits.

Every transaction involved in the 'transactional tax contract' between enterprise and its stakeholders is a complex relationship. This relationship is closely related to the transaction making it a 'relational contract'.[21] It has three following notable features:

The first is that there exists contractual unity or common awareness in each party of transactional tax contract. Each party takes advantage of formal or informal rules to ensure the stability of their relationship. It is because of the intricacy and mutual independence of interests that each party of transactional contract must reach an agreement on the issue. This conclusion definitely assumes the communication between the parties. During the communication, some formal or informal rules would be formed to regulate the behaviour of each party, to reduce the information asymmetry and then decrease the transaction costs. Hence, transactional tax contract emphasises the maintenance of cooperation and long-run relationship and parties of the contract are all willing to build up a governance structure to make an adaptive adjustment on contractual relationship.

The second is that there is a partnership between the parties of transactional tax contract. Different from statutory tax contract which needs to rely on the mandatory nature of the law to preserve the contractual relationship between the government and the taxpayers, transactional tax contract is reliant on the 'market contract' of economic activities between enterprise and its stakeholders. There is a partnership based on interests between them. In fact, based on partnership, the transactional tax contract ultimately aims at winning corresponding economic interests. Therefore, the latter lays emphasis on the procedure and continuity of economic partnership, leading to many unsettled contractual items which need to be appropriately adjusted in line with the situation of commerce. This makes transactional tax contracts flexible and adaptable. Consequently, during the conclusion and the performance of transactional tax contracts, there is only an interest contract in the commercial environment without any rights, ranks or orders to hinder the freedom of contract. The conflict, in transactional tax contract, could be resolved by self-adjustment, by the intervention of the third party, or by other interests-coordinating mechanisms.

The last is that there is a freedom of transactional tax contracts within the legal boundary. The free rights of the contractual parties, including the liberty of conclusion, the liberty to choose the counterparts, the liberty to determine

the content and form, the freedom to change or terminate, are protected by law, these free rights reflect in the self-determination of the intention of contract. However, there is no absolute freedom, which has a certain limit — it is obliged to conclude contract under the restraint of the framework of statutory tax contract and the country's or the district's law. When beyond this border, no transactional tax contract could be set up.

The Functions of the Transactional Tax Contract

Belonging to one set of economic rules or economic agreements, the 'transactional tax contract' is based on the point of interest. Interest is the beginning to study the human being's economic activities. Interest is 'the social need, and subject to category of social relationship'.[22] The human individual and the group are both the demander and the supplier of interest. In the social net of stakeholders, to gaining benefits, one needs to make an exchange with other interest bodies. In a transaction, every stakeholder is a 'rational person' who seeks after the maximisation of short-term or long-run interest. Since the power of each party is not balanced, conflict of interest inevitably arises in the transaction. Because of interest conflict, contract could exist. Through adjustment of interest relationship, it makes constraints on the transaction in order to interest coordination. Regarding the pursuit of interests as the origin of its functions, 'transactional tax contract', by which the parties could obtain the proportionate benefits, is an effective tool to seek after economic interests. Only with the existence and the distribution of interests are the taxpayers and stakeholders attracted to sign favourable tax contracts to protect their own benefits. From this perspective, the fulfilment of the 'transactional tax contract' does not need the restraint of political power, but the self- discipline of each party who wants to gain the satisfied interests. The functions of the transactional tax contract are necessarily limited to the law framework which is led by constitution, contract law and tax law to take effect.

THE IMPLEMENTATION MECHANISMS OF TAX CONTRACT

Implementation mechanisms are internal to the system, they connect each factor through means of organic combination and automatic regulation. There is a necessary inner link between an implementation mechanism and the properties and characteristics of the matter to be completed. The contract is not perfect, while the transaction or the economic relationship is complex. The information asymmetry between each party, the characteristics of rational person and the imperfection of a contract, can lead to opportunism during the transaction.

