Journal of Chinese Tax & Policy

中国税收与政策

(2017) Vol 7 No.1

JOURNAL OF CHINESE TAX AND POLICY

SUBSCRIPTION

Months of Distribution: February and August
Current Edition: 2017 Issue 1
ISSN: 1839-065X (Online)
2205-2550 (Print)

For information relating to the submission of articles, visit the JCTP website at

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ABOUT THE JOURNAL

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

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

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EDITORIAL

ARTICLES

Editorial

The 2017 vol 7 issue 1 of the Journal Chinese Tax and Policy features recent articles relating to the ever-changing climate of Chinese tax both reflectively and prospectively. Focusing on the areas of transfer pricing regulation, replacement business tax and individual income tax reform, these articles all postulate on the further implications of these reforms, drawing upon global and international practices in offering alternatives and adaptive solutions.

Dr George Tian's paper focuses on the technological globalisation of major companies, illustrating the potential impacts of increasing borderless cloud-based models and China's response. Developing first into cloud computing and its impact on China's Transfer Pricing, the article deals in detail with the implementation and impact of an OECD BEPS Action as well as major reforms from 2016-17. In response, the paper also suggests blockchain technology and considers its role in providing a supplementary solution.

Research on the Replacement Business Tax with Value-Added Tax of Chinese Banking Industry by Long, Cai and Zhang investigates the possible deficiencies of China's current financial tax system of business & income tax for banks, postulating on an alternative Value Added Tax (VAT) chain. Considering the core tax burdens on the financial industry and its manifesting inequality in income tax, the paper a thorough reasoning to the consequences of mismatch between capital expansion and rapid growth of banking services. Alongside rationalising the lack of international competitiveness dominating Chinese Banks, it proposes the selective levying of VAT by considering a variety of successful international models.

Dr Huang and Nan's article comprehensively considers how the far-reaching consequences of implementing a family based filing in supplementing the proposed Individual Income Tax Reform. Through their feasibility study, a "revenue neutrality" analysis compares projected revenue from existing policies and a proposed family based individual income tax filing to calculate and compare projected revenue. It emphasises the importance of careful legislative consideration in the proposed shift into a global tax structure.

Eva Huang

Sydney, September 2017

China's New Transfer Pricing Rules & Their Implications to Cloud-related Multinationals - Blockchain as a Supplementary Solution

Dr George TIAN[1]

Abstract: Technology companies are at the forefront of multinationals operating in a developing new global tax environment. Their ever-evolving and increasingly borderless cloud-based business models have set off a scramble among companies and governments around the world to grasp cloud taxation issues and impacts.[2]

Key words: Cloud Computing, Transfer Pricing, Multinational, Blockchain, Smart Contract, BEPS, China

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[2] http://www.ey.com/Publication/vwLUAssets/EY-cloud-taxation-issues-and-impacts/$FILE/EY-cloud-taxation-issues-and-impacts.pdf at page 4.

I. Introduction

The booming digital economy has become a major engine for China's economic growth. According to a White Paper issued by the China Academy of Information and Communications Technology (CAICT) of the Ministry of Industry and Information Technology (MIIT) in July 2017, China's digital economy increased 18.9 per cent in 2016 to 22.6 trillion CNY (3.35 trillion USD), which was much faster than that of China's overall economy (with a growth rate of 6.7 per cent in 2016).[3] Cloud computing, as one of the important components of the digital economy,[4] grows rapidly in China also. A study conducted by the US Department of Commerce found that the cloud computing market is still 'relatively nascent' in China. [5] Although China's cloud computing market was worth $1.5 billion in 2013, that figure is expected to increase to $20 billion by 2020, a compound annual growth rate of approximately 40 per cent.[6] However, in relation to international tax, cloud computing, as a relatively new business model that is borderless in nature, creates both challenges for taxing authorities and uncertainties for businesses in different countries,[7] particularly in cross-border transfer pricing areas.[8]

This article examines the major forms of cloud-transfer pricing activities conducted by multinational companies, China's implementation of the OECD BEPS Action Plan, as well as some unilateral actions adopted by China in order to address cross-border transfer pricing issues. Some of the most recent development of the Chinese transfer pricing rules, including the *Public Notice of the State Administration of Taxation Regarding the Release of the "Administrative Measures for Special Tax Investigation Adjustments and Mutual Agreement Procedures*" (SAT Public Notice [2017] No.6),[9] and their implications to the cloud-related MNEs in China, are also examined. In addition to legal solutions, it attempts to explore the possibility and feasibilities of using new blockchain technology to address the transfer pricing problems in China. It contends that it is important to make law and technology work together to address the transfer-pricing problem.

II. Cloud Computing and Transfer Pricing in China

A. Definition, Service Models and Key Features of Cloud Computing

[3] Digital economy accounted for 30.3 per cent of China's total gross domestic product (GDP) over the year, said the white paper. Taking its spillover effect into account, digital economy contributed 69.9 per cent to the GDP in 2016, it added. See [ref] http://www.chinadaily.com.cn/business/2017-07/20/content_30179729.htm See The Foreword session of the China Digital Economy Development Report (2017) [in Chinese] (中国数字经济发展白皮书（2017 年）). See also 中国信息通信研究院, 中国互联网行业发展态势暨景气指数报告（2017 年）, 2017 年 8 月

[4] Digital economy, also known as the internet economy, is based on digital computing technologies, comprising new business models such as e-commerce, cloud computing and payment services. http://www.chinadaily.com.cn/business/2017-07/20/content_30179729.htm

[5] http://trade.gov/topmarkets/pdf/Cloud_Computing_China.pdf

[6] http://trade.gov/topmarkets/pdf/Cloud_Computing_China.pdf

[7]http://www.ey.com/Publication/vwLUAssets/EYWorking_in_the_cloud:_Tax_considerations_of_cloud_computing/$FILE/Tax_Consideration_Cloud_Computing.pdf at page 2.

[8] With the development of digital technology, an increased number of businesses (within or outside China) have moved to cloud computing solutions. Many items we view as 'tangible' products are now transformed into 'intangible' or 'digital' products. As a result, this brings significant challenges to the traditional tax system, which was established on the basis of physical transactions and trade. See David Shakow, 'The Taxation of Cloud Computing and Digital Content' (2013) Faculty Scholarship Paper 475, 2.

[9] The STA Public Notice No.6 was issued by the State Administration of Taxation (SAT) in March 2017. https://www.pwc.com/gx/en/tax/newsletters/pricing-knowledge-network/assets/pwc-tp-china-sat-spec-tax-adj-map.pdf

Before examining the in-depth problems of the implementation of Transfer Pricing rules to cloud-related transactions, it is necessary to understand the meaning of cloud computing, the different types of cloud service models that exist, as well as the key features of cloud computing technology.

It has not been an easy task to provide a strict and standardized definition of cloud computing since cloud computing itself is an evolving technology. Different countries, and even different stakeholders in the same country, may provide different definitions of cloud computing.[10] For example, based on a study conducted by the Defense Group Inc, there are more than twenty competing definitions of cloud computing in the US.[11] However, the U.S. National Institute of Standards and Technology's (NIST) provides the most widely accepted definition, which defines cloud computing as:

'a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.' [12]

In 2012, the Ministry of Industry and Information Technology (MIIT)'s China Academy of Information and Communications Technology (CAICT) defined cloud computing in its *2012 Cloud Computing White Paper* as follows:[13]

"Cloud computing is a method for achieving large-scale computing information processing, which unifies, organizes, and flexibly draws upon various Information and Communication Technology (ICT) information resources through the Internet. Cloud computing utilizes distributed computing and virtual resource management technologies, among others. Using the Internet, it takes spread-out ICT resources (including computing, storage, application platforms, and software, among others) and brings them together to form a shared resource pool. Furthermore, it uses dynamic, on-demand, and scalable methods to provide services to users. Users can use various types of terminals (such as personal computers (PCs), tablet computers, smart phones, even smart televisions, among others) to access ICT resource services through the Internet."[14]

[10] See Steven Rosenbush, 'The Morning Download: Cloud Computing Hazy Meaning Creates Confusion for CIO's' (8 October 2016) Wall Street Journal <http://blogs.wsj.com/cio/2016/10/18/themorningdownloadcloudcomputingshazymeaningcreatesconfusionforcios/>; New Zealand Law Society, Defining Cloud Computing (4 July 2014) <https://www.lawsociety.org.nz/lawtalk/lawtalk-archives/issue-845/defining-cloud-computing>; Lizhe Wang et al, 'Scientific Cloud Computing: Early Definition and Experience' HPCC '08 Proceedings of the 2008 10th IEEE International Conference on High Performance Computing and Communications, 825-830.

[11] Leigh Ann Ragland and et al, Red Cloud Rising: Cloud Computing in China, Research Report Prepared on Behalf of the U.S.-China Economic and Security Review Commission (September 5, 2013) at <https://www.uscc.gov/sites/default/files/Research/DGI_Red%20Cloud%20Rising_2014.pdf> at 6.

[12] See Peter Mell & Tim Grance, The NIST Definition of Cloud Computing - Recommendations of the National Institute of Standards and Technology (September 2011) National Institute of Standards and Technology, US Department of Commerce <http://nvlpubs.nist.gov/nistpubs/Legacy/SP/nistspecialpublication800-145.pdf>, 2.

[13] "The Ministry of Industry and Information Technology's Guidance Concerning Promoting the Informatization of Logistics Work," (工业和信息化部关于推进物流信息化工作的指导意见) Ministry of Industry and Information Technology (工业和信息化部), modified January 9, 2013, http://www.miit.gov.cn/n11293472/n11295327/n11297127/15121041.html .cited by

[14] See China Academy of Information and Communications Technology, Cloud Computing White Paper (2012) [Chinese] at http://www.caict.ac.cn/kxyj/qwfb/bps/201512/t20151211_2146678.htm or http://www.caict.ac.cn/kxyj/qwfb/bps/201512/P020151211378881360681.pdf

As some commentators observed, it seems that China largely hews to the NIST definition of cloud computing, but excludes some key concepts of NIST's definition. Most notably, it appears not to embrace the idea of providing 'on-demand self service' – a core characteristic of cloud computing under the NIST definition.[15] However, in 2016, the CAICT further developed its definition of cloud computing in its *Security Guide for Cloud Computing Services* (2016) as follows:[16]

"Cloud computing is a model that provides computing resource services through the network, through which customers, on a dynamic and self-service basis, receive and manage the computing resources provided by the cloud service providers according to their needs. Computing resources include servers, operating systems, networks, software, and storage devices."

It is clear that by including the wordings of 'dynamic and self-service basis' and 'according to their needs', China's definition is now very similar to that of the NIST in the US.

Furthermore, based on the nature of services provided, cloud computing is generally categorized into three service modes: Software as a Service (SaaS), Platform as a Service (PaaS), and Infrastructure as a Service (IaaS).[17] Put simply, SaaS means the provision of software by the cloud service to the user, which allows users from different locations to use it without actually installing the software on their devices. Users can simply interact with the software through an Internet browser. Some typical examples of SaaS include Microsoft Office 365 and Google Mail. PaaS means the provision of a platform for software developers, including webservers, development tools and operating systems.[18] For example, the new release of IBM Blockchain, which enables developers to quickly build and host security-rich production blockchain networks on the IBM Cloud, fits well in the definition of PaaS. [19] IaaS means the provision of third-party server space for users to process or store files. This means that users do not need to buy or build their own data centre or server any more. For example, Dropbox provides its users with an online storage space hosted on Dropbox accessible anywhere via the Internet,[20] which enables its users to store files on remote cloud servers and have the ability to share files within a synchronized format. Different cloud computing service models may attract different legal risks and tax implications.[21]

Although the forms of cloud computing services can be different, CC technology does share common features. First, computational resources under CC technology are 'elastic'. They can be shared by many simultaneous remote users, and can be scaled up or down with demand.[22] This may significantly reduce the operational costs and increase the ease of service providers and users. Second, CC technology is 'borderless' in nature. It permits data transmissions that

[15] Leigh Ann Ragland and et al, 'Red Cloud Rising', above n 11, 9.
[16] See CAICT, Cloud Security Guide (2016) (云计算安全指南 2016) cited by Samuel Yang, 'Regulation of cloud computing in China' in Practical Law in China, at < https://uk.practicallaw.thomsonreuters.com/w-007-4744?originationContext=document&transitionType=DocumentItem&contextData=(sc.Default)&firstPage=true&bhcp=1> at 1.
[17] Christian Solmecke, The legal aspects of cloud computing under copyright law (13 September 2013) Wilde Beuger Solmecke <http://www.wbs-law.de/eng/the-legal-aspects-of-cloud-computing-under-copyright-law-45886/ > accessed 13 April 2014.
[18] Yang, above n 16, 2.
[19] See IBM Launches Industry's Most Secure Enterprise-Ready Blockchain Services for Hyperledger Fabric v 1.0 on IBM Cloud (20 Mar 2017) IBM <https://www-03.ibm.com/press/us/en/pressrelease/51840.wss >
[20] For more information, see Cory Janssen, Dropbox, techopedia <http://www.techopedia.com/definition/26850/dropbox>.
[21] More details will be discussed in Part III and Part IV of this article.
[22] NR Herbst et al, 'Elasticity in Cloud Computing: What It Is, and What It Is Not.' (2013) ICAC, 23-27.

span the globe. Data processing activities shift from country-to-country depending on load capacity, time of day, and a variety of other factors. These decisions are sometimes 'made in real time and by machines rather than humans'.[23] As a result, cloud users, and even cloud service providers, may not be able to tell the true location of physical infrastructure as well as the true location of the processed data.[24] These have arguably increased the 'unpredictability' of data control and the uncertainty of legal compliance, particularly the enforcement of transfer pricing laws.

B. Transfer Pricing and Arm's Length Principle

Transfer Pricing concerns 'the prices charged between associated enterprises established in different tax jurisdictions for their intercompany transactions'.[25] The mismatch of the rate of income tax in different countries is a key reason and driving force for multi-national enterprises (MNEs) [26] to pursue a planning strategy in order to allocate its resources and assets in the most tax efficient manner. Although tax planning itself is not illegal per se, artificially shifting profits from a high-tax country to a low-tax country may not only reduce a country's essential tax revenues, but also may undermine the legitimacy and credibility of the country's tax system, and discourage compliance among all taxpayers.[27]

The tax laws in many countries, including the OECD Transfer Pricing Guidelines, explicitly provide that the "Arm's Length" principle (ALP) should be used to establish the price of transactions between associated enterprises,[28] that is, the price of the associated enterprises should be the same as the price for unrelated enterprises. [29] The rationale behind this is, when two unrelated enterprises trade with each other, a 'market' price (or 'arm's length' price) for their transactions will generally apply. Multi-national Enterprises, which have moved their operations to the cloud, arguably need to follow the arm's length principle also, when conducting any intra-group transactions. However, the traditional tax systems, including Transfer Pricing rules, were established on the basis of physical transactions and trade. As such, cloud computing has arguably brought challenges for both MNEs and tax authorities to comply and apply the existing tax laws against illegitimate transfer pricing activities.

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[23] Paul M. Schwartz, 'EU Privacy and the Cloud: Consent and Jurisdiction Under the Proposed Regulation' (2013) 12 BNA Privacy and Security L. Rep. 718, 718

[24] Although traditional Internet technology already allows cross-border data transactions, in these transactions, data owners and processors at least know where the data is stored (location of data centre) and where the data will be sent to (destination of data).

[25] See Asia Briefing Publications, Transfer Pricing in China, 2nd Edition, (Springer, 2011) at 3.

[26] A multinational enterprise (MNE) is a company that is part of a "MNE Group." An MNE Group consists of related corporations or similar entities operating in more than one country. Organisation for Economic Co-operation & Development Transfer Pricing Guidelines for Multinational Enterprises and Tax Administrations (2001) [hereinafter OECD Guidelines] cited by Manish Jain, 'Transfer Pricing Issues in Intangibles (Intellectual Property): An Analysis of Problems and Possible Solutions' (2014) 1 RGNUL Student Law Review 10, 12.

[27] See, OECD, Developing Capacity in BEPS and Transfer Pricing at https://www.oecd.org/tax/tax-global/developing-capacity-in-beps-and-transfer-pricing.pdf , at 2 (Stated: 'When transfer pricing is used by multinational enterprises to artificially shift profit out of a country, it, first and foremost, denies the country of essential tax revenues. But it can also have much wider implications: tax avoidance by high profile corporate taxpayers will be perceived as "unfair" by citizens, and may undermine the legitimacy and credibility of the tax system, thus discouraging compliance among all taxpayers.)

[28] See OECD Transfer Pricing Guidelines 2010 and 2016.

[29] Arm's-Length Principle (17 August 2017) USTransferPricing.com <http://www.ustransferpricing.com/arms_length_principle.html> (stated: 'The "arm's-length principle" of Transfer Pricing states that the amount charged by one related party to another for a given product must be the same as if the parties were not related'). See also IRS, LB&I International Practice Service Transaction Unit, Other Transfer Pricing Issues – Section 482 Fundamentals (9 March 2014) Internal Revenue Service, Department of Treasury <https://www.irs.gov/pub/int_practice_units/ISI9422_09_06.PDF>.

III. Impacts of Cloud Computing on Transfer Pricing

A. Major Forms of Cloud-related Transfer Pricing Strategies

The alleged tax evasion, or according to accountants of MNEs, the efficient tax management and planning, may be undertaken by the MNEs in various ways in the new cloud environment. First, Cloud Service Provider Relocation is a typical transfer pricing strategy for MNEs. In the current cloud-computing environment, traditional IP ownership transfer business model has been replaced by a new cloud service business model. As Professor Mazure pointed out, a 'plausible, and arguably more likely, characterization' is that 'cloud-based transactions are classified as the provision of services rather the provision of IP'. As introduced above, SaaS, IaaS and PaaS are all provided to clients as cloud computing 'services'. Instead of focusing on IP ownership transfer, the key transfer pricing strategy now focuses more on how to relocate affiliated Cloud Service Providers from a high tax jurisdiction to a low tax jurisdiction. The application of cloud computing technology enables a MNE group to relocate the CSP to a low-tax jurisdiction more easily.30 With current CC technology, the MNE's IT infrastructure, such as servers, data centers, and other facilities, can be located almost anywhere without affecting the quality of their business operations.[31] In relation to a potential breach of Transfer Pricing rules, a key concern could be the fee of the subject cloud service. Tax authorities may raise dispute in relation to the 'reasonable' service fee in line with the Arm's Length principle.

Second, cloud service agreements are another important transfer pricing strategy for MNEs. Due to the implications of the Arm's Length Principle, the pricing of cloud service fees between related enterprises cannot be too high.[32] As introduced above, the tax laws in many countries require that the transfer pricing arrangements between related enterprises comply with the Arm's Length principle, that is, the price of the associated parties should be the same as the price for the non-related party. [33] One way for MNEs to justify their low pricing for cloud services is to sign a cloud service agreement between affiliated enterprises, which not only covers the basic cloud service (rights to use online software), but also covers other related technical services (such as software maintenance and management). Using Adobe Photoshop as an example, Adobe has successfully transited from the traditional 'Licensed Software Model' to the current 'SaaS Subscription Model'. In addition to using its main website to provide cloud-based Photoshop software services to its subscribers (basic cloud service), it provides registered Adobe members with access to all of Adobe's photography, design, video, and web apps on all their desktop and mobile devices (other related technical services).[34]

Third, Cost Sharing Arrangement/Agreement (CSA) is also an important strategy for cloud-related Transfer Pricing by MNEs. In a CSA, related enterprises agree upon how the research and development costs for creating intangible assets (such as cloud-based software or cloud service platform) are to be allocated between them.[35] For example, although a high-tax affiliate (e.g. affiliated research and development center in Australia) may have economically contributed to generate such an income by developing or funding the development of the subject

[30] Ibid 670.
[31] Mazur, above n **Error! Bookmark not defined.**, 671.
[32] Artificially high cloud service fee from a high tax affiliate to a low tax affiliate could arguably reduce the tax burden of the high tax affiliate, and increase the global revenue of the MNE as a whole.
[33] Arm's-Length Principle, above n 29; IRS, LB&I International Practice Service Transaction Unit, above n 29.
[34] Ibid
[35] Jain, above n 26, 12.

intangible (e.g. cloud-based software), the low-tax affiliate (e.g. affiliated CSP company, which is in charge of cloud-related infrastructure maintenance and updates as well as cloud client management) may be treated as the affiliate that generates the majority of the income. The overall global tax liability of the MNE group will be decreased accordingly. [36]

B. Challenges for Applying Transfer Pricing Rules to Cloud-Related Transactions

As introduced above, the key for the transfer pricing rule enforcement is the application of the Arm's Length Principle (ALP). The key for the application of the ALP is to 'accurately value' the relevant cloud-related transactions.[37] However, it has not been an easy job for tax authorities to assess the true value of any intangible-related transactions, including cloud-transactions.[38]

First, there is a lack of comparables for transfer pricing analysis.[39] As Herve and Ham observed, given the *uniqueness* of intellectual property, the potentially comparable uncontrolled transactions are 'in fact effectively not comparable.'[40] It is same in the cloud environment. Each cloud computing related product and/or service often has its own unique feature, and it is hard to find appropriate comparables. This is particular true for developing countries. In the *United Nations Practical Manual on Transfer Pricing for Developing Countries Pricing for Developing Countries (the Manual)*, which was first issued in 2013, the State Administration Of Taxation (SAT) of China highlighted the challenges for identification and valuation of intangibles that developing countries have to face.[41] It pointed out that unlike developed countries, which usually have a much larger number of public companies (e.g. Google, Amazon and IBM are all MNEs founded in the US), developing countries usually only have a small number of public companies, and information on domestic private companies is lacking or inadequate. This directly limits the availability of public information on 'domestic companies' (potential 'domestic comparables'), which can be used for transfer pricing analysis.[42]

Second, there is a lack of a good understanding of the operation of MNE's business structure and global value chain as a whole. In practice, intangibles are often transferred in combination with tangible assets or associate services.[43] Buyers may want to acquire a product (product package) that relies on a combination of intangibles and other associated services, such as a combination of software patent, IT infrastructure and technical support services.[44] For example, when buyers purchase Adobe's cloud-based Photoshop software, the product package they acquire not only includes a license to use the Photoshop software online, but also includes

[36] Ibid.
[37] See Part II of this article.
[38] Jain, above n 26, 14-15. IP valuation represents an important reason for various disputes between the MNEs and tax authorities.
[39] See also OECD, The Platform for Collaboration on Tax delivers a toolkit to help developing countries address the lack of comparables for transfer pricing analyses and better understand mineral product pricing practices, (June 22, 2017) at http://www.oecd.org/tax/pct-delivers-toolkit-to-help-developing-countries-address-lack-of-comparables-for-transfer-pricing-analyses.htm
[40] See Herve & Ham, 'Germany: Hypothetical arm's-length testing and intellectual property' in International Tax Review (27 June 2012) (see the 'Application of the hypothetical arm's-tenth test' session]
[41] Department of Economic & Social Affairs, United Nations Practical Manual on Transfer Pricing for Developing Countries (2013) UN Doc ST/ESA/347 <http://www.un.org/esa/ffd/documents/UN_Manual_TransferPricing.pdf>, 374-87 [10.3].
[42] Ibid 375 [10.3.2.2]
[43] Such a combination is also known as 'embedded intangibles'. See Richard L. Doernberg, 'Taxation Silos: Embedded Intangibles and Embedded Services Under U.S. Law' (2006) 41 Tax Notes International 561 cited by Jain, above n 26, 15.
[44] See above Part III.B.3 of the article.

associated services on software updates and cloud platform maintenance. [45] Thus, it is not always easy to identify an accurate 'separate' value for the subject intangible asset (e.g. the value of the cloud-based Photoshop software in the subject transaction). The situation becomes even more complicated when a cloud-related 'product package' is provided by related enterprises located in different tax jurisdictions. Because the parent companies or service centres of most of MNEs are located overseas, the local taxpayers (domestic enterprises) can often only provide information in relation to their own operations rather than provide 'an overall understanding of the entire intra-group services structure'.[46] In the other words, even if a local taxpayer intends to fully cooperate with the tax authority, it may not be able to provide all the information that the tax authority needs.