All these factors would lead to the departure from the agreed terms of tax contract. To ensure tax contracts are effectively carried out, it is necessary to set up valid implementation mechanisms of tax contract. According to the different types of contracts and contractual relations between the parties, the implementation mechanisms of tax contract are different from each other.

The Implementation Mechanism of Statutory Tax Contract

The statutory tax contract is concluded between the state and citizens who want to enjoy the benefits of public goods and services. Its establishment has resulted from the willingness of each side, which is expressed by the mechanism of public choice. Once this contractual process is concluded, statutory tax contract becomes compulsory. The state as a party to this social contract, is an abstract body, its rights need to be performed by the government as its agent.

The implementation of the statutory tax contract is a complex process. From the theory of contract, the rights of the State and the rights of the citizens (taxpayers) are equal, however when the State's public authority and citizen's private interests are in conflict, the latter is always in a weaker position. As the agent of the nation, the government has the motivation to pursue the maximisation of revenue. To guarantee the taxpayers' rights and thereby ensure the consistency of rights and obligations of both parties, it is critical to use constitutional concepts to enforce tax contracts. For a tax contract that complies with tax constitutionalism, the State authorises the tax administration to collect tax. On behalf of the government, the tax administration can punish taxpayers who have violated the law with measures such as forced tax, fines for delaying payment or penalties to protect the government's credibility and tax revenue. Meanwhile, the government should disclose the information about the use of tax to the taxpayers and should be supervised by the general taxpayers. As far as the government's violating the statutory tax contract, the taxpayers are entitled to amend the content of tax contract through the procedure of public selection with the help of their representative organisation and to get the lawful compensation from the government. Therefore, the implementation mechanism of the statutory tax contract is based on the principal-agent system, and its effective fulfilment would enhance the optimisation and evolution of one country's or one district's taxation.

The Implementation Mechanism of Transactional Tax Contract

The transactional tax contract is an agreement established between the parties of economic intercourse who want to reduce the transactional costs and obtain the economic interests. It conforms to the restraint of the basic framework of statutory tax contract. Under the framework of statutory tax contract, each party relies on the self-enforcement to realise the maximisation of their own interests —according to contract or agreement, each party performs their respective rights and obligations to win the tax interests and the maximisation of other economic interests.

Compared with the statutory tax contract, the transactional tax contract is of a more distinct imperfection. This imperfection has increased the convenience to flexibly cope with the change of commercial situation for each party, as well as the difficulty to fulfil the transactional tax

contract. Its performance needs to rely on the contractual unity or common awareness. Since enterprises in the transaction are generally supposed to be going concerns, the economic relationship with its stakeholders could be deemed to be long term. This long-term collaboration, whether supported by successive short-term contracts or by a one-off long-run contract, would always form a dynamic game relationship between the parties which is long-term and under the information asymmetry. In the long-run game, even the participant who focuses on the immediate interests, would be driven to pretend to emphasise long-term cooperation and thereby to win the maximisation of long-run benefits. The fulfilment of the transactional tax contract requires relying on long-term cooperative game, rather than the short-term and one-off competitive game.

Consequently, the core implementation mechanism of the transactional tax contract needs to set up the information disclosing system on the basis of fairness and transparency and be supervised by social intermediaries or the government. All in all, the implementation mechanism of transactional tax contract is based on the information disclosing system and the principle of good faith, and the final performance of transactional tax contract is preserved by the 'goodwill' shaped during the long-run game between the parties.

AUTHOR BIO

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NOTES

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Discussion Paper on China's Carbon Tax

JIN DONGSHENG

High levels of industrial activity resulting in greenhouse gas emissions are causing climate change. These changes are likely to result in severe environmental consequences including rising sea levels, and ecological changes. There have been suggestions that China's 'carbon-based growth model' will be detrimental to its future development and transition into a civilised ecological environment. As a result carbon taxes are being introduced around the world, and one such tax is currently under consideration in China. Carbon tax policy and collection methods generally as well as China's specific example are examined and conclusions are drawn regarding temporal considerations for policy implementation in China.

INTRODUCTION

High levels of industrial and domestic resource consumption is shaping global climate change and greenhouse gas emissions. Climate change refers to the greenhouse effect, the scientific term for increasing global temperatures. There will be severe consequences as a result of the greenhouse effect, as sea levels are predicted to rise, icebergs will melt around both the South and North Pole. As a direct course, islands and coastal cities are faced with the threat of submergence and extinction. The global warming phenomenon is attracting substantial social and political attention in the international community, with numerous countries signing international agreements to address the issue. One such agreement is the 'Kyoto Protocol' which came into effect on 16 February 2005, with the aim of regulating climate change. Currently, 141 jurisdictions have signed this agreement, including 30 industrialised countries. Between 7 to 18 December 2009, the World Climate Conference was held in Copenhagen, Denmark. The conference included the 15th Conference of the Parties (COP15) to the 'United Nations Framework Convention on Climate Change' and the 5th meeting of the Parties (MOP5) to the Kyoto Protocol. With representatives from 192 countries, the summit addressed the follow-up programme after expiration of the first phase of the Kyoto Protocol. Specifically, this summit aimed to develop a global emissions agreement for the post-Kyoto period from 2012 to 2020.

It is argued that China's 'carbon-based growth model' severely curbs its future development and transition to a low-carbon economy, which is the essential imperative should China progress to establish a "civilised ecological environment". As a responsible developing nation, China has strongly supported global effective international cooperation to regulate and minimise climate change. China has further agreed to adhere to the fundamental framework of the 'United Nations Framework Convention on Climate Change' and the Kyoto Protocol. China acknowledges the notion of 'Common Aim but Differentiated Responsibility', and has aims to lower its carbon dioxide emissions per unit of gross domestic product (GDP) by 40-45 per cent, which is further below the targeted levels than where announced in 2005 for 2020. At the annual 'Green Company Conference' held in China, experts from the National Development and Reform Commission stated that the basic research on carbon tax had been finalised and the state agency hoped to impose carbon tax in China through the 12th Five-Year Plan in cooperation with the government. The research institutions/department under NDRC and Ministry of Finance has accordingly published a report outlining the framework for China's Carbon Tax. As a direct cause, the carbon tax is expected to attract increased levels of attention in society, as members of the community will demand information on how they will be affected.

WHAT IS THE CARBON TAX?

The carbon tax is a tax levied on carbon dioxide emissions. Its main purpose is to increase environmental protection, the carbon tax aims to steadily reduce carbon dioxide emissions in order to slow the process of global warming. Through applying tax correlated to proportions of carbon in chemical fuel such as coal, fossil oil as well as petrol and diesel gas, the carbon tax is reducing the consumption and dependency on chemical fuels and thus carbon dioxide emissions. In comparison to a quantitatively controlled approach and carbon trading schemes based on market competition, the carbon tax has the benefit of comparable lowered administration costs. It is an important component of environmental tax, which is also known as ecological tax, green tax or environmental protection tax. Introduced in the 20th century, environmental tax has no consistent accepted definition. An environmental tax is a social cost representing both environmental damage and pollution from industrialised corporate activity. This cost is further incorporated by businesses into their production costs and market price. The market mechanism then allows for the efficient allocation of environmental resources. Some developed countries have environmental levies and employ instruments such as the carbon tax, sulphur dioxide tax, nitrogen oxide tax, water pollution tax, noise tax, solid waste tax and garbage tax.