Third, there is a lack of information on intangible transactions in financial statements. Generally speaking, the traditional model of financial reporting is not able to provide relevant information about a company's intangible assets.[47] Intangibles other than patents are particularly difficult to detect because they are not usually reported in MENs' financial statements.[48] More specifically, most royalties, licenses, and management fees in relation to intangibles (including IP and cloud-related services introduced above) are intra-group payments flowing from foreign affiliate(s) of a MNE group to the parent company of the MNE group.[49] Therefore, they are generally not recorded or disclosed in a MNE Group's financial statements or its footnotes.[50] It is therefore very hard for tax authorities to find the pricing information in relation to comparables of relevant intangibles.[51] In order to explore possible solutions for these challenges, this article next follows up with the recent development of transfer pricing rules in China, particularly the implementation of the recommendations of the OECD's *BEPS Action Plan* in China.

III. Legal Solutions: Implementation of the OECD BEPS Action Plan & Its Implications to Cloud-related Enterprises in China

A. Recent Development of Transfer Pricing Rules in China – Overview

In China, the fundamental rules in relation to transfer pricing can found under the *Enterprise Income Tax Law* and its *Implementation Rules* (EIT Law) promulgated by the National People's Congress and the State Council in 2007. Moreover, the SAT issued the *SAT Circular on Implementation Measures for Special Tax Adjustments (Trial Implementation),* Guoshuifa

[45] See Adobe Creative Cloud website, above n **Error! Bookmark not defined.**; In addition to basic software service, a registered Adobe member also has full access to all of Adobe's photography, design, video, and web apps.
[46] See State Administration of Taxation, above n **Error! Bookmark not defined.**, 5.
[47] See also Jovan Krstić and Milica Đorđević, 'Financial Reporting on Intangible Assets – Scope and Limitations' (2010) 7(3) Series: Economics and Organization 335, 336 (stated: 'Lack of relevant information on intangible assets (intellectual capital and the like) in the financial statements disables the possibility for external users to perceive real value of the company and adequate decision making.')
[48] Jain, above n 26, 15 See also Lorraine Eden et al., 'The Production, Transfer, and Spillover of Technology: Comparing Large and Small Multinationals as Technology Producers' in (1999) Zoltan J. Acs & Bernard Yeung (eds), Small and Medium Sized Enterprises in the Global Economy 121, 122 (stated: 'More than seventy-five percent of all private R&D expenditures worldwide are accounted for by MNEs. Most royalties, licenses, and management fees are intra-firm payments flowing from foreign affiliate MNEs to the parent corporation MNE').
[49] Eden et al., above n 48.
[50] See Jain, above n 26, 16. (stated: 'IP generally does not appear on an MNE Group's balance sheet unless acquired through a purchase, in which case the IP appears only as "goodwill because the accounting standards in most countries allow internally-generated IP to be expensed rather than capitalized as investments. IP is generally not recorded or disclosed in an MNE Group's financial statements or its footnotes.')
[51] See also Krstić & Đorđević, above n 47, 335. (stated: 'Lack of relevant information on intangible assets (intellectual capital and the like) in the financial statements disables the possibility for external users to perceive real value of the company and adequate decision making.')

[2009] No. 2 (*Circular 2*) on 8 January 2009, which sets out more detailed transfer pricing rules.[52] The *Circular 2* has marked 'a significant step up' in China's transfer pricing enforcement regime.[53] Although China is not an OECD member, the transfer pricing regime in China is generally consistent with the *Organisation for Economic Co-operation and Development (OECD) Transfer Pricing Guidelines.* It was also found that the Chinese tax authorities have made reference to certain principles under the *OECD Transfer Pricing Guidelines* in an increasing number of TP investigations in recent years.[54]

China certainly is one of the early movers for implementing the recommendations in the *OECD BEPS Action Plan* into its domestic tax laws. Building on its existing anti-avoidance rules, China has been aggressively introducing new laws to implement the recommendations of the OECD and G20 *BEPS Action Plan*.[55] Following the G20 Hangzhou Submit in 2016, China's SAT has released three new regulations (Public Notice 42 and 64 in 2016 and Public Notice 6 in 2017) on special tax adjustments, and made the regulatory framework for transfer pricing in China 'spread across a number of regulations'.[56] By adopting the recommendations of the OECD's BEPS Action Plans, these regulations arguably have significant impacts on the landscape of the Chinese transfer pricing laws as well significant implications for cloud-related transfer pricing arrangements by MNEs.

B. Major Changes and Implications

1. Public Notice 42 [2016]- Three-Tier Transfer Pricing Documentations Scheme

The Public Notice Regarding Refining the Reporting of Related-Party Transactions and Administration of Transfer Pricing Documentation (SAT Public Notice [2016] No. 42, hereinafter referred to as *"Public Notice 42")*[57] was enacted in 2016 to replace and modernize the current documentation regulations as prescribed under *Circular 2* (2009) and *Annual Reporting Forms for Related-Party Dealings of Enterprises of the People's Republic of China* (Guo Shui Fa [2008] No. 114).[58] *Public Notice 42* has been considered as 'the first of a series of regulations to localize OECD/G20 BEPS Project recommendations in China'.[59] Unlike Circular 2 (2009), which covered various aspects of special tax adjustments comprehensively,

[52] See Li, J. Tax Transplants and Local Culture: A Comparative Study of the Chinese and Canadian GAAR. Theoretical Inquiries in Law, (2010). 11(2)
[53] See PWC, International Transfer Pricing (2013) http://www.pwc.com/gx/en/international-transfer-pricing/assets/china.pdf at 329
[54] Raymond Wong and Tony Dong, 'Overview of Transfer Pricing in Hong Kong and China, (KWM.com, November 26, 2015)' at http://www.kwm.com/en/knowledge/insights/overview-of-transfer-pricing-in-hk-and-china-20151126 at 6.
[55] PWC, 'Roundup of Australia's BEPS developments' in TaxTalk—Insights Global Tax (12 April 2017) PWC <https://www.pwc.com.au/tax/taxtalk/assets/alerts/taxtalk-roundup-of-australia-beps-developments-april-2017.pdf >, 1.
[56] Deloitte, 'China's SAT issues new rules to improve administration of special tax investigations and Mutual Agreement Procedures', Global Transfer Pricing Alert 2017-012 at https://www2.deloitte.com/content/dam/Deloitte/global/Documents/Tax/dttl-tax-global-transfer-pricing-alert-17-012-6-april-2017.pdf
[57] For the full text in Chinese, see 《国家税务总局关于完善关联申报和同期资料管理有关事项的公告》 http://www.tax.sh.gov.cn/pub/xxgk/zcfg/ssxd/201607/t20160713_425681.html
[58] Public Notice will take into effect from 2016, and the applicable sections in the old regulations (Chapters 2 and 3, and Articles 74 and 89 of Circular 2 (2009); and Circular Guoshuifa [2008] No. 114) will be repealed. See also PWC, 'SAT issues new China transfer pricing compliance requirements' Tax Insights from Transfer Pricing (July 27, 2016) at http://www.pwc.com/gx/en/tax/newsletters/pricing-knowledge-network/assets/pwc-TP-China-SAT-issues-TP-compliance-requirements.pdf at 1. The Public Notice 42 provides new transfer pricing compliance requirements in China, including annual reporting forms for related-party transactions (RPT Forms), Country-by-Country (CbC) Reporting, and Transfer Pricing Documentation (TPD), all of which are substantial changes to the existing rules.
[59] See China Transfer Pricing Developments: Announcement 42 and New Circular 2 (Discussion Draft) at https://www.kpmg-institutes.com/institutes/taxwatch/events/2016/08/us-china-transfer-pricing-announcement-42.html

Public Notice 42 only focuses on the reporting of related-party transactions and contemporaneous documentation.[60] It formally adopts the 'three-tiered' transfer pricing documentation approach under the BEPS Action 13.[61] MNEs meeting specific reporting criteria must prepare (1) the master file, (2) the local file, and/or (3) the country-by-country (CbC) report under the new 'three-tiered' documentation regime in China now.[62]

Moreover, the *Public Notice 42* obligates MNEs to disclose more information in relation to intangible-related transactions and transfer pricing arrangements. Article 12 explicitly requires that any enterprise that meets the criteria[63] for preparing a 'Master File' needs to provide 'an overview of the global business operations of the MNE group to which the ultimate holding company belongs'.[64] The *Public Notice 42* even has a specific session particularly focusing on intangibles. Art 12.3 explicitly requires MNE disclosure of the following intangible-related information in Master File, including (1) a general description of the MNE's overall strategy for the development, ownership and exploitation of intangibles; (2) a list of intangibles or groups of intangibles of the MNE group that are important for transfer pricing purposes and which entities own them; (3) a list of important agreements entered between constituent entities and their related parties related to intangibles; (4) a description of the groups' transfer pricing policies related to research and development and intangibles; and a description of any important transfers of interests in intangibles among related parties during the fiscal year concerned.

It is clear that through these provisions, the Public Notice 42 not only requires MNEs to disclose their overall strategies for commercializing intangibles and transfer pricing polices, but also obligate them to provide specific intragroup agreements in relation to intangible-related transactions, as well as disclose their business intention of each major transaction in relation to intangibles. These detailed information requirements would arguably significantly facilitate the transfer pricing analysis of tax authorities both within and outside the cloud environment. Furthermore, given the borderless nature of cloud computing service, incorporating the OECD's country-by-country reporting (CBCR) requirement into domestic laws would arguably contribute to international enforcement of transfer pricing rules also.

2. Public Notice 64 [2016] – Advance Pricing Arrangements & Value Chain Analysis

Right after the Public Notice 42 on reporting related party transactions and contemporaneous documentation on 11 October 2016, the SAT issued new regulations *Public Notice 64 [2016]* to improve the administration of *Advance Pricing Arrangements* (APAs) in line with OECD's Action 14 of the BEPS Project.[65] It has been released as the second significant revision to the

[60] A discussion draft revision to Circular 2 (Draft Circular 2) was published on September 17, 2015, for public consultation. For the full text of the draft in Chinese, see http://hd.chinatax.gov.cn/hudong/noticedetail.do?noticeid=577376 ; see also https://www2.deloitte.com/content/dam/Deloitte/global/Documents/Tax/dttl-tax-global-transfer-pricing-alert-16-026-14-july-2016.pdf (Many observers believed that a series of additional regulations will be issued to complete the revision of Circular 2)

[61] OECD, Action 13.

[62] The latter report must be submitted as a part of the related party transaction forms filed with the annual corporate tax return.

[63] Article 12 of Public Notice 42. (i) The enterprise that has conducted cross-border related party transactions during the tax year concerned, and the MNE group to which the ultimate holding company that consolidates the enterprise belongs, has prepared a master file. (ii) The annual total amount of the enterprise's related party transactions exceeds 1 billion RMB.

[64] Article 12 of Public Notice 42.

[65] Eunice Kuo and et al, 'SAT Issued New Rules to Improve Administration of Advance Pricing Arrangements' in Tax Analysis Issue P248/2016 (18 October 2016) Deloitte at https://www2.deloitte.com/content/dam/Deloitte/cn/Documents/tax/ta-2016/deloitte-cn-tax-tap2482016-en-161018.pdf

relevant chapters of Circular 2 [2009].[66] The *Public Notice 64* has taken effect since 1 December 2016 to replace the applicable sections concerning APAs in old regulations, such as Chapter 6 of *Circular 2*.

APA is an effective method to resolve tax disputes in advance and improve taxation certainty. Bilateral or multilateral APAs can resolve in advance tax disputes amongst different tax jurisdictions, and effectively avoid double taxation or no taxation. [67] Public Notice 64 provides the process and requirements for an enterprise to apply for an APA[68] as well as specific criteria for an APA application to be prioritised or declined. Put simply, it made two important changes.

First, an enterprise intending to apply for an APA must clear the pre-filing, analysis, and evaluation stages, and obtain approvals from tax authorities before it can submit the letter of intent and formal application, respectively.[69] In other words, the new rules have moved the analysis and evaluation stage before the formal application stage. Moreover, the new rules require enterprises to agree to negotiate with the SAT and adjust their proposed transfer pricing methods (to the most appropriate method) when it is necessary during the analysis and evaluation stage, or their APA applications may be declined.[70] As some commentators observed, these arguably strengthen the tax authorities' control over the APA process, and 'set higher standards on the enterprise's compliance, cooperation, and information disclosure during the APA application process'.[71]

Second, Public Notice 64 has updated the requirements on analysis to be included in an APA application package,[72] notably to include analysis on *location-specific advantages* (LSAs), such as location savings, market premiums, and the value chain analysis[73] or supply chain analysis. This revision arguably has significant implications on MNEs, particularly cloud-related MNEs. As introduced above, the cloud computing services are borderless in nature. On the one hand, an affiliated enterprise (CSP) can provide cloud service to related enterprises (cloud users) across different tax jurisdictions. On the other hand, the establishment of cloud-service platform or the research and development (R&D) of a specific cloud-related products/services may involve the effects of the developers from affiliated companies in different countries. Many IT giants, such as Microsoft, have R&D centres in various countries (such as the US, China and India), and these centres may work together on the same project in turn, and contribute to the value of the final intelligible products created together. Moreover, the specific location where

Full Text of Public Notice 64 [in Chinese] 国家税务总局公告 2016 年第 64 号《关于完善预约定价安排管理有关事项的公告》(以下简称"64 号公告") http://www.chinatax.gov.cn/n810341/n810755/c2292979/content.html

[66] Eunice Kuo and et al, 'SAT Issued New Rules to Improve Administration of Advance Pricing Arrangements' in Tax Analysis Issue P248/2016 (18 October 2016) Deloitte at https://www2.deloitte.com/content/dam/Deloitte/cn/Documents/tax/ta-2016/deloitte-cn-tax-tap2482016-en-161018.pdf

[67] Eunice Kuo and et al, 'SAT Issued New Rules to Improve Administration of Advance Pricing Arrangements' in Tax Analysis Issue P248/2016 (18 October 2016) Deloitte at https://www2.deloitte.com/content/dam/Deloitte/cn/Documents/tax/ta-2016/deloitte-cn-tax-tap2482016-en-161018.pdf

[68] According to Public Notice 64, the negotiation, signing and implementation process of an APA involve six stages: 1) the pre-filing meeting, 2) letter of intent, 3) analysis and evaluation, 4) formal application, 5) negotiation and signing, and 6) execution and monitoring. See https://www.pwccn.com/en/china-tax-news/chinatax-news-oct2016-29.pdf

[69] See Article of the Public Notice 64; see also [Another] http://www.pwc.com/gx/en/tax/newsletters/international-tax-services/assets/pwc-international-tax-news-december-2016.pdf ;

[70] Article 6 (3) and Article 8(2) of the Public Notice 64 provide the specific circumstances in which an APA may be declined.

[71] https://www.pwccn.com/en/china-tax-news/chinatax-news-oct2016-29.pdf (further states: 'This change may have limited impact on unilateral APA applications. For bilateral or multilateral APA applications, however, the impact may be more significant, as changes to an enterprise's applications in China will affect its related parties' application in other countries.')

[72] See Article 6 of the Public Notice 64.

[73] Article 6(2) (vii) of the Public Notice 64. See Article 6(2)(vii) 价值链或者供应链分析，以及对成本节约、市场溢价等地域特殊优势的考虑；

the exploitation of the intangibles takes place is not easily identified either. For example, the locations for manufacturing, marketing, and distributing iPhone are not same. Although the R&D of a new iPhone may happen in the US, most iPhones are manufactured in China, but they are marketed and distributed globally. It is not fair to simply credit tax benefits to any single tax jurisdiction. Therefore, the inclusion of location-specific advantages and value chain analysis would arguably place more obligations for MNEs to provide accurate global value chain information, and would facilitate transfer-pricing assessment by SAT.

In fact, the *Public Notice 42* (introduced above) has also affirmed a value chain analysis approach. Article 14.3.2 of the Public Notice 42 explicitly requires taxpayers to include 'value chain analysis' into the transfer pricing documentation. It requires the taxpayers who meet the criteria for 'Master File' to disclose information in relation to 'value chain analysis', including: (1) Flows of business, goods and materials, and capitals within the group; (2) Annual financial statements of each of the aforementioned parties for the immediately preceding fiscal year; (3) Measurement and attribution of value creation contributed by location specific factors; (4) Allocation policies and actual allocation results of the group's profits in the *global value chain.* However, Public Notice 42 has not provided a clear explanation on the basic procedures for implementing this approach to transfer pricing analysis. Public Notice 64 has now arguably fit in the procedure gap in a timely manner.

3. Public Notice 6 [2017] – Profit Split Method

On 17 March 2017, the SAT issued new regulations *Public Notice 6 [2017]* to improve the administration of *"Special Tax Investigation Adjustments and Mutual Agreement Procedures.*"[74] The *Public Notice 6* largely completes the revision of the transfer pricing-specific clauses under the *Circular 2*, and adds to the transfer pricing framework set out in the previously issued Public Notice 42 and Public Notice 64 (introduced above). The *Public Notice 6* clarified some key transfer pricing issues, as well as the methodology and procedures for special tax audits and adjustments by incorporating some important recommendations arising from the *OECD's BEPS Actions 8-10 and Action 14*. It put more emphasis on a risk-oriented tax administration system, and more diverse transfer pricing methods. More importantly, in addition to five traditional transfer pricing method under the Circular 2[75] and the OECD transfer pricing guidelines,[76] *Public Notice 6 [2017]* permits 'other' asset valuation methods that comply with the Arm's Length principle (such as cost method, such as the cost, market),[77] and

[74] The Public Notice of the State Administration of Taxation Regarding the Release of the "Administrative Measures for Special Tax Investigation Adjustments and Mutual Agreement Procedures" (SAT Public Notice [2017] No.6, hereinafter referred to as the "Public Notice 6"). The STA Public Notice No.6 was issued by the State Administration of Taxation (SAT) in March 2017 .https://www.pwc.com/gx/en/tax/newsletters/pricing-knowledge-network/assets/pwc-tp-china-sat-spec-tax-adj-map.pdf ; see full text in Chinese http://www.chinatax.gov.cn/n810341/n810755/c2538695/content.html

[75] Generally speaking, there are five world recognized pricing methods to calculate the arm's length price: Comparable Controlled Price (CUP), Resale Price Method (RPM), Cost Plus (C+, CP) and Profit Based Methods, including Profit comparison methods (TTNMM/CPM), and Profit-split methods (PSM) . See Elizabeth Shi, China's New Transfer Pricing Regulations, (ECOVIS Beijing, 15 November 2016) at http://www.ecovis-beijing.com/en/blog-en/articles/762-china-s-new-transfer-pricing-regulations .

[76] In this regards, the OECD Transfer Pricing Guidelines set forth five specific methods to be used to determine whether the conditions of controlled transactions are in line with the arm's length principle: (1) the comparable uncontrolled price method (CUP method), (2) the resale price method, and (3) the cost-plus method; (4) the transactional net margin method (TNMM) and (5) the transactional profit split method. These five methods represent the 'international consensus' on the manner of applying the arm's length principle. Centre for Tax and Policy Administration, Transfer Pricing Method (July 2010) OECD <http://www.oecd.org/ctp/transfer-pricing/45765701.pdf>, 2.

[77] See Article 22 of 第二十二条 其他符合独立交易原则的方法包括成本法、市场法和收益法等资产评估方法，以及其他能够反映利润与经济活动发生地和价值创造地相匹配原则的方法。

allows the tax authorities to apply any other methods that could 'align profit with economic activity and the creation of value'.[78]

This is clearly in line with the OECD's recent position on transfer pricing. The *OECD BEPS Action Plan* obligates member countries to adopt 'a coordinated and compressive manner' to address aggressive international tax planning, and to provide countries with 'instruments that will better align rights to tax with economic activities'.[79] In other words, through the *Public Notice 6* [2017], China has reaffirmed the adoption of a very important OECD principle for international tax jurisdiction justification, that is, '*profits are taxed where the economic activities generating the profits'*. [80] This principle arguably sets up a foundation for the SAT to conduct Transfer Pricing analyses within and outside the cloud environment.

Moreover, in line with the recent position of the OECD,[81] the Public Notice 6 also reaffirmed the importance of the '*profit split method' (by introducing detailed provisions on the implementation of the profit split method– Article 21), and* asserts that it is feasible to use the 'value chain analysis' and 'transactional *profit split method*' to determine the arm's length price,[82] particularly in situations where both parties make unique and valuable contributions to the transaction.[83] It contends that the profit split methods may be viewed as a means of achieving "*a closer alignment between profits and value creation*." [84] Article 21 further provides some profit-splitting factors, which show a strong correlation with value creation (such as value contribution related incomes, cost, expense, capital, and employee number), to facilitate the implementation of the profits split method to determine the arm's length price.[85]

In the cloud-computing context, the adoption of the profit split method would arguably increase the SAT's ability to prevent a MNE from engaging in tax planning that results in BEPS. When a *profit split method* is used, a taxpayer is obliged to prove that its 'allocation of residual profits' is in line with the 'substantive functions' that created the MNE's residual profits. This means that the taxpayer cannot allocate a significant portion of its profits to a low-tax affiliate if the affiliate provides non-routine services and owns the non-routine intangibles. For example, if a

[78] https://www2.deloitte.com/content/dam/Deloitte/global/Documents/Tax/dttl-tax-global-transfer-pricing-alert-17-012-6-april-2017.pdf

[79] Organization for Economic Cooperation & Development, Action Plan on Base Erosion and Profit Shifting (hereinafter OECD BEPS Action Plan) (2013) 10, 11 <http://www.oecd.org/ctp/BEPSActionPlan.pdf>; See also Mazur, above, 646.

[80] Mazur, above n **Error! Bookmark not defined.**, 679. See also OECD, Aligning Transfer Pricing Outcomes with Value Creation, , 20-21 ('Functional Analysis' section).

[81] In relation to the proper Transfer Pricing methods for determining Arm's Length price, the OECD's Report Action 1 on Tax Challenges of the Digital Economy asserts that the 'profit split method' may be more reliable than traditional one-sided methods in certain circumstances, particularly where the features of the transaction makes the application of other Transfer Pricing methodologies problematic. See OECD, Action 1 on Tax Challenges of the Digital Economy -2015 Final Report (2015), 92. See also OECD, Aligning Transfer Pricing Outcomes with Value Creation, above n 55 ('Scope of Work for Guideline on the Transactional Profit Split Method' session stated: '… the consultation process confirmed the transactional profit splits can offer a useful method which has the potential when properly applied, to align profits with value creation in accordance with the arm's length principle and the most appropriate method, particularly in situations where the features of the transaction makes the application of other transfer pricing methodologies problematic'). See also Ibid 57-8

[82] Article 21 of the Public Notice 6.

[83] See Article 21 of the Public Notice 6. See also OECD, Aligning Transfer Pricing Outcomes with Value Creation, above n **Error! Bookmark not defined.**, 57.

[84] Ibid 55 (stated 'Action 10 of the BEPS Action Plan invites clarification of the application of Transfer Pricing methods, in particular the transactional profit split method, in the context of global value chain'); See also Christiana HJI Panayi, Advanced Issues in International and European Tax Law (Hart Publishing, 2015) 121-9 (stated 'It was conceded in the Profit Split Discussion Draft that transactional Profit split methods may be viewed as a mean of achieving closer alignment between profits and value creation')

[85] Article 21 --当难以获取可比交易信息但能合理确定合并利润时，可以结合实际情况考虑与价值贡献相关的收入、成本、费用、资产、雇员人数等因素，分析关联交易各方对价值做出的贡献，将利润在各方之间进行分配。

cloud service provider (CSP) cannot explain how its tax haven's activity has functionally contributed to the creation of residual profits (e.g. the CSP company registered in the tax haven did not have any substantive business functions there), it would receive a zero allocation. [86] The Public Notice 6 has arguably increased the burden of proof of MNEs in justifying its cloud-related transfer pricing arrangements.

C. Remarks and Limits

In summary, Public Notice 42, Public Notice 64 and Public Notice 6 clearly show that the SAT is paying attention to technical positions regarding intangible assets, related-party services, and value chain analyses. They also show that the SAT is paying more attention to related-party transactions and transfer pricing policies of Chinese-headquartered MNEs. [87] As some commentators observed, China has 'a clear focus on identifying transactions where the Chinese company has not been adequately remunerated for its contribution to value creation, intangible development, or service provisions'. [88]

Under the current cloud environment, it is not an easy task for tax authority to understand the operation of a multi-national group's global valuation chain, and to accurately locate the value drivers. A successful application of the 'profit split method' for the arm's length pricing assessment arguably requires full cooperation of a MNE group (as a whole) rather than a cooperation of a taxpayer (the MNE's affiliated company) within a single tax jurisdiction. It is clear that the SAT has made remarkable progresses in implementing the recommendations under the *OECD BEPS Action Plan* to reform the existing Chinese tax standards to address BEPS, including cloud-related BEPS, and contributing to restore the balance and fairness of an international taxation regime. Through detailed provisions, three Public Notices have arguably strengthened the investigation and enforcement power of the SAT combating against BEPS, and have helped to at least minimize some of the current transfer pricing strategies for artificially shifting profits related to intangibles. Nevertheless, instead of offering a complete alterative solution, to a large extent, the *SAT* continues to rely on the long-standing Arm's Length principle. As a result, some inherent problems/challenges for tax authorities to implement the Arm's Length principle remain unchanged, such as (1) the difficulty of identifying appropriate comparables, (3) the difficulty in understanding the operation of MNE's business structure and global value chain, and (2) the lack of information on MNE's transactions on intangibles. These arguably limit the effects of the Chinese new transfer pricing rules in minimizing BEPS both within and outside of the cloud context. In addition to legal solutions, this article next examines the recent developments in blockchain technology and explores the possible technical solutions for addressing transfer pricing challenges in and outside cloud environment.

IV. Technical Solutions – Blockchain as a Supplementary Solution

A. Blockchain or Distributed Ledger Technology: Key Features

[86] See Wells & Lowell, above note **Error! Bookmark not defined.**.
[87] See https://www2.deloitte.com/content/dam/Deloitte/global/Documents/Tax/dttl-tax-global-transfer-pricing-alert-17-012-6-april-2017.pdf
[88] See https://www2.deloitte.com/content/dam/Deloitte/global/Documents/Tax/dttl-tax-global-transfer-pricing-alert-17-012-6-april-2017.pdf

Blockchain is not bitcoin, but is a platform on which the bitcoin (or other cryptocurrencies) network and other applications run. Blockchain is a 'decentralised ledger, or list, of all transactions across a peer-to-peer network'.[89] A ledger is a book in which transactions are recorded by the company. However, blockchain is not just a financial ledger but a multipurpose ledger which may record operational, financial, qualitative or quantitative aspects of particular transactions or arrangements.[90] In plain language, Blockchain or Distributed Ledger Technology (DLT) is 'a ledger distributed or shared over computers of several parties who might be participants of particular transactions or arrangements'.[91] These parties may become blockchain participants, which share a common ledger. Each participant in blockchain may be able to broadcast and record the attributes of a particular transaction on the ledger.

When a transaction is recorded, the transaction is recorded with a timestamp in the distributed ledger simultaneously across several computers which may belong to blockchain participants. Once the transaction is recorded on a blockchain, it is not reversible. In other words, a transaction on a blockchain is permanent in nature. It is technically impossible to change a recorded transaction on blockchains. As blockchains are spread over several computers of blockchain or DLT participants on the Internet, a single system crash or failure will not result in a loss of transaction records. Baş and Gündüz made a fine summary of Blockchain's core attributes, which gives it significant potential for use in tax, as follows: (1) *Transparency*: blockchain provides provenance, traceability and transparency of transactions; (2) *Control*: access to permissioned networks is restricted to identified users; (3) *Security*: the digital ledger cannot be altered or tampered with once the data has been entered. Fraud is less likely and easier to spot; (4) *Real-time information:* when information is updated, it's updated for everyone in the network at the same time.[92] It is clear that the application of blockchain may significantly improve the transparency of supply chains and ensure robust internal controls of MNEs.

Further, blockchains can be programmed with business logic to validate only certain types of transactions and automate such transactions, when conditions are met (that is, 'smart contracts'). Similarly, the payments for transactions can be automated under the same business logic (in the case that the programmed conditions are satisfied, which is also known as 'smart payments'). The ability of blockchains to execute smart contracts and automate smart payments could be a major application for MNE groups in their cross-border transfer pricing activities.

B. Application of Blockchain Technology to Multinational Transfer Pricing

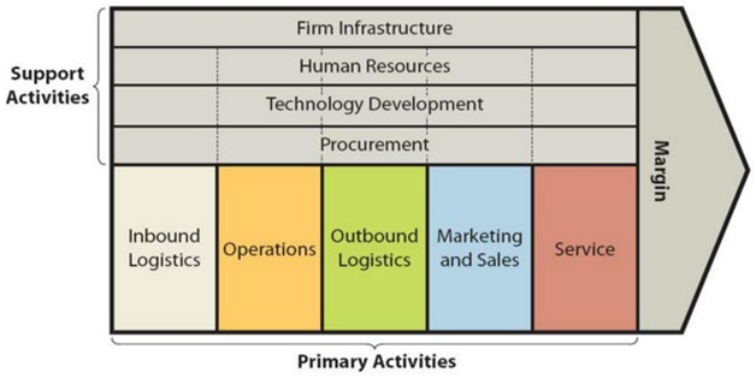
In a recent study, Wagh provides some fine suggestions in relation to how blockchains may contribute in combatting Multinational Transfer Pricing.[93] Put simply, it mainly includes two aspects: (1) facilitating MNE's compliance with transfer pricing rules; and (2) facilitating tax authorities' enforcement of transfer pricing rules. This article next examines how these may affect transfer pricing on the cloud-related transactions.

First, blockchain or DLT technology may facilitate the MNEs' compliance of transfer pricing rules, particularly, the Arm's Length principle. More specifically, for transfer pricing purposes,

[89] https://www.pwccn.com/en/industries/financial-services/publications/qa-what-is-blockchain.html
[90] [Wagh, 2017]
[91] [Wagh, 2017]
[92] Baş and Gündüz, 'How blockchain technology could improve the tax system', PWC at https://www.pwc.com.tr/en/sektorler/teknoloji/yayinlar/blockchain-teknolojisi-vergi-sistemini-nasil-gelistirebilir.html
[93] [Wagh]

all subject transactions happen between associated enterprises in a MNE group. Therefore, the DLT can be used to facilitate relevant transactions will be private DLT or Blockchain. The ledger will be a closed shared ledger, which may only be shared with the DLT participants who are the parties of relevant intra-group arrangements or transactions (security feature of blockchain).[94] Blockchain or DLT can be used as a sound platform when the supply chain participants in respect of a particular end product or service consist only of associated enterprises (no external enterprises involved). For example, where an entire supply/value chain of a product or service consists of associated enterprises, all such associated enterprises[95] would be the participants or nodes of a private blockchain.

Supply/value-chain analysis is 'an analytical framework that assists in identifying business activities that can create value and competitive advantage to the business'.[96] Porter and Millar provide a 'framework for analysing the strategic significance of the new information technology on how the companies operate internally as well as the relationship among companies and their suppliers, customers and rivals'. [97]



Using a cloud-based software as an example, in line with the Porter's framework, the associated enterprises on the value chain may include: infrastructure service providers (IaaS), procurement service providers, technology developers (e.g. programmer and software developers), logistics support service providers, marketing service providers, and distributor and post-sale service providers in relation to the end cloud-based software product or service. The application of blockchains will ensure that each movement of products or services across the entire supply chain is tracked, and the entire journey of the product or service through the supply chain life cycle is broadcasted and recorded on the 'distributed ledger', which is accessible to all blockchain/DLT parties (associated enterprises) in the cloud-base software supply chain of the MNE group.[98] Such a 'distributed ledger' will be highly effective for a MNE group to control inter-company transfer pricing because the MNE group is in position to program certain 'business logic' in the blockchain in advance, and can ensure that transfer pricing policy and

[94] For business confidentiality purpose, a MNE group will normally adopt a private blockchain rather than an open public Blockchain network (in which the common ledger can be accessible to general public, including the parties not related to the subject transactions or arrangement)
[95] (i.e. entities of group across the world are raw material procurement service provider, logistics support service provider, contract manufacturer, distributor etc. in relation to single product/service),
[96] See also John Dudovskiy, Microsoft Value-Chain Analysis (11 May 2017) Research Methodology at http://research-methodology.net/microsoft-value-chain-analysis-2-2/
[97] See Pasi Tyrväinen, A Reference Model for Software Business Activities, at http://users.jyu.fi/~pttyrvai/papers/RMSBA.pdf, 4.
[98] In addition to improving operational efficiency and supply/value chain transparency
[99] Sagar Wagh

terms and conditions of the intragroup transactions is properly programmed for the blockchain.[99]

More specifically, the 'smart contract' function of blockchains (as introduced above) allows the blockchain to operate on a 'if – then' condition, that is, a contract between related enterprises will be executed only if the 'if - then' condition is satisfied. Further, 'smart payment' application of blockchains (as introduced above) ensures that the payments will be processed automatically on the blockchain 'only if' the transaction is recorded as per the pre-determined transfer pricing policy.

For example, when developing a cloud-based software, Company A (a software developer) may require the use of a software development platform (PaaS) and network infrastructure services (IaaS), which enable 1 million online software users to use Company A's software, from Company B (the cloud service provider). The smart contract function of blockchains will ensure that the contract will be executed 'only if' Company B is able to broadcast that Company B has the capacity to provide the PaaS and IaaS which can support 1 million online software users. Further, assuming that the MNE group's transfer pricing policy requires that Company B has to charge its users 'cost plus 15 per cent' on the service it provided, Company B will have to raise the invoice for its user (i.e. Company A) providing details of its costs and associated mark-up which is consistent with the requirements of the transfer pricing policy. The smart payment function of blockchains will ensure that the payment can be automatically released from Company A to Company B, only if the invoice and relevant details broadcasted on the distributed ledger meet the MNE's transfer pricing policy.

In summary, the blockchain technology, particularly the applications of smart contracts and smart payments, may help the MNE group to directly monitor and control their inter-company transactions in the entire value chain worldwide.

Second, blockchains can facilitate tax authorities' enforcement of the transfer pricing rule. This can be achieved when the DLT would have reached maturity stage, and tax authorities have been given access to distributed ledger records to audit the transactions. As introduced above, so long as tax authorities can obtain the access to the distributed ledger in the MNE's blockchain, they can certainly take advantages of the core features of blockchain technology, such as Transparency, Control, Security and Real-time information (as introduced above). The improved transparency of the supply chain (through the application of blockchain) would arguably significantly improve the capability of tax authorities in conduction transfer pricing analysis, particularly in the applications of the value chain analysis, and the Profit Split Method (introduced above).

C. Comments and Remarks

It is clear that the application of blockchain technology may help both tax authorities and headquarters (HQ) of MNEs to centrally have a complete picture and control of all the intra-group transactions, and to implement the transfer pricing rules. However, as Wagh pointed out, most of these suggestions are based on the assumption of the 'maturity' of blockchains, and the

recommendations on the involvement of tax authorities in the MNE Group's blockchain DLT is even turning more towards 'super futurism'.[100] For example, in order to add tax authorities as one of DLT participants of the distributed ledger of a MNE group to conduct real time transfer pricing audit of inter-company transactions, the revision of relevant transfer pricing regulations as well as creation of necessary governmental infrastructure of blockchain may be required.

Nevertheless, blockchain, as one of most promising technologies, is developing at a rapid pace. Some blockchain related transfer pricing solutions may become reality in the near future, particularly in China. As many commentators observed, China is emerging as 'a key nation for blockchain technology and has the potential to become its largest market'.[101] Based on the data provided by the Australian Trade and Investment Commission, in 2016, the total amount of digital payments in China has reached $5.5 trillion, which is 50 times that of the USA.[102] Chinese technology companies, financial institutions, government and companies across a wide spectrum of industries are exploring blockchain solutions as part of the Internet of Things (IoT) and as a driver of innovative economy. China is 'setting the pace in global blockchain development' with blockchain technology emerging as a potential disruptive force'. [103] Therefore, the new technical solutions, such as blockchain solutions, are very possible to succeed in China first.

V. Conclusion

This article examined the major forms of cloud-transfer pricing activities by MNEs, and the main challenges for implementing transfer pricing rules in the cloud environment. It then explored the progress in the implementations of the *OECD BEPS Action Plan* in China, in particular, the recent development of the Chinese transfer pricing regulations, such as Public Notice 42, Public Notice 64, and Public Notice 6. It also examined the implications of these new transfer pricing rules to the cloud-related MNEs operating in China. Both advantages and limits were examined. In addition to legal solutions, it explored the possibility to apply the new blockchain technology to address the cloud-related transfer pricing problems by MNEs.

The author contends that the blockchain may serve as an important supplementary solution for current legal solutions to combat against increased complicated transfer pricing activities by MNEs in and outside of the cloud environment. Given the rapid progress of blockchain and cloud technology in China, these new blockchain solutions for transfer pricing may first succeed in China. It contends that it is imperative to make legal solutions and technical solutions work collectively to address the transfer-pricing problem in the ever-changing cloud computing and digital economy environment.

[100] Sagar Wagh
[101] http://www.steptoe.com/blockchain
[102] See https://www.austrade.gov.au/EventViewBookingDetails.aspx?Bck=Y&EventID=25047&m=0|0#/event?_k=lrbuv2
[103] Ibid.

Research on the Replacement Business Tax with Value-Added Tax of Chinese Banking Industry

Zhaohui LONG, Mengwei CAI, Ke ZHANG

Abstract: As the heart of China's financial system, the banking industry plays an important role in the nation's economic development. Under Chinese current financial tax system, the main taxes levied to Banks are business tax (BT) and income tax. Shouldering heavy tax burden and being taxed repeatedly, such policies on the Chinese banking industry undermines the integrity of Value-Added Tax (VAT) chain, contrary to the international guiding rule that the financial industry should be lighter taxed. The defect of Chinese financial tax system makes the phenomenon that the capital accumulation rate is lower than business expansion rate. As a result, Chinese banking industry lack a foundation for further development and international competitiveness. This paper, using developed countries' successful experiences in financial tax system for reference, in combination with China's practices, proposes to include the banks into the levying scale of VAT, handling local and central income distribution properly to consummate Chinese financial tax system reform in replacing the business tax with VAT gradually.

Keywords: The Chinese Banking Industry; Business Tax; Value-Added Tax; Tax Reform

I. Introduction

On August 1, 2013, the tax reform to replace the business tax with VAT is extended from the pilot regions to other parts of the country. Though the finance industry is not included in the levying scale of VAT, it is imperative to incorporate the industry in the future to consummate tax reform. Commercial banks, the core component of the financial industry, remain subject to BT at the present time. The tax reform to replace BT with VAT has a far-reaching impacts on commercial banks, such as their tax burden, operating costs, net profit, risk- hedging ability.

In today's global economy, Chinese commercial banks face both opportunities and challenges. As Chinese financial industry is gradually opening up, foreign banks enter continuously into China's domestic market to generate fiercer competition everyday. On the one hand, Chinese commercial banks need to attract more clients and improve competitive ability by innovating products, improving the quality of services and perfecting management mechanisms. On the other hand, they also need a favorable and healthy taxation environment. In accordance with most of the relevant researches, the heavy tax burden of Chinese banks is which not only hamper their development, but also impairs the healthy development of the financial market and national economy. In this paper, we will discuss why we should incorporate the banks into the levying scale of VAT in tax reform, with a focus on commercial banks.

II. Literature Review

2.1 Research on the tax burden of the banking industry

The study of LI Gengyin and ZHANG Zongyong (2005) suggests that the tax burden of Chinese banks is excessive, having a detrimental effect on commercial banks' operating performance. Thus, reducing the burden of taxation could improve performance efficiency and increase the competitiveness of commercial banks.