The carbon tax mainly applies to sectors that exploit natural resources, such as the chemical fuel and coal industry. Those liable to carbon tax are both individuals and organisations that use fossil fuels, coal and other non-renewable resources that generate and discharge carbon dioxide into the atmosphere. There are typically three methods of implementation of the carbon tax: (i) As an independently existing tax on carbon emissions; (ii) As a component of environmental tax; (iii) Based on the original tax type, levying the tax according to the proportion of the carbon in the chemical fuel. The carbon tax is a levy on carbon emissions. By increasing the cost of emissions, the carbon tax plays an important role in energy saving and emission reduction. According to the 2010 carbon emission list published by the Chinese Academy of Sciences, three industries account for approximately 66.3 per cent of total carbon consumption. These are accordingly iron smelting, petroleum processing and coal and nuclear energy.

The introduction of carbon tax will result in energy savings and emission reduction, encouraging sustainable economic growth and development, benefiting the economic growth transformation in China. The carbon tax will change the cost structure of corporations, in particular throughout the processes of production. Here, carbon emissions, the cost of which were previously unaccounted for, will now be transferred directly to the market price. This will give a competitive advantage to renewable energy sources, such as wind and nuclear resources. However, there are some problems associated with the implementation of the carbon tax. Overlaps with existing taxes have been identified as a

threat, where prices on resources are expected to increase, and will hence have a negative impact on the economic growth and industry competitiveness most likely to occur.

FOREIGN COUNTRIES CARBON TAX COLLECTION METHODS

The method of collection is an important matter raised by Chinese officials in response to the proposed carbon tax. In recent years, the method of carbon tax collection has received much attention in developed countries. Whilst some countries have already begun carbon tax collection, others are still deliberating as to whether or not the carbon tax should be implemented. In comparison with other forms of taxation, the carbon tax is an unprecedented type of taxation and thus has little history of development.

In 1990, Finland was the first European nation to introduce the carbon tax. Subsequently, Denmark, Iceland, Netherlands, Norway, Sweden, UK, Germany, Canada and Italy all introduced the carbon tax to their economies. France later followed and prepared to introduce carbon tax. In 1991, Norway implemented the carbon tax, whereby tax was levied on 65 per cent of emissions including the manufacturing industry's electricity consumption and industry-wide greenhouse gas emissions. In Norway, however, coal used to produce cement or lightweight aggregate products is exempted from the carbon tax. Sweden also introduced carbon tax in 1991, however, it only levied tax on 50 per cent of emissions in order to minimise the potential deterioration of industry competitiveness. Denmark imposed a carbon tax on both household and industrial carbon emissions in 1993. An exemption or tax reduction was, however, granted for high energy consumption based enterprises who signed an agreement to voluntarily reduce their carbon emissions. In 1996, the Netherlands implemented an energy adjustment tax which levied taxes on five resources: fuel oil, gasoline, liquefied petroleum gas, natural gas and electricity. Carbon-free generated electricity was subject to a reduced rate of tax. As part of its ecological tax reform, Germany introduced an energy tax in 1999. Initially, the German energy tax was levied on petrol, light weight oil l, natural gas and electricity, however, in 2000 this expanded to include heavyweight oil. In order to combat climate change, the United Kingdom began collecting taxes on electricity, coal, natural gas and liquefied petroleum gas sold both commercially and to public departments. The standard collection resulted in a 15 per cent increase in the price of goods. Recyclable material is tax exempt. In order to reduce carbon emission levels, the Swiss government introduced a tax on fossil fuel based carbon dioxide emissions in 2008 of 12 Swiss franc per tonne. Carbon neutral resources are tax exempt in Switzerland, examples include wood and biological products.