YANG Jingzhong (2007) points out issues such as an unreasonable business tax basis, unfair tax burden and the high actual tax burden of the Chinese financial tax system. Following an analysis into the experience and operation of OECD countries, he encouraged the establishment of an united income tax system, simplifying the tax system for banks, and improving and unifying regulations for deduction before tax.

The research of ZHANG Jianhua and XIONG Lu (2010) revealed that the taxation upon the banking industry has continued to grow rapidly in recent years and the tax burden of Chinese banks is still heavy despite the drop in its overall actual tax burden rate. Thus, the tax system of Chinese banking industry suffers from dilemmas and problems which undermine the sustained its development, sorely in need of reform.

Starting with uncertainty and information asymmetry, QIN Kai (2012) thoroughly analyzed the internal mechanisms of risk control among the banking industry, the government, and taxation departments. He puts forward opinions about how to use tax policies to lower the financial risk of banks, and that excessively heavy tax burden imposes risks to banking.

2.2 Research on the impact of tax reformation in replacing business tax by value-added tax on commercial banks

The study of ZHANG Furong (2007) suggests that it is necessary to increase tax support for banking innovation and improve the regulation of taxation management, but the decision between reducing the tax burden by lowering business tax rates or covering the financial industry with value-added taxation requires further consideration.

YANG Moru (2010) argues that the design of foreign value-added tax system for the financial industry should serve as references to commence value - added tax reform for the financial industry.

The research of CUI Jun (2013) suggests that since the input tax on the software and hardware purchases of the banking industry could not be credited against the output tax, and that interbank borrowing could not be deducted, the problem of double taxation becomes severe. The reform to replace the business tax with a value-added tax in banking industry could avoid repeated levies and reduce the burden of taxation on commercial banks.

On the other hand, XIONG Rong (2003) has proposed more than a decade ago that adjusting the levying coverage of value-added tax on a large scale would lead to a sharp decline of business tax income and impair the benefits of local government.

III. History of the Chinese Banking Industry Development and Taxation System

3.1 Development History of the Chinese Banking Industry

The bank is a core financial institution, whose origin can be traced back to ancient Babylon. However, it is generally acknowledged that the early bud of banking emerged in Renaissance Italy, and modern banking began in 1694 when the Bank of England was founded.

The first bank in China was the Oriental Bank Corporation set up by the British in 1845. In 1897, the first Chinese-owned bank, Commercial Bank of China, started its operation. During 1977-1986, China's banking system recovered and reconstructed, basically forming a banking system with the central bank as the center, and the four state-owned specialized banks as the backbone. The Chinese Economic Reform provided the impetus for banking reform and development. In 1987, People's Bank of China proposed to establish a socialist financial system with the central bank as the leadership, various banks as the main body, and a variety of financial institutions coexisting and dividing the work; since then China's banking industry began nuanced and extended reform. After the establishment of the Third Plenary Session of the Fourteenth Central Committee proposed policy banks in 1994, policy banks like China Development Bank, Export-Import Bank of China and Agricultural Development provided the gradual transition from specialized state banks to commercial banks. Meanwhile, the joint-stock banks team also began to grow. Examples include Bank of Communications, CITIC Industrial Bank, China Merchants Bank, China Ever bright Bank, Shenzhen Development Bank (now known as Ping An Bank), Fujian Industrial Bank, Guangdong Development Bank, Pudong Development Bank, Hua Xia Bank, Minsheng Bank etc. being established. In 1995, the People's Bank of China set up 16 urban cooperative banks. In the same year, China's first city commercial bank was established in Shenzhen. China's banking industry began to manifest diversely, transparency, and with constant improvement. In 2001, China joined the World Trade

Organization (WTO), thereby reducing restrictions on foreign banks, and allowed them to gradually enjoy the same treatment as Chinese banks.

Table 1: Introduction of the establishment of China's commercial banks

Bank Name	Year Founded	Bank Type	Notes
Agricultural Bank of China	1979	State-owned Commercial Banks	Listed state-owned commercial banks
Bank of China	1979	State-owned Commercial Banks	Listed state-owned commercial banks
China Construction Bank	1979	State-owned Commercial Banks	Listed state-owned commercial banks
Industrial and Commercial Bank of China	1984	State-owned Commercial Banks	Listed state-owned commercial banks
Bank of Communications	1986	Joint-stock commercial banks	China's first joint-stock banks
China Merchants Bank	1986	Joint-stock commercial banks	First created by corporate shares
CITIC Bank	1987	Joint-stock commercial banks	SOE background
Ping An Bank (Shenzhen Development)	1987	Joint-stock commercial banks	The first public offering of shares and listing
Industrial Bank	1988	Joint-stock commercial banks	Fujian Provincial Government Holdings
Guangdong Development Bank	1988	Joint-stock commercial banks	Guangdong Provincial Holdings
China Everbright Bank	1992	Joint-stock commercial banks	SOE background
Pudong Development Bank	1992	Joint-stock commercial banks	Shanghai Municipal Government Holdings
Huaxia Bank	1992	Joint-stock commercial banks	SOE background
Minsheng Bank	1996	Joint-stock commercial banks	First private enterprise owned
City commercial banks	Since 1995	Joint-stock commercial banks	Shenzhen Commercial Bank for the first

Source: Compilation from the official website of major banks and other public market data

3.2 Tax System of the Chinese Banking Industry

3.2.1 Evolution of the tax system

In the early years of the People's Republic of China, China's banking was consolidated under the "unification" policy. Subsequently in 1950, the Central People's Government Administration Council issued the "National Tax Implementation Guideline", which stipulated that taxation for the banking industry mainly consisted of sales tax, income tax and stamp duty. The business tax rate was 4%, and the income tax rate was the full progressive tax rate from 5% to 30%.

In 1958, influenced by the "left-leaning" guiding ideology and the former economic theory and taxation theory of the Soviet Union, China reformed its tax system. That year, "People's Republic of China Industrial and Commercial Consolidated Tax Ordinance (draft)" was issued, which exempted state-owned banks from taxation. During the Cultural Revolution, China's banking sector lost its integrity and independence. The People's Bank of China was incorporated into the Ministry of Finance, and the tax system was heavily criticized. In 1973, China conducted a large-scale tax reform again, where the re-issued "People's Republic of China Industrial and Commercial Tax Ordinance (draft)" reinstated state-owned bank exemption from taxation.

After the reforms in 1978, the management mechanism as well as taxation of banking in China were adjusted drastically, where sales tax, income tax and stamp duty resumed, alongside taxation of the financial sector being repeatedly modified. In 1994, China's fiscal and financial system reformed again. After these multiple reforms, tax on banking mainly included: Business tax, corporate income tax, stamp duty, urban maintenance and construction tax, vehicle use tax, land use tax, property tax, excise tax, land tax, securities transaction tax and additional tax education etc.. Among them, there was a 55% corporate income tax on commercial banks, which was higher than corporate income tax rate of 33% on other domestic industries, in comparison to the business tax rate of 5%. Sales tax and corporate income tax accounted for about 90% of total bank taxes. In 1997, China raised income tax rate on commercial banks to 33%, the business tax rate was increased to 8%. Since 2001, the state has decided the business tax rate would be reduced to 5% within a three year period. In 2008, after the "tax integration", bank's income tax rate decreased from 33% to 25%.

3.2.2 The current tax policy and tax burden

China's current bank tax system are sales tax and income tax based, where business tax, which is paid centrally by the Bank Head Office, who is levied and managed by the State Administration of Taxation. The income tax revenue is placed under the central government. The remaining part of sales tax paid by the banks is managed by the local tax bureau, and the income tax revenue is placed under the local government and then shared with the central government. According to statistics, in 2013, the sales tax revenue alone of listed commercial banks amounted to RMB 187.693 billion, accounting for 11.91% of the national sales tax class income that year.

According to China's tax law, the tax basis of banking business tax constitues the taxable services turnover which taxpayers achieved. Taxable operation revenue is as shown in Equation I, where according to the nature and form of business income, determining taxable banking turnover can be divided into three types: the first is the total income for the taxable turnover, such as general loan business, financial brokerage business and other financial services; the

second is the spread income, where the taxable turnover equals the balance of interest income minus interest expense, such as foreign exchange lending business; the third is the price-difference income for the taxable turnover, such as financial goods for sale business. Unified business tax rate is 5%. Banking income tax rate is 25%, and its taxable income is as shown in Equation II.

Equation I:

Taxable revenues = loan interest income + foreign currency lending spreads + fee income + Net foreign exchange transfers and other financial products such as securities

Equation II:

Taxable income = gross profit - to make up for losses in previous years - Treasuries exempt interest income + interest expenses exceed the specified + funding exceeding specified for employee education and welfare + exceeds the extraction of allowance for doubtful accounts + prescribed proportion of business promotion expenses and entertainment expenses exceed specified amounts+ philanthropic donations exceed specified amounts + illegal business accruments, fines and penalties for late fees + various taxes, fines and penalties + the sponsorship spending etc.

In addition, urban construction tax and education surcharge within banking is based on the size of business tax, so it should be treated as business-tax-related. By referencing the financial data of the 16 listed banks, we calculated the business tax, additional tax burden and the income tax burden. As Table 2 shows, in 2013, the business income of 16 listed banks is in total RMB2,911.782 billion, paying sales tax and surcharges in a total of RMB187.693 billion, accounting for revenue proportion of 6.45%. Among them, the highest tax rate is Ever Bright Bank at 8.59%, and the lowest is the Bank of China at 5.88% . Therefore, the actual tax burden of banking business tax exceeds its nominal tax of 5.5%. Judging from the burden of income tax in 2013, the 16 listed banks paid income tax in total RMB352.424 billion, thus accounting for 12.1% of revenue. Among them, Shanghai Pudong Development Bank's holds the highest tax rate of 15.11%, the lowest rate was Ping An Bank at 9.21%. The income tax burden of commercial banks far exceeds the 2.5% tax burden corresponding to 10% profit margin the tax administration-approved.

The heavy tax burden has had major consequences in the accumulation of bank capital, causing the mismatch between bank capital expansion and the rapid growth of banking services, thus exacerbating the shortage of capital adequacy ratio in Chinese banks, and leading to a reduced ability of risk aversion and their lack of international competitiveness.

Table 2: Cases of 16 listed banks tax in 2013

Serial number	Bank Name	Operating income (100 million yuan)	Business tax and surcharges (100 million yuan)	Business tax burden ratio	Income tax (100 million yuan)	Income tax ratio
1	Ping An Bank	521.89	40.65	7.79%	48.09	9.21%
2	Bank of Ningbo	127.61	7.71	6.04%	14.41	11.29%

3	Shanghai Pudong Development Bank	1,000.15	68.13	6.81%	151.17	15.11%
4	Huaxia Bank	452.19	32.46	7.18%	51.76	11.45%
5	Minsheng Bank	1,158.86	80.04	6.91%	138.69	11.97%
6	China Merchants Bank	1,326.04	85.79	6.47%	166.83	12.58%
7	Bank of Nanjing	104.78	8.40	8.02%	12.07	11.52%
8	Industrial Bank	1,092.87	78.31	7.17%	127.50	11.67%
9	Bank of Beijing	306.65	22.19	7.24%	33.56	10.94%
10	Agricultural Bank of China	4,626.25	272.26	5.89%	477.19	10.31%
11	Bank of Communications	1,644.35	119.49	7.27%	174.48	10.61%
12	ICBC	5,896.37	374.41	6.35%	755.70	12.82%
13	Everbright Bank	653.06	56.07	8.59%	76.67	11.74%
14	China Construction Bank	5,086.08	316.48	6.22%	677.44	13.32%
15	Bank of China	4,075.08	239.65	5.88%	490.36	12.03%
16	CITIC Bank	1,045.58	74.88	7.16%	128.32	12.27%
-	Total	29,117.82	1,876.93	6.45%	3524.24	12.10%

IV. Problems of the Current Business Tax System implemented on the Chinese Banking Industry

4.1 Heavier Tax Burden Compared with Other Domestic Industries

China's current business tax system uses different proportions in different tax rates based on industry and categories. The categories of construction, postal services and telecommunications, culture and sports are at the proportional tax rate of 3%, plus 7% for the city maintenance & construction tax and 3% for the education surcharge, thus their overall nominal tax rate of 3.3%. The financial and insurance industry is applicable to the proportional tax rate of 5%, and its overall nominal tax rate is 5.5%. In other words, the overall nominal tax rate of banking industry exceeds the construction industry, post and telecommunications, culture and sports by a proportion of 66.7%.

The reason for the high-tax rate of 5% for the banking sector is that the banking industry is a highly profitable monopoly industry, and requires adjustment by high tax burden. Although the banking sector do profit extensively due to their monopoly, it should be noted that a considerable part of the high profits present in the banking industry is brought by its rapid expansion and increase in the number of outlets in recent years. Currently, the central

government has decided to break the bank monopoly, which means that the climate of monopoly that have ensured banks achieve high profits will change.

On the other hand, the regulatory requirements of China's commercial banks' capital adequacy ratio has raised, and it requires a larger amount of additional capital to cover the risk generated by the high profits of the banking sector. The capital gains rate is lowered by high-tax constraints, and it is not conducive to capital accumulation to raise their capital adequacy ratio and thus results in the risk of inadequate coverage. Thus there poses a greater risk in the process of large-scale expansion. Compared with other industries, the higher tax reduces the banking operation incomes, which impairs the capital accumulation and expansion of small and medium scale commercial banks. It is also not conducive to undermine and break up the big banks' oligopoly.

From the design of the taxes, business tax belongs to turnover tax and has distorting effects. Excessive tax burden is not conducive to the development of financial markets. Monopoly profits should be constrained by breaking the monopoly and market profits should be adjusted by income tax.

4.2 Heavier Tax Burden and Lack of International Competitiveness Compared with Foreign Banks

According to the tax law, the business tax policy to domestic banks and foreign banks is consistent. The general lending is of full taxation on its interest income, the taxation on the foreign exchange lending business is levied from the loan interest income minus the loan interest payments, and a tax on the transfer of financial products business is based on the post income. However, since there are significant differences in the revenue structure, domestic banks are loaded with a heavier tax burden than foreign banks on business tax.

Sources of income of domestic banks are mainly loan interest income, accounting for nearly 90% of its revenue, especially prevalent in state-owned commercial banks as their intermediate business income accounts for only about 5% of its total revenue. Foreign bank loans are mainly foreign currency lending business, and intermediate business income generally accounts for about 50% of total revenue. Therefore, nearly 90% of the income in domestic banks is liable for business tax, while nearly half of the income of foreign banks pays only the difference, resulting in a heavier tax burden for domestic banks than foreign banks under the same operating income. In addition, according to Chinese tax law, foreign banks are exempt from China's current urban construction tax and education surcharge, while domestic banks must pay.

Currently, the scope of business for foreign banks is limited within China's domestic territory, and due to the advantages of RMB business, domestic banks are still able to maintain a strong competitive edge. But with the deregulation of foreign banks, domestic banks will be at a disadvantage in competition with foreign banks because of their heavier tax burden. Western countries have generally adopted a lower tax rate on the banking sector to support the development of the financial sector and consequently improve their banking sector's overseas expansion and international competitiveness. In contrast, the high tax burden on China's banking sector restricts its financial innovation and development, resulting in lack of competitiveness in the international arena.

In addition, due to the inability of Chinese business tax to materialize export reimbursement, domestic banks' foreign business cannot truly be at zero tax rate. Despite few countries collecting business tax on banks, many impose a value added tax and achieve export tax

reimbursement. This places greater tax constraints at the international level for domestic banks, highly detrimental to their overseas business expansion and competitiveness, leading to more obstacles in the competition against foreign financial giants.

4.3 Double taxation that undermines the integrity of the VAT chain

Firstly, the levy scope of VAT and business tax does not overlap in China, as manufacturing and commercial industries belong in VAT and there is business tax on construction and most of the service industry, with typical industrial characteristics. This double taxation leads to the inability to deduct partial VATs when banks purchase goods such as fixed assets or other investment provided by the services that banks provide. Therefore, the banking industry is paying business tax at the same time as carrying the full burden of the VAT when purchasing goods, bearing double taxation.

Secondly, the business tax is a tax included in price and the tax burden can be passed on to final consumers according to tax theory. However, due to the restrictions upon the floating rate of loans and deposits in China (deposit and loan interest rates as well as savings and loan spreads are stringently restricted), passing on the banking sector's tax burden by changing the prices of its services on the market is impossible. This creates a dilemma of taxation upon taxes.

Thirdly, the business tax that producers carry cannot be deducted when they obtain services from the banking sector, resulting in the breaking of producers' VAT deduction chain. In practice, production enterprises also bear the double burden of VAT and business tax. As VAT and business tax are parallel, it is not conducive to the joint development of the banking sector and the manufacturing sector.

The three points above suggest that there is a deviation of banking sector's current tax goal domestically in China compared to the international norm, alongside the breaking of VAT chain. Thus the current tax system creates a higher tax burden on the banking industry, and restricts its vitality, accumulation and scale expansion. It is also not conducive to maintaining the integrity of the VAT chain.

Therefore, the Chinese banking industry should replace business tax with the VAT, covering the banking industry within the VAT.

V. A comparison between the VAT systems of foreign banking industries

Applying VAT for the banking industry is a common international practice. The application can avoid double taxation and keep the VAT deduction chain integrated, promoting industry amalgamation. It realises the advantage of tax excluded in price. Furthermore, it is beneficial for the tax authority to levy in unison and manage effectively.

5.1 Full levying of VAT for the banking industry

The total amount of tax would be levied, covering the entire banking industry in the scope of VAT tax. Israel levied VAT from 1976 to 1979, and levied a full VAT for the banking industry. In practice, it used the direct addition method because of the difficulty of calculating a tax base. That is, adding up the wage, salary and profit to compute the appreciation value, and then multiplying by the applicable tax rate to calculate the tax payable.

This method is similar to business tax. It can expand the tax base, and increase the fiscal revenue. However, it is detrimental to the complete chain of VAT and tax management.

5.2 Selective levying of VAT for the banking industry

The selective levying of VAT for the banking industry is the most mainstream way of implementation. However there are three models of implementation available in practice.

5.2.1 The EU model

Although different countries have slightly different details of VAT for the banking industry, the general ideas are congruous. The core business of the banking industry takes a non-deductible tax exemption policy. The majority of countries that implement a VAT system choose to give tax exemption to the core business of banking, including general interest on loans and other financial services without direct charge. But alongside giving tax exemption to the main business, the input VAT cannot be deducted. So taxation exemption does not mean untaxed, and it is distinct from a zero tax rate. Some countries such as Germany give financial institutions the right to determine whether these businesses enjoy the duty-free policy or pay taxes in accordance with a standardised criteria.

Banking subsidiary businesses are levied VAT in accordance with a standardised criterion. Those applicable to a banking subsidiary business includes fee and commission income. The VAT rates are different in EU countries contingent to individual situation. The zero-tax rate of VAT is carried out for exports in financial service. With the rapid development of economic and financial globalization, finance as the core of modern economy has increasingly strengthened its prominent position and cannot be replaced, which makes developed financial activities an important symbol of economic power. Therefore, EU countries mostly implement the zero-tax rate policy to domestic export-oriented financial services, in order to lower the transaction costs and to gain more global market share. Because the zero-tax rate policy is more concessional than tax exemption, which applies a simultaneous exemption from VAT for export-oriented financial services, it is allowed to deduct the all input VAT included in products purchased (including fixed asset). This is called deductible tax exemption in short. This way, the cost of the export-oriented financial services can be reduced, boosting competitiveness and promoteing the country's financial sector expansion overseas.

5.2.2 The New Zealand model

The New Zealand model is also termed a zero-tax rate model. All banking is brought into the system of value-added tax, but all intermediary and indirect charge of financial services of banking implement the zero-tax rate policy. And the services of direct charge are levied VAT according to the stipulation. In this way, compared to the EU model, all the input VAT can be deducted. This tax system can lower much more tax burden than the EU model. However, it introduces the problem of different service transfer between direct fee and indirect fee.

5.2.3 The Australia – Singapore model

The Australia – Singapore's model is also called the input tax of fixed percentage deduction, which is similar to the EU model. The core business of banking is exempted from taxes, but deduction of input VAT adopts the way that brings compromise between the EU model and the New Zealand model. That is to say, it sets a fix rate to deduct the input VAT of Duty-free

service in banking. Australia sets a 25%deduction of input VAT for banking duty-free service. And the deducted rate in Singapore is determined every year with fluctuation.

Although the developed western countries have adopted three different models on levying VAT for banking, they have all uniformly covered the whole banking industry by the scope of VAT. The practice keeps the integrity of the VAT deduction chain, and lowers tax burden to encourage the development of the banking industry through tax relief. This is the the mainstream international practice and thought for taxing the banking industry.

VI. "Replace BT with VAT" for Chinese commercial banks: Accounting and Impact

China is currently promoting the "replace BT with VAT" tax reform nationwide, where the changes in the tax rate is the addition of two tranches rates of 11% and 6% to the current tax rate of 17% and 13%. Transportation tax which is applicable to a rate of 11%. Other sectors of the modern service industry which includes research and technical services, cultural entrepreneurial services, consulting services and others are applicable to the tax rate of 6%, tangible personal property leasing services is applicable for rate of 17%. The taxation method is divided into general and simple methods. The tax rate for the banking industry after " replace BT with VAT " is still undergoing further design.

6.1 Accounting for "Replace BT with VAT" tax reform

After the business tax reforms to VAT, the tax burden of the banking industry will see differences. Among them, for deposit and lending business, business tax on total interest income will be replaced by VAT levied on net interest income; for intermediate business income and other revenue, they will also change to be levied VAT on its net income. Different levying models is bound to affect the actual calculations of tax burden, due to limiting conditions like how the banking system cannot materialize any deduction when enterprises trade with the banks. In the actual collection process, a number of banks take a simple method of assessment internationally which uses "sales times tax rate" directly, with the following formula:

VAT tax = (net interest income + net income + other business intermediary business net) × levy rate.

Since modern services are applicable to the tax rate of 6%, and as the banking sector belongs to the modern service industry when taking into account its characteristics, we believe that the 6% level of tax is appropriate. According to the bank's currently applicable business tax rate of 5%, plus considerations for the city maintenance and construction tax and education surcharge, the actual tax rate incurred by the banks is 5.6%. On the premise of keeping tax range and tax relief constant, a rough estimate of VAT rates is:

Turnover × 5.6% = [tax sales × r / (1 + r)] × (1+ + city maintenance and construction tax surcharge for education tax rate)

The estimated VAT rate r is 5.26%, close to the modern service tax rate of 6%.

In addition, based on publicly available financial data of the 16 listed banks, we assume that in 2013 the banking officially implemented "Replace BT with VAT ", and use the existing 6%, 11% and 17% tax rate to estimate the impact of "Replace BT with VAT " on banks total profits. Note the calculation results are shown in Table 3. For the 6% VAT tax rate, the total profit of

16 listed banks will increase by RMB15.294 billion; under the 11% tax rate, the total profit will be reduced by RMB128.371 billion; under the rate of 17%, the total profit will be reduced by RMB300.770 billion. These estimates only consider the case of VAT credits under normal circumstances, but cannot take into account the VAT tax incentives rebates, extra credit etc. that commercial banks may enjoy. As is the general case in China, banks tend to be applicable to enjoy some tax benefits, therefore the actual tax situation after the "Replace BT with VAT" policy will more optimistic than the calculation results.

Table 3: 16 listed banks fact after "replace BT with VAT" in 2013, unit: billion

Tax Rate	Net Interest Income Tax	Intermediate Business Net Income Tax	Other Operating Net Income Tax	Total Tax	Impact on Total Profit
6%	134.344	34.196	3.859	172.399	15.294
11%	246.298	62.692	7.074	316.064	-128.371
17%	380.642	96.888	10.933	488.463	-300.77

6.2 Impact of "Replace BT with VAT" tax reform

China's VAT taxpayers are divided into two kinds: one being general taxpayers, and the other being small scale taxpayers. The general taxpayers' tax rate are 17%, 13%, 11% and 6%, and the small-scale taxpayers' tax rate is 3%. Export commodities are applicable to a zero rate. The most important feature of VAT is that in product circulation the tax levied is in a ring of deduction, the tax burden being shared and finally transferred. After concentrating idle funds, commercial banks used them to distribute loans to businesses and people in need, and derive spreads to maintain daily operations. Enterprises obtain funds through issuing of shares and bonds. The current tax policy is taxing interest on loans for business tax. If the switch to VAT is made, every aspect of circulation will be taxed. Then the input tax deduction of commercial bank loan in interest paid to VAT can be carried out, which can reduce the cost of the bank.

In some cases, commercial bank's lending cannot be recovered in time, which will result in carrying a higher amount of income than the actual income. Under sales tax, commercial banks are required to pay sales tax for interest which they have not received, and this income which cannot be provisioned for bad debts preparation or bad debts losses will be taxed with the interest that has been received, increasing the invisible tax burden and risk of banks. Under value-added tax, the input tax cancels against output tax for each link, and banks can reduce unnecessary taxes and risk of loss.

"Replace BT with VAT" will have a huge impact on the reporting of banks. Sales taxes are the tax inclusive price, which means interest on loans are inclusive of taxes, consequently included in the tax basis of the sales tax. What has not been collected is also counted together, leading to a high tax paid. VAT is the tax exclusive price, then the bank's interest income does not include taxes, and VAT is not accounted for in the income statement. In addition, banks issue relevant VAT invoice of interest and fees, which can be used as deductible input VAT to prevent double taxation.

"Replace BT with VAT" will also affect the business decisions of banks. Banks need to raise prices of goods and services in order to pass on the VAT. In today's heated banking competition, this would lead to a reduction in customer base. However, if the prices are lowered the bank's

revenue may not meet the tax, leading to debt. Therefore, this is both a time of trial and opportunity for bank's future in management and product innovation. Every bank should also improve the quality of the management system, and correspond with reduction to management expenditure in improving the efficiency of operation.

VII. Suggestions for Replacing the Business Tax with A Value-added Tax of Chinese Banking Industry

Judging from the current issues in business taxation of the Chinese banking industry such as heavy tax burden, the chain breakage of VAT, and the inability to carry out the export tax, and considering the impacts of replacing the business tax with a value-added tax on the commercial banks, we hold the opinion that Chinese banking industry should be put into the taxation scope of the VAT system, following the mainstream practice that VAT is levied on banking overseas.

Unlike the income structure of the foreign banking industry, Chinese banking derived most of the revenue (reaching 90%) from the general loan interest income with very small proportion of the fees and commissions. If we completely copy praxis of developed countries, exempting the core business from VAT and only levy VAT on the subsidiary business, the VAT fraction will be small, which will make the tax base of VAT much smaller than the business tax model currently, and greatly reduce the tax burden rapidly as well. Because of the sharply reduction in the tax revenue of the banking, fiscal revenue will be significantly influenced in the short term, bringing a new kind of inequality for different industries as a result.

In the long run, Chinese banking should learn from the business method from international banks; great efforts should be made in financial innovation as well as appropriate adjustment of the income structure. Perhaps then through long-term structural adjustments, the mainstream foreign method of levying tax can be adopted. However, within the immediate future, the practical reality of the Chinese banking industry should be considered holistically. Tax reforms should be implemented gradually, allowing the Chinese banking industry to reach international standards step by step.

Firstly, the banking industry should be included in the scope of VAT taxation as soon as possible. The simple collection method can be adopted first, with applying the method for small-scale taxpayers in paying the VAT, a 3% rate of levy collection to banking without deducting the input tax. The export of the banking services is subject to zero rating in the meanwhile may be considered. Compared to the business tax rate of 5%, the simple collecting method of taxing at the rate of 3% will reduce the tax burden on the bank to some extent, and solve the problem of double taxation on VAT and the business tax currently also, while not affecting the fiscal income substantially.

Secondly, after the income structure of the banking industry has adjusted, the simple collection method can be changed in order to make the VAT system of banking internationally compatible. To do this, the core business of banking, for example, the general loan interest income, should be duty-free, but the input tax should not be allowed to be deducted. As for the subsidiary business, like the foreign currency lending, VAT should be levied according to the rules of the general taxpayers, maybe at the rate of 6%, which is the same as modern services. The export of banking services should still be subject to zero rating as before. All of this will further assuage the tax burden of the banking industry, increasing its operation capacity and sharpening the international competitiveness.

Finally, in the process of reforms that brings banking ultimately into the full scope of VAT, the fiscal relationship between the central and the local governments must be well handled to unify financial and operational authorities. In accordance with the current rules of tax allocation, except head offices of the state-owned commercial banks which pay the business tax to the central government, other branches' business tax belongs to the local fiscal revenue. Business tax is the main tax fund of local fiscal revenue, and the bank sector plays an important part in it. In the light of the regulations of the tax distribution system in China, VAT has become a central and local shared tax, with 75% allocated to the central government and 25% for the local district. If the banking industry is required to pay the VAT, local governments will lose important tax fund, consequently intensifying the conflict and disunity between the financial and operational authorities. Therefore, when replacing the business tax with a VAT in the banking industry, under the condition that the overall social tax burden cannot increase, the distribution ratio should be adjusted. A new local tax, such as the property tax, could also be introduced. Moreover, transfer payment from the central to local governments may also serve a similar purpose of reconciliation. By these means, the unification of the financial and operational authorities of the local governments may be guaranteed.

Contributing to the Individual Income Tax Reform Debate in China: Is Family Based Filing of Individual Income Tax Returns a Feasible Solution to the Social Problems Arising from the Increasing Family Income Inequality in China?

Dr Eva HUANG, Xi NAN

Abstract: China's new wave of Individual Income Tax Reform is currently hotly debated. The Finance Minister, Lou Jiwei was reported to say that the relevant government departments in China – the State Council, the Ministry of Finance, and the State Administration of Finance had worked out a reform plan together in 2015. One goal of this plan is to move China's scheduler individual income tax to a global structure, and to put in place policies that contribute to income redistribution that takes into consideration family related expenditure, such as looking after the elderly and childcare.

A review of the literature shows that Chinese scholars and commentators suggest that China could learn directly from the US, adopt their global income tax system and allow family based filing of individual income tax returns. The literature does not provide reasons for this suggestion.

This paper performs a feasibility study to assess whether China could adopt the suggestions proposed by the prevailing literature. The study is performed based on a "revenue neutrality" analysis that compares projected revenue from existing policies, and that collectable if China allows family based individual income tax filing.

Results from a pilot study reports that the projected revenue from allowing family based individual income tax filing would be at a level that is closer to 40% of revenue collectable if China does not allow family based individual income tax filing. This result suggests that policy makers in China need to take careful considerations of costings before proceeding with the reform.

Keywords: Revenue Neutrality; (Family Based) Individual Income Tax; Policy Consideration.

1. Introduction

Individual income tax reform in the People's Republic of China (PRC) has become a key part of the PRC's fiscal policy reform agenda. The PRC's rapid economic growth over the past years has seen the income of urban residents increase sharply.[1] Individual income tax plays an increasingly important role[2] in increasing government revenue and adjusting income distribution. The immaturity of the contemporary individual income tax system in the PRC induced the unjustified wealth redistribution to some extent.[3]

There have been numerous attempts at individual income tax reform; the current round of reform discussions began in 2011, after the tax rate reforms.[4] Recent reform suggestions suggested that the PRC should move from individual filing to family filing of tax returns.[5]

Chinese scholars and commentators[6] suggested that the People's Republic of China (PRC) could learn directly from the US, and adopt their global income tax system and allow family based filing of individual income tax returns. This paper reports a pilot feasibility study that assesses whether it is appropriate for the PRC to adopt family-based filing of individual income tax returns. The study is performed based on a "revenue neutrality" analysis[7] that compares projected revenue from existing policies, and that collectable if the PRC allows family based individual income tax filing.

A pilot study[8] is a small-scale preliminary study conducted before the intended study in order to evaluate the feasibility of the intended study. The reported feasibility study is the pilot study for further research on an individual income tax reform that captures tax filing issues. The design of the feasibility study is a quantitative experiment that has two modules. The first module is a forecast analysis[9] of the total individual income tax revenue based on the existing filing system. The data can be found from the National Bureau of Statistics of the People's Republic of China. Since the prevailing literature[10] proposes that the PRC learns from the US by considering its family based individual income tax filing system, module 2 replicates the US's filing system into the PRC. The second module is the estimation of the net present value of the forecasted total income tax revenue over 10 years under the family filing approach. The module calculates the average family income of a sample of couples matched according to different income earning capabilities. The second model applies the US filing methods to the PRC's current individual income tax system and calculates the national total net present value

[1]Liang Q & Teng J, 'Financial Development and Economic Growth: Evidence from China.' (2006) 17 *China Economic Review* (4) 395-411.
[2]Gouveia M & Strauss RP, 'Effective Federal Individual Income Tax Functions: an Exploratory Empirical Analysis.' (1994) 47 *National Tax Journal* (2) 317-339.
[3]Zhang Y, 'Individual Income Tax Reform and Wealth Redistribution in China.' (2014) 7 *Journal of Politics and Law* (4) 112.
[4]王宝利,《我国个人所得税改革的新阶段》, Wang B, 'The New Stage of the Individual Income Tax Reform in the PRC', (2016) 8 China Business 94-95.
[5]Ibid.
[6] Li H, 'Family or Individual, Choices of Individual Income Tax Unit in China' (2011) 2 Journal of Public Finance Research (5) 31-34.
Zhang Y, 'Individual Income Tax Reform and Wealth Redistribution in China.' (2014) 7 *Journal of Politics and Law* (4) 112.
刘维,《对个人所得税综合计征改革的思考》, Liu W, 'Considerations on Individual Income Tax Reform from Global System Perspective', (2016) 18 *Journal of Economics Sanjiang University* 148-154.
[7]Russell M, *Distributional Equity, Tax Neutrality and Tax Effectiveness: Issues in Tax Reform*, (Canberra: Australian National University, Centre for Research on Federal Financial Relations, 1985), at 28.
[8]Enrick NL, 'A Pilot Study of Income Tax Consciousness' (1963) 16 *National Tax Journal* 169-173.
[9]Xin R & oths, eds, *The China Society Yearbook, Volume 1 (2006): China's Social Development; Analysis and Forecast.* vol. 1, (Boston: BRILL, 2007), at 321.
[10]Above n234.

of individual income tax. The study then compares the revenue gap between the two filing systems.

The quantitative research aims to quantify the magnitude of the revenue gap between module one and two. Finally, whether it is appropriate to adopt family based individual income tax filing is assessed according to the criteria of tax revenue neutrality.[11]

1.1 The Revenue Neutrality Criteria

This pilot study of a feasibility study is based on a "revenue neutrality" analysis. The term "revenue neutrality" describes the situation[12] where the government should still receive the same amount of revenue despite changes in tax laws. In order to maintain the same level of tax revenue, the government may lower taxes for one particular group of people, while increasing taxes for another group. The term "revenue neutral" implies that there is no change in the amount of government revenue as the result of changes in the tax laws.[13]

A tax reform proposal that is revenue neutral will result in neither increases nor decreases in tax revenues compared to the existing tax system. That is, a proposal to increase taxes for one economic group must[14] include a mechanism to decrease tax revenues from another group in order to offset the revenue increase.

The "revenue neutral" concept has been implemented with the aim to improve the efficiency of the American tax system, which was the decisive factor in drafting the *Tax Reform Act*[15] of 1986 in the United States. Provisions estimated to add tax revenue were offset by opposite provisions to reduce revenue, which achieves revenue neutrality of the new bill for generating the same amount of revenue compared with previous law.[16]

The adoption of the value added tax in many European countries and the evidence of the *Tax Reform Act*[17] of 1986 in the US were claimed to be consistent with "revenue neutrality" criteria. The element[18] to achieve the goal of "revenue neutrality" includes lowering certain tax rates, broadening the tax base, closing loopholes and eliminating deductions. After analysing the concept of revenue neutrality, Brennan and Buchanan[19] claimed that the total amount of tax revenue works as the function of the tax base, as a broader tax base means more tax revenue will be collected. The *Tax Reform Act of 1986* contributed to major changes and constructions in the U.S. tax structure and it became effective in 1987. The purpose of the reform act was

[11]Bradford DF, *Taxation, Wealth, and Saving*. (Massachusetts: MIT Press, 2000), at 167.
[12]Mankiw G & oths, 'Optimal Taxation in Theory and Practice', (2009) 23 *Journal of Economic Perspectives* (4) 147-174.
[13]Zhang L, 'Neutrality and Efficiency of Petroleum Revenue Tax: A Theoretical Assessment,' (1997) 107 *The Economic Journal* (443) 1106-1120.
[14]Young L, 'Distributional Neutrality and Optimal Commodity Taxation: Comment,' (1980) 70 *The American Economic Review* (1) 233-236.
[15]Tax Reform Act of 1986.
[16]Atkins C, Tax Reform and Revenue Neutrality: President's Panel Should Avoid the Redistribution of 1986, Online <http://taxfoundation.org/article/tax-reform-and-revenue-neutrality-presidents-panel-should-avoid-redistribution-1986> (30 Jul. 2016).
[17]Above n15.
[18]Gravelle JG. & Kotlikoff LJ, 'Corporate Taxation and the Efficiency Gains of the 1986 Tax Reform Act' (1995) 6 Economic Theory (1) 51-81.
[19]Brennan G & Buchanan JM, The Power to Tax: Analytical Foundations of a Fiscal Constitution, (Sydney: Cambridge University Press, 1980), at 55.

claimed by all parties to create a more efficient[20] tax system with the aim of raising the same amount of revenue, which is considered to be a revenue neutral reform.

Brennan and Buchanan[21] argued that broadening the tax base and lowering tax rates would result in the same amount of revenue being collected with lower excess burden. They examined data from 1986 U.S. Reform and the tax reforms in the European countries. Both cases showed that the tax reforms were undertaken with the aim to achieve revenue neutrality, and at the same time, lowering the excess burden[22] of taxation. As one of the costs of taxation, if the excess burden is being reduced, it is reasonable to expect that the government could collect more taxes. The theory behind the facts is that a reduction in the excess of the burden of taxation reduces the political cost of imposing taxes[23]. Their conclusion was that as revenue neutral tax reform could raise the same value of revenue with lower excess tax burden, the total government revenue would be increased. That is the reason why the government would like to maintain "revenue neutrality" criteria.[24]

The second purpose for adopting "revenue neutrality" criteria relates to the equity objectives, which aims to improve both vertical and horizontal dimensions about tax equity.[25] Vertical equity[26] in taxation refers to the idea that people with unequal income should be treated unequally, commensurately higher tax liabilities should be levied on taxpayers with higher incomes. On the other hand, horizontal equity in taxation is generally taken to require that individuals with similar income should pay the same amount in taxes.

Redistributive taxation reform[27] refers to the enhancement of equity from the vertical dimension through a reduction of after-tax income inequality. Policy makers implemented the reform plans with the intention to leave the income distribution fundamentally unchanged, which is known as distributional neutral reform. Rectifying inequity from the horizontal dimension is the ordinary intention for the government to perform redistributive and distributional neutral tax reform.

1.2 Study Methodology

This study focuses on individual income tax. The pilot study[28] has consulted the optimal income tax model theories proposed by Edgeworth[29] and Stern[30] and the optimal income tax model proposed by Mirrlees.[31] These theories are the basis for performing income tax analyses on public policies. They are integral parts of the public economics and tax economics literature.[32]

[20]Above n245.
[21]Above n246.
[22]Holcombe RG. & Mills JA, 'Is Revenue-Neutral Tax Reform Revenue Neutral', (1994) 22 *Public Finance Review* (2) 65-85.
[23]Ibid.
[24]Eaton J & Rosen HS, 'Optimal Redistributive Taxation and Uncertainty', (1980) 95 *The Quarterly Journal of Economics* (2) 357-364.
[25]Cubel M & Lambert P, 'Progression Neutral Income Tax Reforms and Horizontal Inequity', (2002) 77 *Journal of Economics* 1-8.
[26]Berliant MC & Strauss RP, *The Horizontal and Vertical Equity Characteristics of the Federal Individual Income Tax, 1966-1977 Horizontal Equity, Uncertainty, and Economic Well-Being*. (US: University of Chicago Press, 1985), at 205.
[27]Dixit A & Londregan J, 'Redistributive Politics and Economic Efficiency', (1995) 89 *American Political Science Review* (4) 856-866.
[28]Huang E, Fiscal Considerations for Sustainable Public Funding of Urban Old-Age Pensions in the People's Republic of China, *Working Paper 2016*, The University of Sydney, 2016.
[29]Edgeworth FY, 'The Pure Theory of Taxation', (1897) 7 *The Economic Journal* (25) 46.
[30]Stern NH, 'On The Specification of Models of Optimum Income Taxation', (1976) 6 *Journal of Public Economics* 123.
[31]Mirrlees JA, 'An exploration in the theory of optimal income taxation', (1971) 38 *Review of Economic* Studies 175; and Mirrlees JA, 'Optimal tax theory: A synthesis', (1976) 6 *Journal of Public Economics* 327.
[32]See for example: Kaplow L, *The Theory of Taxation and Public Economics*, (Princeton and Oxford: Princeton University Press, 2008); Rosen, HS & Gayer T, *Public Finance*, (Beijing: McGraw-Hill Companies, Inc. & Tsinghua University Press, 8th ed, 2008); Stiglitz JE,

The pilot study has an experimental research design. Experimental research[33] describes the process that a researcher undergoes when controlling certain variables and manipulating others to observe if the results of the experiment reflect that the manipulations directly caused the particular outcome.

This study has two modules. Module 1 estimates the net present value[34] of national individual income tax revenue under the individual filing approach. Module 2 predicts the net present value of national individual income tax revenue under the family-based filing approach.

The revenue forecast procedures are:

- Find the most recent data on total individual income tax revenue in the PRC under the two filing approaches, and then apply the growth rate factor to inflate and forecast the amount for the next 10 years.
- Once the estimated amounts of individual income tax over the next 10 years have been calculated, apply the discount factor to discount the estimated future value back to the initial year for comparative purpose.
- Add the present value from each year's forecast together and get the total net present value.[35]

1.3 Determinants of the Growth Rate

In order to construct a revenue forecast over ten years, the research inflates the individual income tax from the base year to the next 10 years based on the growth rate. This section discusses the determinants of the growth rate.

1.3.1 Growth Rate Determinants: GDP Growth

Within this research, the growth rate for income tax revenue was determined by the growth rate of gross domestic product (GDP) in the secondary and tertiary industries of the PRC of the base year.

Gross domestic product[36] refers to the market value of all officially recognised final goods and services produced within a country in a given period of time. GDP is commonly used as an indicator of a country's economic health, as well as to gauge a country's living standard.[37] Increasing the rates of economic growth will result in increased consumption, improved public services and reduced unemployment and poverty.