Many countries decided and prepared the introduction of a carbon tax to their economies in 2009, with ambitions to start collection in 2010. For example, in 2010 , the Netherlands government submitted a bill to parliament on 15 September 2009, approving the proposal and detailed changes to their fiscal budget whereby the vehicle tax on petroleum was changed to the carbon tax based on the volume of carbon dioxide emission levels. This bill became effective in March 2010. Zambia has also introduced the carbon emission tax in its 2010/11 fiscal budget. In addition, Switzerland announced that from January 2010, the rate of tax levied on carbon emissions would triple, reaching 36 Swiss Francs per tonne. The New Zealand government is currently working towards replacing the carbon trading scheme with the carbon tax. The European Union has developed a uniform carbon tax rate guideline for their member countries. Each member country must increase the carbon tax rate continuously according to the guidelines issued, as such the carbon tax rate in the EU is on a defined upward path. According to the European Union Committee's recommendation, the carbon tax is collected in the final stage of energy production. In addition, the carbon tax is imposed on coal, black coal, peat and its by-products such as coking coal, coal gas etc, also, it includes uprising fluid, formaldehyde used as fuel for power facilities, electricity, heating, natural gas and mineral oil used for water and nuclear power plant stations. There is not a uniform tax rate for carbon, for example, the tax rate for liquefied petroleum gas, heavy oil and kerosene energy production is relatively higher than the tax rate for coal.

CHINA'S INTRODUCTION OF THE CARBON TAX

The method of implementation of the carbon tax has been addressed as an important social issue in China. According to Su Ming, the deputy director of the Financial Academy of the Ministry of Finance who spoke at the '2009 China Sustainable Energy Development Summit', the initial method to levy tax on the emission of carbon dioxide, sulfur dioxide, nitrogen oxide and industrial waste water, provided the fundamental framework for tax in this area. Therefore, the implementation of the carbon tax in these essential areas is very important and should be carefully considered.

The main focus of the carbon tax is on the chemical oil and coal energy industries. Today, the main energy sources in China are still coal and oil, with no sign of change in the next decade as China's dependency rate on these resources is expected to reach 70 per cent by 2020. The concentration and strong market power of the coal and oil industry enables them to easily control product prices and pass on the cost of the carbon tax to consumers. Thus, it is likely that the burden of the carbon tax will be borne by consumers rather than corporations. In addition, the appropriate rate of tax on carbon emissions need to be reached by a consensus. Assuming the tax rate is based on the emission volume of carbon dioxide, two proposed methods for taxation are as follows: (i) A tax rate of RMB10/tonne in the first year which will be increased and fixed at a final rate of RMB40/tonne ; and (ii) A tax rate of RMB20/tonne, which is to be increased to RMB50/tonne after a period of 10 years and

further increased to be fixed at a final rate of RMB100/tonne. Regardless of which method is adopted, the carbon tax will encourage corporations and individuals to reduce carbon emissions through technological innovation, however, the chosen method may procure different results. If the cost of technological innovation is higher than the cost of the carbon tax, enterprises will have no motivation to pursue R&D development to reduce their exposure to the carbon tax. This causes a pricing dilemma, whereby a low carbon tax rate may fail to encourage enterprises to embark in technological research and development, however, if the carbon tax rate is too high, this may significantly impair normal business development and operations.

Given China's current state of development, the impact of this tax policy on the Chinese economy should be carefully considered and it is imperative that its implementation is a gradual process. Firstly, the carbon tax may be incorporated into an existing tax type, and only subsequently transformed into an independent form of tax. Secondly, from an administrative perspective, the tax may initially be levied on industrial fossil fuel consumption and gradually expanded to include society and individuals in the scope of the tax. Thirdly, the tax burden should initially be minimal and should gradually increase as the administration processes become more advanced. Finally, the carbon tax may lead to an increase in the cost of production, and it will place downward pressure on economic growth. Whether or not China is able to collect the carbon tax within a short time period is still contingent on a variety of factors. Consequently, it remains difficult to ascertain whether this is the most appropriate time to implement the carbon tax.

NOTES

[1]中国国际税收研究会 [Conference of Chinese Internationl Tax],《2008世界税收发展研究报告》[2008 Report on Global Tax Developments], 中国税务出版社 [China Tax Press] 2009, November.

[2] 中国国际税收研究会 [Conference of Chinese Internationl Tax],《2008世界税收发展研究报告》[2008 Report on Global Tax Developments], 中国税务出版社 [China Tax Press] 2009, November.

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