Tax[38] is a finance charge or other levy imposed upon a taxpayer (an individual or legal entity) by government, such that failure to pay is punishable by law.

Economics of the Public Sector, (New York: W.W.Norton & Company, 3rd ed, 2000); and 萨拉尼、伯德著,陈新平、王瑞泽、陈宝明、周宗华译,《税收经济学》, Salanié B, *The Economics of Taxation*, Chen X & oths, trans, (Beijing: China Renmin Press, 2009).

[33]Creswell JW, *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*, (New York: Sage publications, 2013).

[34]Reyck BD & oths, 'Project Options Valuation with Net Present Value and Decision Tree Analysis', (2008) 1 *European Journal of Operational Research* (184) 341-355.

[35]Ibid.

[36]Williamson, SD, *Macroeconomics*, 5th ed., (Melbourne: Pearson, 2013), at 446.

[37]Brokaw SC & oths, 'GDP Source as an Indicator of Economic Health' (2009) 9 *Review of Business Research* (4)1.

[38]Khoury D, *Tax*, 8th ed, (Chatswood: LexisNexis Butterworths, 2015), at 34.

The PRC's economy has leapt forward since the PRC embarked on a major program of economic reform to encourage the formation of rural enterprises and private businesses, promote foreign investment and trade and invest in industrial production.[39] The tax system also contributed to this evolvement. For example, the GDP and tax revenue of Hebei[40] Province have achieved both developments since the 1994 tax-sharing reform. As individuals tend to earn increasing amount of income and over the years during the stages of economic growth, more income tax liability will be incurred correspondingly. The increase in the income tax rate and GDP growth rate is highly correlated.

1.3.2 Considerations of Not Adopting the Urban Economy Growth Rate as the Inflation Factor

The development of the urban economy includes the broad aspects of urban issues such as[41] public transit, housing, local government finance, crime and education. The vast differences[42] in development between Western and Eastern China revealed the issue of unbalanced regional developments in the PRC. Giani [43] selects Xinjiang, Gansu and Sichuan provinces as representatives for Western China and Shanghai, Shandong and Zhejiang to represent Eastern China, and calculates the GDP Per Capita and education spending figure from the National Bureau of Statistics from 1980 to 2010. These figures are put into charts for comparison.

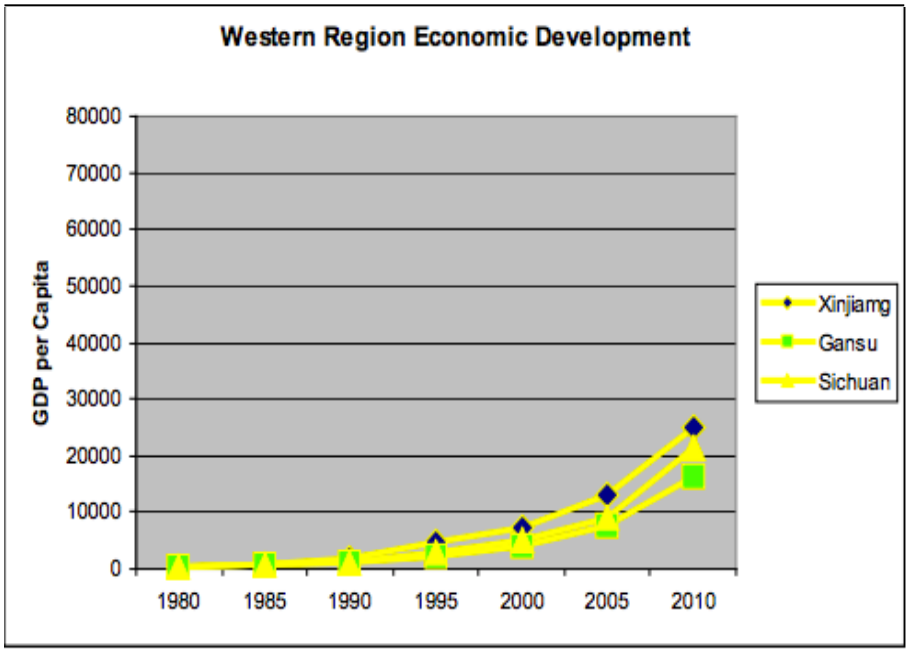
Table 1 GDP Per Capita and Education Spending in West and East China from 1980 to 2010[44]

GDP Per Capita	West			East		
	Xinjiang	Gansu	Sichuan	Shanghai	Shangdong	Zhejiang
1980	410	388	320	2725	402	471
1985	820	608	570	3811	887	1067
1990	1713	1099	1136	5911	1815	2138
1995	4701	2316	3043	17779	5701	8149
2000	7372	4129	4956	30047	9326	13415
2005	13108	7477	9060	49649	19934	27062
2010	25034	16113	21182	76074	41106	51711
Education Spending	Xinjiang	Gansu	Sichuan	Shanghai	Shangdong	Zhejiang
1980	206.58				532.96	
1985	456.41				975.65	
1990	749.37				2020.6	
1995	1878.32		3782.81		5237.54	
2000	3135.38	2754.77	6480.48	8410.31	11810.42	7819.43
2005	7265.17	6748.31	14052.6	18294.15	24874.84	23154.89
2010	31383.56	22823.29	54065.46	41727.75	77044.72	60654.31

Table 1 demonstrates the figure of GDP Per Capita and education spending in the West and East of China over the 30 years between 1980 and 2010.

[39]Arnold C & Lin W, *China's Economic Reforms*. (Philadelphia: University of Pennsylvania Press, 1982), at 553.
[40]Feng Y & Eko S, 'The Relationship between Tax Revenue and Economic Growth of Hebei Province Based on the Tax Multiplier Effect', (2014) 7 *Global Economy and Finance Journal* (2) 1-18.
[41]Smith ME & Hamilton BW, *Urban Economics*, (US: Scott Foresman, 1994).
[42]Dijk MP, 'A Different Development Model in China's Western and Eastern Provinces', (2011) 2 *Modern Economy* 757-768.
[43]Giani C, China's Unbalanced Development and What can Learn from It. *Senior Theses*, Trinity College Hartford, 2014.
[44]Ibid.

Table 2 Western and Eastern Region Economic Development[45]



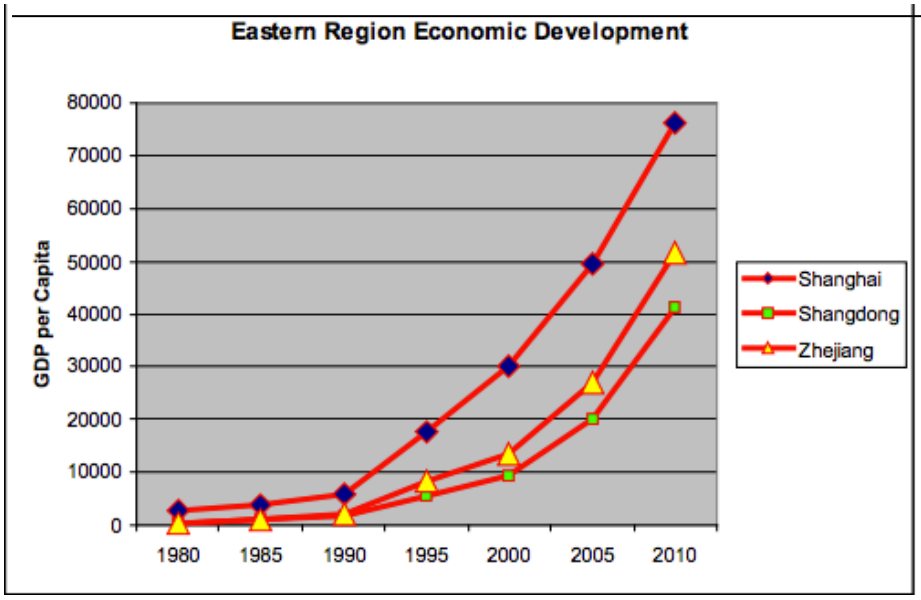


Table 2 shows the economic growth measured in GDP per Capita in both the Western and Eastern Region.

It is clear from the three above tables that the GDP per Capita in Eastern China is nearly four times of that in Western China, and it is clearly visible at a first glance that the Eastern regions have an economic development that is increasing at a rate which is much greater than that of the Western regions.

[45] Above n270.

This research aims to forecast[46] the nationwide individual income tax revenue. Due to the development imbalance between the cities in China, it is argued that the urban economy growth rate would not serve as the most accurate measure to compound[47] income tax revenue over the years.

There is another concern regarding the appropriateness to consider the growth rate of citizen's income[48] in the urban area as the growth rate of individual income tax. As the individual income tax is the result of the application of progressive tax rate on the individual income, the growth rate of income cannot serve as the only determinant of the income tax rate growth. Thus, it is required from a more general approach to decide on the growth rate for individual income tax.

1.3.3 Considerations for Not Adopting CPI as the Growth Rate

The Consumer Price Index[49] (CPI) is a measure that examines the weighted average prices of a basket of goods and services for consumption, such as transportation, food, beverage and medical care. Each good in the basket is weighted according to the proportion of average household expenditure accounted for by that good. The CPI[50] demonstrates the change in prices of the basket from the base year to a particular given year. Changes in the CPI are used as indicators to illustrate price changes associated with living costs.

The PRC's CPI figure is reported by the National Bureau of Statistics of China from 1986 to 2016. The average figure[51] for CPI is 105.46 Index Points, reaching a peak of 128.40 Index Points in February of 1989 and a low of 97.80 Index Points in April of 1999. There is a decrease in Index Points from 2011 to 2012, reaching 104.3 Index Points at the start of the year 2012.

The CPI is one of the most frequently used indicator measures for inflation, despite the fact that it is not the most appropriate figure for measuring the growth rate for income tax revenue growth.

Based on its definition, the CPI is the index number calculated using a specific set of 600 retail the goods and services[52], the calculation procedures involved include selecting a certain period as the base period and calculating the prices for a basket of goods and services, collecting price data for the same basket of goods on a monthly basis, and then comparing the prices from the base period with the prices from a different time period.

The CPI represents prices paid by consumers (or households) for their consumption, while the individual income tax is the tax levied on taxable income.[53] Income is the process of production,[54] which means people earn revenue based on the goods or services generated by

[46]Mikesell JL & Ross JM, 'State Revenue Forecasts and Political Acceptance: the Value of Consensus Forecasting in the Budget Process' (2011) 74 *Public Administration Review* (2) 188-203.
[47]Castellanos AR, 'Tax Strategies Available under Income Forecast Method*'* (1994) 25 *The Tax Adviser* (7) 419.
[48]Rankin A, 'Citizen's Income' (2004) 16 *European Business Review* (6) 632.
[49]Mankiw GN, *Principles of Macroeconomics*. (Melbourne: Cengage Learning, 2014), at 412.
[50]Tutterow R, 'Evidence on Commodity Prices as a Leading Indicator of CPI Inflation', (1995) 23 *Atlantic Economic Journal* (2), 148.
[51]Trading Economics, *China Consumer Price Index*, Online
<http://www.tradingeconomics.com/china/consumer-price-index-cpi> (10 Sep.2016).
[52]Svensson L, 'Open Economy Inflation Targeting', (2000) 50 *Journal of International Economics* 155-183.
[53]Above n276.
[54]Goode R, *The Individual Income Tax*, (Brookings institution: 1964), at 541.

themselves.[55] Conceptually, the consumption based measurement of the CPI Index does not match the core production based income tax concept.

Secondly, the CPI measures the price level of consumer goods for households from both rural and urban areas. In rural areas, peoples' major income source comes from the primary industry.[56] Based on the source of income, individual income tax is most likely not to be levied on individuals from rural areas. Thus, the CPI is not able to correctly reflect the individual income tax features.

1.3.4 Reasons for Not Including the Primary Industry in the Calculation

The calculation for the growth rate includes the GDP growth rate of secondary and tertiary industries rather than the primary sector. The primary sector[57] in China is the sector of an economy making direct use of natural resources. This includes agriculture, fishing, mining and forestry. In contrast, the secondary sector converts[58] the raw material produced by primary sector into commodities and produces manufactured goods, whilst the tertiary industry is concerned with the production of services.

The eleven categories of income taxable by the individual income tax are prescribed by Article 2 of the *Individual Income Tax Law of the People's Republic of China.*[59]

Table 3 Eleven Categories of Income

1	Income from salaries and wages
2	Income from production, operation derived by industrial and commercial households
3	Income from contractual or leasing operations to enterprises or institutions
4	Income from remuneration for personal services
5	Income from author's remuneration
6	Income from royalties
7	Income from interest, dividends and bonuses
8	Income from the lease of property
9	Income from the transfer of property
10	Incidental income
11	Income from other sources specified as taxable by the department of finance under the State Council

Table 3 is a summary of the eleven categories of income as prescribed in the individual income tax law. Income derived from the primary industry ordinarily is not included in the taxable income base. It is common that only people living in the urban areas will normally lodge individual income tax returns in the PRC. The growth rate for the primary sector in the PRC is thereby not related[60] to income tax revenue growth, and, it is unnecessary to include the GDP growth rate of the primary industry in the calculation.

[55]Ibid.
[56]Fisher A, 'Production, Primary, Secondary and Tertiary.' (1939) 15 *Economic Record*, (1) 24-38.
[57]Ibid.
[58]Ibid.
[59]《中华人民共和国个人所得税法》*Individual Income Tax Law of the People's Republic of China* 2011 (Standing Committee of the National People's Congress), Art 2.
[60]Above n283.

The next step in the study is to apply the average growth rate to calculate the forecasted value[61] over the 10 years. The compound formula to calculate the future value is:

$$P_n = P_0(1 + r)^n$$

P_n is future value of P_0
P_0 is original amount invested
r is the rate of interest
n is the number of compounding periods (years, months, etc.)

1.3.5 The Determinants of the Discount Rate

After calculating the forecasted amount for income tax revenue in each year, the discounted cash flow[62] method is applied to estimate the present value. The discounted cash flow analysis uses future cash flow amount and discounts them back to a present value estimate. The following is the formula for net present value:

$$\text{DCF}=\frac{CF1}{(1+r)^1}+\frac{CF2}{(1+r)^2}+\cdots+\frac{CFn}{(1+r)^n}$$

CF = Cash Flow
r = Discount rate (WACC)

CF_n refers to the estimated national individual income tax revenue in each year since the base year, and DCF is the sum of the net present value. As the estimated amount could be, the only determinant in this case is the discount rate "r".

According to Caplin and Leahy,[63] the social discount rate is the discount rate applied to social funds. When the social fund lasts over a long period, the discount rate is a critical parameter in cost-benefit analysis whenever costs and benefits differ in their distribution over time.[64] The choice of the appropriate discount rate will affect the quality of the cost-benefit analysis,[65] which will be used to improve decision making by systematically evaluating the social benefits and costs of government policies, with an emphasis on valuing them in monetary terms.[66]

Many scholars used the social discount rate as the discount factor to find the present value of the estimated government revenue.[67] The individual income tax forms an important and continuous stream of national revenue for the PRC, so it is appropriate to use the social discount rate in this pilot study. The social discount rate in 2014 is 7%.[68]

[61]Damodaran A, *Corporate Finance*. (US: Wiley,1996), at 102.
[62]Cabinet Office, *Discount Rates and Net Present Value*, Online <https://data.gov.uk/sib_knowledge_box/discount-rates-and-net-present-value> (01 Sep.2016).
[63]Caplin A & Leahy J, 'The Social Discount Rate', (2004)112 *Journal of Political Economy* (6) 1257-1268.
[64]Huang E & Underwood N, 'The Impact of Tax Holidays on Renewable Energy Project Development in China: A Cost Benefit Analysis' (2013) 3 *Journal of Chinese Tax and Policy* (2) 270-273.
[65]Harrison M, Valuing the Future: The Social Discount Rate in Cost-Benefit Analysis, *Visiting Researcher Paper April 2010*, Australian Government Productivity Commission,<http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.627.7762&rep=rep1&type=pdf> (30 Jul. 2016).
[66]Congressional Budget Office, Forecasting Individual Income Tax Revenues: a Technical Analysis, *Special Study August 1983*, Congress of the United States. <http://www.cbo.gov/sites/default/files/cbofiles/ftpdocs/50xx/doc5044/doc16-entire.pdf> (30 Aug.2016).
[67]Zhuang J & oths, Theory and Practice in the Choice of Social Discount Rate for Cost-Benefit Analysis: a Survey, *Working Paper 94*, Asian Development Bank, 2007.
[68]Above 291.

2. Feasibility Study Results

This part illustrates the calculation procedures for Module 1 and Module 2. There are three steps in Module 2 to conclude the forecasted national individual income tax revenue under a family-based approach in the People's Republic of China (PRC).

2.1 Module 1: Revenue Forecast under Individual Based Filing Approach

Module 1 generates the calculation of the 10-year-forecast for individual income tax revenue of the PRC under the existing individual based income tax filing system.

The revenue forecast procedures are:

1. Find the most recent data on total individual income tax revenue in the PRC, and then apply the growth rate factor to inflate and forecast the amount for the next 10 years.
2. Once the estimated amounts of individual income tax over the next 10 years have been calculated, apply the discount factor to discount the estimated future value back to the initial year for comparative purpose.
3. Add the present value from each year's forecast together and get the total net present value.[69]

The most recent data for individual income tax can be found on the National Bureau of Statistics of China website. The website gives the available data until the year 2014. From the chart, the total amount of individual income tax in 2014 is RMB 7,376.61bn.[70]

Table 4 Annual Tax Figure in 2014 in the PRC[71]

Database：Annual	
Indicators	2014
Taxes(RMB billion)	119,175.31
Domestic Value-added Tax(RMB billion)	30,855.36
Business Tax(RMB billion)	17,781.73
Domestic Consumption Tax(RMB billion)	8,907.12
Tariffs(RMB billion)	2,843.41
Individual Income Tax(RMB billion)	7,376.61[72]
Corporate Income Tax(RMB billion)	24,642.19
Data Sources：National Bureau of Statistics	

Table 4 lists the individual income tax amount as in year 2014. The research sets 2014 as the initial year to construct the 10-year-forecast, which spans from year 2014 to year 2024. The

[69]Reyck BD & oths, 'Project Options Valuation with Net Present Value and Decision Tree Analysis', (2008) 1 *European Journal of Operational Research* (184) 341-355.
[70]Equivalent to AUD 1475.32bn, the current exchange rate ratio between RMB and AUD is 5:1 as on 30 Sep.2016.
[71]National Bureau of Statistics of China, < http://data.stats.gov.cn/easyquery.htm?cn=C01&zb=A0806&sj=2014>.
[72]Ibid.

reason to set a forecast timeline of 10 years is because the input for the estimation (such as the inflation factor and discount factor) is reasonable and accessible, which adds reliability to the research. It is a common timeline chosen by scholars[73] to construct their revenue side forecast.

2.1.1 Calculation and Application of the Growth Rate

The research then inflates the individual income tax as in 2014 to the next 10 years based on the growth rate.

1. Calculation of the Growth Rate

The calculation of the growth rate[74] involves two processes. The first step works out the difference between the amount of GDP in the secondary and tertiary industries in the years 2013 and 2014, and the second step divides the increase amount by the GDP in the secondary and tertiary industry in 2013.

The growth of GDP (△GDP) in the secondary and tertiary industries from 2013 to 2014 equals to the sum of GDP in the secondary and tertiary industries [GDP_{2014} (S.I. + T.I.)] in 2014, less the sum of GDP in the secondary and tertiary industries in 2013. [GDP_{2013} (S.I.+T.I.)]

The GDP growth rate [GR] equals to the increase amount of GDP (△GDP) from 2013 to 2014 divided by the amount of GDP in secondary and tertiary industry in 2013. [GDP_{2013} (S.I.+T.I.)]

The formula used to calculate the GDP growth rate [GR] in 2014 is

$$[\mathrm{GR}] = \frac{\triangle \mathrm{GDP}}{\mathrm{GDP}_{2013}\ (\mathrm{S.I.+\ T.I.})}$$

$$= \frac{\mathrm{GDP}_{2014}(\mathrm{S.I.+\ T.I.}) - \mathrm{GDP}_{2013}(\mathrm{S.I.+T.I.})}{\mathrm{GDP}_{2013}\ (\mathrm{S.I.+\ T.I.})}$$

Table 5 Annual GDP of Secondary and Tertiary Industries

Database: Annual[75]

Year：LATEST10		
Indicators	2014	2013
Gross National Income(RMB 1 billion)	644,791.1	590,422.4
Gross Domestic Product(RMB 1 billion)	643,974.0	595,244.4
Value-added of the Primary Industry(RMB 1 billion)	58,343.5	55,329.1
Value-added of the Secondary Industry(RMB 1 billion)	**277,571.8**	**261,956.1**
Value-added of the Tertiary Industry(RMB 1 billion)	**308,058.6**	**277,959.3**
Per Capita GDP (RMB)	47,203	43,852

[73]Golosov M & King J, Tax Revenue Forecasts in IMF-Supported Programs, *Working Paper 02/236*, International Monetary Fund, 2002.
[74]Kuznets SS, & Murphy JT. *Modern Economic Growth: Rate, Structure, and Spread*. (New Haven: Yale University Press, 1966), at 251.
[75]National Bureau of Statistics of China, < http://data.stats.gov.cn/easyquery.htm?cn=C01&zb=A0806&sj=2014>.

Table 5 lists the annual GDP of secondary and tertiary industries in 2013 and 2014.

The GDP growth rate [GR] = (277571.8+308058.6) - (261956.1+277959.3)/ (261956.1+277959.3) = 0.084671=8.467%

The average rate for income tax growth is approximately 8.5%.

2. Compound for Future Value

Money has a different value over the course of time,[76] in which the value of money is deflated by inflation and opportunity cost as time passes. In other words, money held today is worth than money held tomorrow.

The next step in the study is to apply the average growth rate to calculate the forecasted value[77] for the total individual income revenue for 2015 to 2024. The compound formula to calculate the future value is:

$$P_n = P_0(1 + r)^n$$

P_n is future value of P_0
P_0 is original amount invested
r is the rate of interest
n is the number of compounding periods (years, months, etc.)

In this research, **P_0** is the initial amount of the forecast;
P_0 =RMB 7376.61bn[78]
R is the average growth rate, **r**=8.467%

Calculate the corresponding forecasted future amount for each year. The results are reported in Table 2.3

Table 6 Module 1: Individual Income Tax Forecast under Individual Based Filing Approach.

Individual Income Tax Forecast under Individual Based Filing Approach. (RMB Billion)											
Year	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Forecasted Amount	7377	8001	8679	9413	10210.55	11075.082	12013	13030	14133	15330	16628

Table 6 is the summary of the results of the forecasted income tax revenue under an individual based filing approach.

2.1.2 Application of the Discount Rate and Calculation of the Net Present Value

After calculating the forecasted amount for income tax revenue in each year, the discounted cash flow[79] method is applied to estimate the present value. Discounted cash flow analysis uses

[76]Halperin D, 'Interest in Disguise: Taxing the Time Value of Money', (1986) 95 *The Yale Law Journal* (3) 506-552.
[77]Damodaran A, *Corporate Finance*. (US: Wiley, 1996), at 545.
[78]Equivalent to AUD 1475.32bn, the current exchange rate ratio between RMB and AUD is 5:1 as on 30 Sep.2016.
[79]Above n289.

the future cash flow amount and discounts them back to a present value estimate. The following is the formula for the net present value:

$$\text{DCF}=\frac{CF1}{(1+r)^1}+\frac{CF2}{(1+r)^2}+\cdots+\frac{CFn}{(1+r)^n}$$

CF=Cash Flow
r=discount rate (WACC)

This study substitutes the forecasted amount into the discounted cash flow formula, with the social discount rate at 7%.[80] (r = 7%)

CF_n is the forecasted amount in each year developed in the previous stage.

$$\text{DCF}=7376.61+\frac{8001.193}{(1+7\%)^1}+\frac{8678.659}{(1+7\%)^2}+\frac{9413.487}{(1+7\%)^3}+\frac{10210.53302}{(1+7\%)^4}+\frac{11075.06572}{(1+7\%)^5}+\frac{12012.8}{(1+7\%)^6}+\frac{13029.93}{(1+7\%)^7}+\frac{14133.18}{(1+7\%)^8}+\frac{15329.84992}{(1+7\%)^9}+\frac{16627.83862}{(1+7\%)^{10}}$$

Table 7 summarises the net present value for the forecasted amount as in each year, and the sum of those net present values is the total net present value.

Table 7 the Net Present Value of Individual Income Tax Forecast under Individual Based Filing Approach

Individual Income Tax Forecast under Individual Based Filing Approach. (RMB Billion)											
Year	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Forecasted Amount	7377	8001	8679	9413	10211	11075	12013	13030	14133	15330	16628
Net Present Value	7377	7478	7580	7684	7790	7896	8005	8114	8226	8338	8453
Total Net Present value											86941

According to the table, the total net present value of total income tax revenue for Module 1 is RMB 86,941bn.[81]

2.2 Module 2: Revenue Forecast under a Family Based Filing Approach

In the second module, the research applies the filing model in the US to the PRC's individual income tax system, in order to forecast the total income tax revenue based on family filing in the next 10 years.

2.2.1 Assumptions for Module Two

This feasibility study makes three assumptions.

Assumption 1: The family unit in this research is the urban nuclear family.

[80] Above n291.
[81] Equivalent to AUD 17,388bn, the current exchange rate ratio between RMB and AUD is 5:1 as on 30 Sep.2016.

Assumption 2: All married taxpayers choose "married filing jointly"[82] as the filing status.

Assumption 3: The singles rate[83] in the urban population is the same as the singles rate for the whole population.

A nuclear family[84] is a family group consisting of two legally married adults and their dependents. Since China is going to learn directly from the U.S. about their family based filing approach, the quantitative research design will use the nuclear family as the family structure. In the PRC's urban areas, the common family structure is two married individuals with a dependent child.[85] According to the Sixth National Population Census of the People's Republic of China,[86] the average number of people in a family was 3.1 in 2011; therefore, the nuclear family is the predominant family structure[87] in Chinese cities.

In the US, the federal tax filing status prescribes[88] the type of tax return form an individual could use. There are three possible filing statuses for family lodgement; Married Filing Jointly,[89] Married Filing Separately,[90] and Head of Household.[91] If more than one filing status applies to the taxpayer, the taxpayer will choose the one that gives them the lowest tax liability.[92] This pilot study chooses married filing jointly as the filing status and assumes this method gives the taxpayers the lowest tax. In reality, everything being equal, taxpayers will only choose the one which gives them the most tax benefits among those available filing statutes, so the actual total individual income tax revenue could only be less than the estimated amount based on married filing jointly status.

2.2.2 Internal Methodology

This research estimates the total individual income tax revenue for 10 years from year 2014, based on a family based individual income tax filing system. Under the assumption of the urban nuclear family, the research starts with the individual annual income of each spouse, then calculates the family annual income by combing their income, and finally divides the total family annual income by 2 to identify the average family annual income per person.

The study divides the average income per person based on family unit by 12 to calculate the monthly income[93] and applies the progressive individual income tax rate for the monthly income tax payable. Finally, the research multiplies the monthly income tax by 12 to find the annual income tax amount per person, and identifies the total population[94] in the urban labour force. In order to identify the total national income tax revenue of taxpayers who are married

[82] *The Internal Revenue Code of 1986*, Section 1.
[83] Zhang Y & Hannum E, 'Diverging Fortunes: The Evolution of Gender Wage Gaps for Singles, Couples, and Parents in China' (2015) 1 *Chinese Journal of Sociology* (1)15-55.
[84] Aaberge R, 'Gini's Nuclear Family.' (2007) 5 *The Journal of Economic Inequality*, (3) 305-322.
[85] Shin HB, 'Contesting Speculative Urbanisation and Strategising Discontents' (2014)18 *Journal City* 4-5.
[86] National Bureu of Statistics in the PRC, <http://data.stats.gov.cn/english/easyquery.htm?cn=C01>.
[87] Above n312.
[88] Above n309.
[89] Above n309.
[90] *The Internal Revenue Code of 1986,* Section 2.
[91] Ibid.
[92] Internal Revenue Service, *Publication 501 Exemptions, Standard Deduction, and Filing Information for use in preparing 2015 Returns*, Department of the Treasury, the US Government, 29 Dec.2015.
[93] The Individual Income Tax Law of the People's Republic of China prescribes the tax rates for monthly income.
[94] National Bureau of Statistics of the People's Republic of China, <http://data.stats.gov.cn/easyquery.htm?cn=C01&zb=A0403&sj=2014>.

and filed the income tax return on family basis, the research multiplies the annual individual income tax per head by the population in the labour force.

For one person households, taxpayers should continue with the current income tax filing system to lodge their income tax on an individual basis. There are two types of taxpayers; taxpayers who are part of an urban nuclear family, and taxpayers who are in a one person households. In order to calculate the amount of individual income tax for single taxpayers, it is necessary to apply the singles rate of the taxpayers within the labour force to the current national individual income tax amount in 2014. The singles rate out of the total population is applied to total urban individual income tax revenue of the base year 2014.

2.2.3 Step 1 - Changes in National Individual Income Tax Revenue

This step aims to compare the NPV of the 10-year-forecast[95] for national individual income tax revenue under the existing filing approach with the forecasted NPV of 10 years' income under family based filing status.

2.2.3.1 Calculate the NPV under the Family Based Filing Approach.

Under the urban nuclear family assumption, the research needs to estimate family annual income. Families use their total income amount to prepare for the filing of the individual income tax return for each income earning member under the family based filing system. In order to estimate family income, the first step is to estimate the individual family member's annual income separately. The assumption determines that there are two income earners in the urban nuclear family.[96]

The National Bureau of Statistics of China prepares statistics for seven unevenly distributed income brackets as shown in Table 8. The per Capita Total Income[97] is the average individual annual income within the bracket.

Table 8 Per Capita Total Income of Urban Households

Decile Groups	Per Capita Total Income of Urban Households(RMB) 2012
Per Capita Total Income of Urban Households, Lowest Income Households(10%)(RMB)	9209.5
Per Capita Total Income of Urban Households, Low Income Households(10%)(RMB)	13724.7
Per Capita Total Income of Urban Households, Lower Middle Income Households(20%)(RMB)	18374.8
Per Capita Total Income of Urban Households, Middle Income Households(20%)(RMB)	24531.4
Per Capita Total Income of Urban Households, Upper Middle Income Households(20%)(RMB)	32758.8
Per Capita Total Income of Urban Households, High Income Households(10%)(RMB)	43471

[95]Kaplan S & Ruback R, 'The Valuation of Cash Flow Forecasts: An Empirical Analysis', (1995)50.4 *The Journal of Finance* 1059-1093.
[96]Above n312.
[97]McAuley A, *Economic Welfare in the Soviet Union: Poverty, Living Standards, and Inequality.* (Madison: University of Wisconsin Press, 1979).

Per Capita Total Income of Urban Households, Highest Income Households(10%)(RMB)	69877.3

Table 8 is reproduced from the 2012 statistics.[98] In order to ascertain that the result of the estimation is representative, this research selects[99] individuals from the seven different groups and matches them as a pair, resulting in 28 types of pairs.

Each of the seven income distribution groups are assigned their own order ID (see Table 2.6), where the aim is to sort numerically. Then, two order IDs are combined from the groups to generate the pair matching[100] . The matching pairs need to cover all possible combinations.

Table 9 Order ID for Income Distribution Groups[101]

Decile Groups Year 12	Per Capita Total Income of Urban Households(yuan)	Order Number
Per Capita Total Income of Urban Households, Lowest Income Households(0-10%)(RMB)	9209.5	1
Per Capita Total Income of Urban Households, Low Income Households(10%-20%)(RMB)	13724.7	2
Per Capita Total Income of Urban Households, Lower Middle Income Households(20%-40%)(RMB)	18374.8	3
Per Capita Total Income of Urban Households, Middle Income Households(40%-60%)(RMB)	24531.4	4
Per Capita Total Income of Urban Households, Upper Middle Income Households(60%-80%)(RMB)	32758.8	5
Per Capita Total Income of Urban Households, High Income Households(80%-90%)(RMB)	43471	6
Per Capita Total Income of Urban Households, Highest Income Households(90%-100%)(RMB)	69877.3	7

Table 9 lists the seven income distribution groups with their own order ID.

2.2.3.2 Matched Pairs

Table 10 reports the possible combinations of the pair matching. The numerical number represents the Order ID of different income groups.

Table 10 Possible Combination Groups of Income from Urban Households

All Possible combinations among 7 different groups						
1,1						
1,2	2,2					
1,3	2,3	3,3				

[98]National Bureau of Statistics of the People's Republic of China, <http://data.stats.gov.cn/easyquery.htm?cn=C01&zb=A0403&sj=2014>.
[99]Kothari CR, *Research Methodology: Methods and Techniques*. (New Delhi: New Age International, 2004),at 212.
[100]Casella G, *Statistical Design*, (Berlin: Springer, 2008), at 447.
[101]National Bureau of Statistics of the People's Republic of China, <http://data.stats.gov.cn/easyquery.htm?cn=C01&zb=A0403&sj=2014>.

1,4	2,4	3,4	4,4			
1,5	2,5	3,5	4,5	5,5		
1,6	2,6	3,6	4,6	5,6	6,6	
1,7	2,7	3,7	4,7	5,7	6,7	7,7

Table 10 is the summary of the possible combinations of the pair matching. There are 28 combinations to pair a couple based on different income groups. The family income of each of the 28 pairs is calculated, and the family income of each pair is then evenly attributed to the individuals. The individual income tax rate is then applied to calculate the individual income tax liability.[102] Note that as the data is only available to 2012, the income tax result is for the year 2012.

For each matched pair, the research sets the Per Capita Total Income of Urban Households[103] from each bracket as the family member's annual income, sums the two members' income for the family's income, divides the total family income by 2 to calculate the average annual income in that family, and finally divides the result by 12 for the individual's average monthly income.

This pilot study tests the revenue neutrality if China adopts the US individual income tax filing scheme, where taxpayers are allowed to file as a member of a family. The family revenue reported are comprehensive, and are not separated into the eleven categories in the *Individual Income Tax Law of the People's Republic of China,*[104] thereby per family member monthly income calculated in this research captures all income types of the taxpayer. The results illustrate the income derived from a global[105] individual income tax system.

The US implements a progressive[106] individual income tax rate, where the single rate was applied to the total comprehensive global income derived by an individual. From the determinants of the filing status to the actual lodgement methods of tax, the PRC learns directly from the US. This study therefore adopts the progressive[107] income tax rate.

The income tax rate adopted in this study is compatible with the tax rate prescribed in Article 3, *Individual Income Tax Law of the People's Republic of China.*[108]

For illustrative purposes, the progressive rate scale for wages and salary income is applied to the comprehensive income of all taxpayers.

Table 11 Monthly Marginal Income Tax Rate[109]

Taxable Income (RMB)	Tax Rate	Tax Payable (RMB)
0-1,500	3%	nil
1,501-4500	10%	45 + 10% of excess over 1,500
4,501-9,000	20%	345 + 20% of excess over 4,500

[102] 《中华人民共和国个人所得税法》*Individual Income Tax Law of the People's Republic of China* 2011 (Standing Committee of the National People's Congress), Art 4.
[103] Meng X, 'Economic Restructuring and Income Inequality in Urban China' (2004) 50 *Review of Income and Wealth* (3) 357-379.
[104] Above n329.
[105] Goode R, *The Individual Income Tax*, (Brookings institution: 1964), at 541.
[106] Ibid.
[107] Ibid.
[108] Above n329.
[109] Adapted from 《中华人民共和国个人所得税法》 *Individual Income Tax Law of the People's Republic of China 2011* (Standing Committee of the National People's Congress), Art 1, para (1) sch 1.

9,001-35,000	25%	1,245 + 20% of excess over 9,000
35,001-55,000	30%	7,995 + 30% of excess over 35,000
55,001-80,000	35%	13,995 + 35% of excess over 55,000
Over 80,000	45%	22,745 + 45% of excess over 80,000

Table 11 presents the results of the progressive tax rate format. The income tax free threshold is RMB 3500[110] per month, thus for the amount of taxable income below RMB 3500, there is no income tax levied. Only members of 6 married pairs among the total 28 groups are required to pay individual income tax, namely:

- Family (3,7) with an average annual income of RMB 44,126.04 per member, and with an annual tax payable of RMB 63.72.
- Family (4,7) with an average annual income of RMB 47,204.4 per member, and with an annual tax payable of RMB 156.24.
- Family (5,7) with an average annual income of RMB 51,318 per member, and with an annual tax payable of RMB 279.72.
- Family (6,7) with an average annual income of RMB 56,674.2 per head, and with an annual tax payable of RMB 440.28.
- Family (6,6) with an average annual income of RMB 43,470.96 per head, and with an annual tax payable of RMB 44.28.
- Family (7,7) with an average annual income of RMB 69,877.32 per head, and with an annual tax payable of RMB 1527.6.

For the full calculations, see the footnote.[111]

The total amount of income tax for year 2012 equals to the annual income tax payable per member, multiplied by the number of people in the labour force in the urban area, which is 371.021 million[112] as reported by the National Bureau of China.

2.2.3.3 Calculation of Income Tax

The total amount of individual income tax revenue under the family filing approach in 2012 (TY) equals to the sum of all possible matched pairs' individual income tax amount. For each pair, the amount of total income tax revenue equals to the amount of annual income tax per head (Y.PP.), times the number of people in the labour force in the urban area (N), and then times the possibility (1/p) of the occurrence of a particular matched pair.

$$\text{Total income tax revenue under a family filing approach} = \sum(annual\ average\ income\ tax\ amount\ per\ head\ per\ pair * number\ of\ people\ in\ the\ labour\ force\ in\ the\ urban\ area * \frac{1}{number\ of\ all\ matched\ pairs})$$

$$\text{TY} = \sum(Y.PP).* N * \frac{1}{p}$$

[110]Ibid.

[111]By applying the corresponding income tax rate, the amount of income tax payable per month was shown in the following chart. Times the income tax payable per month by 12 will get the annual income tax payable.

[112]National Bureau of Statistics of the People's Republic of China, <http://data.stats.gov.cn/easyquery.htm?cn=C01&zb=A0403&sj=2014>.

In this research,

N=371.021 million

P=28

See Table 2.9 for the whole calculation procedure. Based on the calculation, the total income tax revenue for 2012 under a family-based filing estimation is RMB 332.8367bn,[113] which is approximately RMB332.84bn.

Table 12 Calculation of Total Individual Income Tax Under Family Filing Basis in 2012 (RMB)

Table 6.10 Calculation of Total Individual Income Tax Under Family Filing Basis in 2012 (RMB)													
Decile Groups	Per Capita Total Income of Urban Households (RMB)	Order ID	Marched Pairs	Family Member A Annual Income	Family Member B Annual Income	Sum of family annual Income	Average Annual Income per person	Income per month per person	Income Tax per month per person	Annual Income tax amount per person	Numbers of people in the labour force in the urban area (Million)	Total Income Tax (Million)	
0-10%	9209.5	1	1,7	9209.5	69877.3	79086.8	39543.4	3295.2833	0	0	371.02	0	
10%-20%	13724.7	2	1,6	9209.5	43471	52680.5	26340.25	2195.0208	0	0	371.02	0	
20%-40%	18374.8	3	1,5	9209.5	32758.8	41968.3	20984.15	1748.6792	0	0	371.02	0	
40%-60%	24531.4	4	1,4	9209.5	24531.4	33740.9	16870.45	1405.8708	0	0	371.02	0	
60%-80%	32758.8	5	1,3	9209.5	18374.8	27584.3	13792.15	1149.3458	0	0	371.02	0	
80%-90%	43471	6	1,2	9209.5	13724.7	22934.2	11467.1	955.59167	0	0	371.02	0	
90%-100%	69877.3	7	1,1	9209.5	9209.5	18419	9209.5	767.45833	0	0	371.02	0	
			2,7	13724.7	69877.3	83602	41801	3483.4167	0	0	371.02	0	
			2,6	13724.7	43471	57195.7	28597.85	2383.1542	0	0	371.02	0	
			2,5	13724.7	32758.8	46483.5	23241.75	1936.8125	0	0	371.02	0	
			2,4	13724.7	24531.4	38256.1	19128.05	1594.0042	0	0	371.02	0	
			2,3	13724.7	18374.8	32099.5	16049.75	1337.4792	0	0	371.02	0	
			2,2	13724.7	13724.7	27449.4	13724.7	1143.725	0	0	371.02	0	
			3,7	18374.8	69877.3	88252.1	44126.05	3677.1708	5.31	63.72	371.02	23641.394	
			3,6	18374.8	43471	61845.8	30922.9	2576.9083	0	0	371.02	0	
			3,5	18374.8	32758.8	51133.6	25566.8	2130.5667	0	0	371.02	0	
			3,4	18374.8	24531.4	42906.2	21453.1	1787.7583	0	0	371.02	0	
			3,3	18374.8	18374.8	36749.6	18374.8	1531.2333	0	0	371.02	0	
			4,7	24531.4	69877.3	94408.7	47204.35	3933.6958	13.02	156.24	371.02	57968.165	
			4,6	24531.4	43471	68002.4	34001.2	2833.4333	0	0	371.02	0	
			4,5	24531.4	32758.8	57290.2	28645.1	2387.0917	0	0	371.02	0	
			4,4	24531.4	24531.4	49062.8	24531.4	2044.2833	0	0	371.02	0	
			5,6	32758.8	43471	76229.8	38114.9	3176.2417	0	0	371.02	0	
			5,7	32758.8	69877.3	102636.1	51318.05	4276.5042	23.31	279.72	371.02	103781.71	
			5,5	32758.8	32758.8	65517.6	32758.8	2729.9	0	0	371.02	0	
			6,7	43471	69877.3	113348.3	56674.15	4722.8458	36.69	440.28	371.02	163352.69	
			6,6	43471	43471	86942	43471	3622.5833	3.69	44.28	371.02	16428.766	
			7,7	69877.3	69877.3	139754.6	69877.3	5823.1083	127.3	1527.6	371.02	566770.15	
											Total Amount	33283.674	Million
												332.8367	Billion

Table 12 is the demonstration of the calculation procedures for the total individual income tax. For each family unit, the total national individual income tax revenue equals to the income tax payable per year for each individual times the total labour force in the urban area. Since there are 28 possible matched pairs of families, the possibility[114] for the occurrence of a certain matched pair is $\frac{1}{28}$, so the research multiplies the national income tax revenue for a particular family by $\frac{1}{28}$ after taking the said possibility into consideration. Finally, the research illustrates that only six hypothetical families are liable for individual income tax, and calculates the total individual income tax revenue under the family filing approach by summarising those 6 families' income tax payable and divides the result by 28.

[113]Equivalent to AUD 70.53bn, the current exchange rate ratio between RMB and AUD is 5:1 as on 30 Sep.2016.

[114]Savage L, *The Foundations of Statistics*. (New York: Courier Corporation, 1972), at 142.

2.2.3.4 Calculation of the Inflated Value as in 2014

While Module One sets 2014 as the base year for future cash flows to be discounted to, statistics for Module Two is only updated to 2012. In order to prepare a clear comparison between the amount under the existing filing status and family-based status, it is necessary to inflate the amount of RMB332.84bn to the year of 2014. The same inflation method as Module One is applied.

1. Calculate the Growth Rate in 2012;

The formula used to calculate the GDP growth rate [GR] in 2012 is

$$[\mathrm{GR}] = \frac{\triangle \mathrm{GDP}}{\mathrm{GDP}_{2011}\ (\mathrm{S.I.+\ T.I.})}$$

$$= \frac{\mathrm{GDP}_{2012}(\mathrm{S.I.+\ T.I.}) - \mathrm{GDP}_{2011}(\mathrm{S.I.+T.I.})}{\mathrm{GDP}_{2011}\ (\mathrm{S.I.+\ T.I.})}$$

Table 13 the Annual Gross National Income for Primary and Secondary Industries[115]

Database：Annual		
Year：LATEST10		
Indicators	2012	2011
Gross National Income(1billion)	539,116.5	484,753.2
Gross Domestic Product (1billion)	540,367.4	489,300.6
Value-added of the Primary Industry(1billion)	50,902.3	46,163.1
Value-added of the Secondary Industry (1billion)	244,643.3	227,038.8
Value-added of the Tertiary Industry (1billion)	244,821.9	216,098.6
Per Capita GDP(RMB)	40,007	36,403

Table 13 lists The Annual Gross National Income for Primary and Secondary industries.

Identify the GDP of secondary and tertiary industry for year 2011 and 2012.

The growth rate in 2012= The increase amount of GDP in secondary and tertiary industry from 2011 to 2012/ The amount of GDP in secondary and tertiary industry in 2011

$$[\mathrm{GR}] = \frac{\triangle \mathrm{GDP}}{\mathrm{GDP}_{2011}\ (\mathrm{S.I.+\ T.I.})}$$

[115]The National Bureau of Statistics of China, < http://www.stats.gov.cn/tjsj/>.

The GDP growth in the secondary and tertiary industries from 2011 to 2012 = (2012 secondary industry GDP+2012 tertiary industry GDP)-(2011 secondary industry GDP+2011 tertiary industry GDP)

$$\triangle GDP = GDP_{2012}\ (S.I. + T.I.) - GDP_{2011}\ (S.I. + T.I.)$$

The GDP growth in the secondary and tertiary industries (△GDP) = (244,643.3+244,821.9)-(227,038.8+216,098.6) =RMB 46,327.8bn

2011 secondary industry GDP & 2011 tertiary industry GDP [GDP_{2011} (S.I. + T.I.)]=227,038.8+216,098.6= RMB 443,137.4bn

The growth rate in 2012[GR]= 46327.8/443137.4=0.104545

As a result, the growth rate for year 2012 is approximately 10.45%.

2. Apply the Growth Rate for the amount as in 2013

The research applied the growth rate[116] and calculates the estimated amount for 2013,

RMB332.84bn * (1+0.104545) = RMB367.64bn[117]

3. Calculate the Growth Rate in 2013

The formula used to calculate the GDP growth rate [GR] in 2013 is

$$[GR] = \frac{\triangle GDP}{GDP_{2012}\ (S.I.+ T.I.)}$$

$$== \frac{GDP_{2013}(S.I.+ T.I.) - GDP_{2012}(S.I.+T.I.)}{GDP_{2012}\ (S.I.+ T.I.)}$$

Table 14: the Annual Gross National Income for Primary and Secondary Industries[118]

Database：Annual Year：LATEST10		
Indicators	2013	2012
Gross National Income(RMB 1 billion)	590,422.4	539,116.5
Gross Domestic Product(RMB 1 billion)	595,244.4	540,367.4
Value-added of the Primary Industry(RMB 1 billion)	55,329.1	50,902.3
Value-added of the Secondary Industry(RMB 1 billion)	261,956.1	244,643.3
Value-added of the Tertiary Industry(RMB 1 billion)	277,959.3	244,821.9
Per Capita GDP(RMB)	43,852	40,007

Table 14 lists The Annual Gross National Income for Primary and Secondary industries.

[116]Above n301.
[117]Equivalent to AUD 77.90bn, the current exchange rate ratio between RMB and AUD is 5:1 as on 30 Sep.2016
[118]The National Bureau of Statistics of China, <http://data.stats.gov.cn/easyquery.htm?cn=C01&zb=A0403&sj=2014>.

Identify the GDP of the secondary and tertiary industries for year 2012 and 2013.

The growth rate in 2013= The increase amount of GDP in secondary and tertiary industry from 2012 to 2013/ The amount of GDP in secondary and tertiary industry in 2012

$$[GR] = \frac{\triangle GDP}{GDP_{2012}\ (S.I.+\ T.I.)}$$

The GDP growth of the secondary and tertiary industry from 2012 to 2013 = (2013 secondary industry GDP+2013 tertiary industry GDP)-(2012 secondary industry GDP+2012 tertiary industry GDP)

$$\triangle GDP = GDP_{2013}\ (S.I. + T.I.) - GDP_{2012}\ (S.I. + T.I.)$$

The increase amount of GDP in secondary and tertiary industry= (261,956.1+277,959.3) - (244,643.3+244,821.9) =RMB50450.2bn[119]

2012 secondary industry GDP & 2012 tertiary industry GDP [GDP_{2012} (S.I. + T.I.)]=244,643.3+244,821.9= RMB489465.2bn[120]

The growth rate in 2013[GR]= 50450.2/489465.2=0.103072

As a result, the growth rate for year 2012 is approximately 10.31%.

4. Apply the Growth Rate for the Amount as in 2014

The research applies the growth rate and calculates the estimated amount for 2014,

RMB 367.64bn * (1+0.103072) = RMB 405.53bn[121]

5. Apply the Average Growth Rate for the 10 year Forecast

The research then applies the average growth rate to calculate the forecasted value for the total individual income revenue as in year 2015 to 2024. The compound formula[122] to calculate the future value is listed as follows:

$\mathbf{P_n = P_0 (1+r)^n}$
$\mathbf{P_n}$ is future value of P_0
$\mathbf{P_0}$ is original amount invested
r is the rate of interest
n is the number of compounding periods (years, months, etc.)

In this research, $\mathbf{P_0}$ is the initial amount of the forecast,

$\mathbf{P_0}$ =RMB 405.53bn[123]

[119]Equivalent to AUD 10,090.04 (100 million), the current exchange rate ratio between RMB and AUD is 5:1 as on 30 Sep.2016.
[120]Equivalent to AUD 97,893.04 (100 million), the current exchange rate ratio between RMB and AUD is 5:1 as on 30 Sep.2016.
[121]Equivalent to AUD 85.93bn, the current exchange rate ratio between RMB and AUD is 5:1 as on 30 Sep.2016.
[122]Above n304.
[123]Equivalent to AUD 82.25bn, the current exchange rate ratio between RMB and AUD is 5:1 as on 30 Sep.2016.

R is the average growth rate, **r**=0.084671[124]

The research substitutes 405.53 of $\mathbf{P_0}$ and calculates the corresponding forecasted future amount for each year. The results are reported in Table 2.12.

Table 15: Forecasted Individual Income Tax (RMB billion) from 2014 to 2024

Forecasted Individual Income Tax (RMB billion) from 2014 to 2024											
Year	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Amount	405.53	439.87	477.11	517.51	561.33	608.85	660.41	716.32	776.97	842.76	914.12

Table 15 reports the results of forecasted individual income tax (RMB billion) from 2014 to 2024.

6. Discount the Forecasted Value to the Present Value

At this stage, the research applies the discount factor, as stated in previous section, of 7%[125] to calculate the present value for the estimated amount as in 2014.

The detailed calculation procedures are explained and demonstrated in the previous section, so this section only reports the results.

Table 16: Present Value of Individual Income Tax (RMB billion) from 2014 to 2024

Presented Value Individual Income Tax (RMB billion) from 2014 to 2024											
Year	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Forecasted Amount	405.53	439.87	477.11	517.51	561.33	608.85	660.41	716.32	776.97	842.76	914.12
Discounted Amount	405.53	411.09	416.727	422.44	428.23	434.1	440.06	446.09	452.21	458.41	464.69
NPV	RMB: 4779.6Billion										

Table 16 reports the results of presented individual income tax (RMB billion) from 2014 to 2024.The research adds the 10 values together to conclude the net present value. From the Table 6.14, the NPV under the family based filing approach is RMB 4779.6bn.[126]

2.2.4: Step 2 - Consideration of the Singles in the Population

Step 1 identified the net present value of total income for the 10-year-forecast based on the current under the current filing method and the family based filing method. It explained the key elements for the calculation under the two different bases. A further step is necessary to review the experiment design to improve the robustness of the research, as not all taxpayers are married.

The quantitative research is based on the assumption of the urban nuclear family in the PRC. For the calculation of total income tax revenue according to the current filing method, it has been assumed that the majority of individual income tax is in the urban area. For the family based filing approach, Step 1 only generated the model suitable for taxpayers who are part of a

[124]Adapt from Step One.
[125]Above n291.
[126]Equivalent to AUD 1012.8bn, the current exchange rate ratio between RMB and AUD is 5:1 as on 30 Sep.2016.

family, while ignoring the individual income tax lodgement for single individuals. One-person households[127] include singles, divorcees and widows. The estimation of the total individual income tax revenue based on family filing should also include one-person households.

2.2.4.1 Calculation of the Income Tax Revenue Levied on One-Person Households

The way for individuals belonging to the one-person households to lodge their individual income tax is the same as what taxpayers did under the current approaches.[128] After the taxpayers receive their taxable income, as they do not have other family members for tax purposes, they need to prepare their Individual Income Tax Return Form on an individual basis.[129] As the same lodgement approach is used for all taxpayers, the reported total national individual income tax revenue in 2014 is used for calculations, and the singles rate is also considered.

1. Calculation of the Singles Rate

The research collected the data from the National Bureau of PRC. The NBC selected a sample population size of 938,993[130] to account for people who are 15 and above. According to the definition from the OECD, the working age population[131] is defined as those aged 15 to 64.

This research takes into consideration the lower age limit of 15, but does not limit the income earning age to 64. The quantitative design aims to forecast the individual income tax levied on taxable income. Those individuals over 64 usually receive a pension[132] if they are part of an urban family in the PRC. Therefore, under the global income approach, the source of income from pension funds also need to be included in the taxable income.

Table 17: Three Types of Singles Population in the Sample Population[133]

Database：Annual Year：LATEST10	
Indicators	2014
Population Aged 15 and Over (Sample Survey)(person)	938,993
Male Population Aged 15 and Over (Sample Survey)(person)	475,585
Female Population Aged 15 and Over (Sample Survey)(person)	463,408
Population Aged 15 and Over, Never Married (Sample Survey)(person)	184,889
Male Population Aged 15 and Over, Never Married (Sample Survey)(person)	109,758
Female Population Aged 15 and Over, Never Married (Sample Survey)(person)	75,132
Population Aged 15 and Over, Divorced (Sample Survey)(person)	16,291

[127]Yeung W and Cheung, AKL, 'Living Alone: One-Person Households in Asia' (2015) 32 *Demographic Research* (40) 1099-1112.
[128]Bakija J & Steuerle E, 'Individual Income Taxation since 1948.' (1991)44 *National Tax Journal* (4) 451-475.
[129]Ibid.
[130]The National Bureau of Statistics of China, <http://www.stats.gov.cn/?>.
[131]OECD Data, *Working Age Population,* Online <https://data.oecd.org/pop/working-age-population.htm> (08Aug.2016).
[132]《基本养老保险基金投资管理办法》*Measures for Administration of Basic Pension Insurance Fund Investment 2015* (State Council), Art 2.
[133]The National Bureau of Statistics of China, < http://www.stats.gov.cn/tjsj/>

Male Population Aged 15 and Over, Divorced (Sample Survey)(person)	9,508
Female Population Aged 15 and Over, Divorced (Sample Survey)(person)	6,783
Population Aged 15 and Over, Widowed (Sample Survey)(person)	50,409
Male Population Aged 15 and Over, Widowed (Sample Survey)(person)	15,064
Female Population Aged 15 and Over, Widowed (Sample Survey)(person)	35,345

Table 17 lists the amount of different types of singles population among the sample. There are three categories of one person households; among the sample population for people above 15, 184,890 were single and have never being married, taking up 19.7% of the total sample size; 16,291 were divorced but were not remarried, accounting for 1.73% of the total sample; and 50,409 have been widowed and were not remarried, accounting for 5.4% of the total sample. The research adds up the total number of people from the three groups and divides the amount by the total size to calculate the singles rate.

Total amount of single persons in the sample

184,890+16,291+50,409=251,590

Singles rate=Total number of single person/ Total population within the sample

Singles rate: 251,590/938,993=0.267936

The singles rate is approximately 26.8% in the PRC.

2. The Calculation Procedure

a. Calculation of Income Tax Revenue for the One-Person Households

Individual income tax revenue for the one-person household is calculated by applying the singles rate to the total individual income tax revenue in 2014. The same procedures have been adopted for the calculation of the forecasted amount in each year by inflating the amount of income tax revenue from 2014 to 2024 with the same growth rate as in step 1. After the calculation of the forecasted amount for the next 10 years, the research discounts those forecasted amount to the base year of 2014 using the given social discount rate of 7%. The total net present value of national income tax revenue for a one-person household is the sum of the ten net present values.

The formula[134] developed to calculate the total income tax revenue for singles is;

Total income tax revenue for singles (TYS) = Total income tax revenue (TY) * singles rate (S)

TYS = TY*S

The growth rate and discount rate applied in this step is exactly the same as the previous step, and the calculation procedures are the same, so step 2 only reports the result of the forecast.

[134]Above n332.

In this research, the amount of total income revenue in 2014 is RMB 7,376.61bn. So the total income tax revenue for singles is RMB 1,976.459bn.[135]

Total income revenue in 2014 for singles = 7376.61* 0.267936 RMB 1976.459bn

Table 18: Present Value of Individual Income Tax (RMB billion) from 2014 to 2024 for Singles

Year	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Forecasted Amount	1976.459	2143.808	2325.326	2522.214	2735.772	2967.413	3218.667	3491.194	3786.797	4107.429	4455.209
The present value	1976.459	2003.559	2031.03	2058.878	2087.107	2115.724	2144.733	2174.14	2203.95	2234.169	2264.802
NPV										23294.55bn	

The total net present value of income tax revenue for one-person households under the family based filing approach is RMB23294.55bn.[136]

b. Estimation of Income Tax Revenue for the Urban Nuclear Family

The calculation procedures are the same as step 1 except for the change in the number of people in the labour force in the urban area. Step 2 only includes married people for family revenue estimation.

This step subtracts the amount of one-person household from the total number of people in the urban labour force.

Number of married people in the labour force in urban area[137] ($N_{married}$) = Total population in the workforce in the urban area (N_{total}) * single rate in the urban area (S)

$N_{married}$ = 371.02*(1-0.267936) = 271.61(Million)

The calculation process for the estimated total individual income tax revenue is the same in this step compared with the previous step, except for the changing of the number of people in the labour force in the urban area from 371.02 (million) to 271.61 (million).

The calculation of the estimated amount of individual income tax for households under the family-based filing approach in 2012 is demonstrated in the following table.

[135]Equivalent to AUD 395.29bn, the current exchange rate ratio between RMB and AUD is 5:1 as on 30 Sep.2016.
[136]Equivalent to AUD 4658.91bn, the current exchange rate ratio between RMB and AUD is 5:1 as on 30 Sep.2016.
[137]Above n332.

Table 19 Calculation of Total Individual Income Tax under Family Filing Approach in 2012(RMB) for Households

Calculation of Total Individual Income Tax under Family Filing Approach in 2012 (RMB) for Households													
Decile Groups	Per Capita Total Income of Urban Households (RMB)	Order ID	Marched Pairs	Family Member A Annual Income	Family Member B Annual Income	Sum of family annual Income	Average Annual Income per person	Income per month per person	Income Tax per month per person	Annual Income tax amount per person	Numbers of people in the labour force in the urban area (Million)	Total Income Tax (Million)	
0-10%	9209.5	1	1,7	9209.5	69877.3	79086.8	39543.4	3295.2833	0	0	271.61	0	
10%-20%	13724.7	2	1,6	9209.5	43471	52680.5	26340.25	2195.0208	0	0	271.61	0	
20%-40%	18374.8	3	1,5	9209.5	32758.8	41968.3	20984.15	1748.6792	0	0	271.61	0	
40%-60%	24531.4	4	1,4	9209.5	24531.4	33740.9	16870.45	1405.8708	0	0	271.61	0	
60%-80%	32758.8	5	1,3	9209.5	18374.8	27584.3	13792.15	1149.3458	0	0	271.61	0	
80%-90%	43471	6	1,2	9209.5	13724.7	22934.2	11467.1	955.59167	0	0	271.61	0	
90%-100%	69877.3	7	1,1	9209.5	9209.5	18419	9209.5	767.45833	0	0	271.61	0	
			2,7	13724.7	69877.3	83602	41801	3483.4167	0	0	271.61	0	
			2,6	13724.7	43471	57195.7	28597.85	2383.1542	0	0	271.61	0	
			2,5	13724.7	32758.8	46483.5	23241.75	1936.8125	0	0	271.61	0	
			2,4	13724.7	24531.4	38256.1	19128.05	1594.0042	0	0	271.61	0	
			2,3	13724.7	18374.8	32099.5	16049.75	1337.4792	0	0	271.61	0	
			2,2	13724.7	13724.7	27449.4	13724.7	1143.725	0	0	271.61	0	
			3,7	18374.8	69877.3	88252.1	44126.05	3677.1708	5.31	63.72	271.61	17306.989	
			3,6	18374.8	43471	61845.8	30922.9	2576.9083	0	0	271.61	0	
			3,5	18374.8	32758.8	51133.6	25566.8	2130.5667	0	0	271.61	0	
			3,4	18374.8	24531.4	42906.2	21453.1	1787.7583	0	0	271.61	0	
			3,3	18374.8	18374.8	36749.6	18374.8	1531.2333	0	0	271.61	0	
			4,7	24531.4	69877.3	94408.7	47204.35	3933.6958	13.02	156.24	271.61	42436.346	
			4,6	24531.4	43471	68002.4	34001.2	2833.4333	0	0	271.61	0	
			4,5	24531.4	32758.8	57290.2	28645.1	2387.0917	0	0	271.61	0	
			4,4	24531.4	24531.4	49062.8	24531.4	2044.2833	0	0	271.61	0	
			5,6	32758.8	43471	76229.8	38114.9	3176.2417	0	0	271.61	0	
			5,7	32758.8	69877.3	102636.1	51318.05	4276.5042	23.31	279.72	271.61	75974.749	
			5,5	32758.8	32758.8	65517.6	32758.8	2729.9	0	0	271.61	0	
			6,7	43471	69877.3	113348.3	56674.15	4722.8458	36.69	440.28	271.61	119584.45	
			6,6	43471	43471	86942	43471	3622.5833	3.69	44.28	271.61	12026.891	
			7,7	69877.3	69877.3	139754.6	69877.3	5823.1083	127.3	1527.6	271.61	414911.44	
											Total Amount	24365.745	Million
												243.66	Billion

The research then inflates the total individual income tax for households from 2012 to 2014.

The growth rate of 10.45%[138] for income tax in year 2012 (calculated in previous section) is applied and the amount of income tax revenue for 2013 is calculated as follows:

$$243.66* (1+0.1045) = \text{RMB } 269.12\text{bn}^{139}$$

The amount for income tax revenue in 2013 for households is RMB 269.12bn.

The growth rate of 10.31%[140] for income tax in year 2013 (calculated in previous section) is applied and the amount of income tax revenue for 2014 is calculated as follows:

$$269.12*(1+0.1031) = \text{RMB } 296.87\text{bn}^{141}$$

The amount for income tax revenue in 2014 for households is RMB 296.87bn.

[138]Adapted from Step One.
[139]Equivalent to AUD 57.03bn, the current exchange rate ratio between RMB and AUD is 5:1 as on 30 Sep.2016.
[140]Adapted from Step One.
[141]Equivalent to AUD 62.91bn, the current exchange rate ratio between RMB and AUD is 5:1 as on 30 Sep.2016.

The step further applies the growth rate of 8.47% and the discount rate of 7% to inflate the projected cash flows and then discount those cash flows to the base year.

Table 20: Present Value of Individual Income Tax (RMB billion) from 2014 to 2024 for Households

Presented Value Individual Income Tax (RMB billion) from 2014 to 2024 for Households.											
Year	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Forecasted Amount	297	322	349	379	411	446	483	524	569	617	669
Present Value	297	300	305	309	313	318	322	327	331	336	340
NPV										RMB3499Billion	

Table 20 summarises the presented value of individual income tax from 2014 to 2024 for households.

c. Report the Final Results

Step 2 considers the income tax lodgement for the one-person households and the families. Based on previous calculation, the NPV of family based total income tax is RMB 3,499bn,[142] the NPV of one-person households' total income tax is RMB 23,294.55bn,[143] and the NPV of total individual income tax is RMB 26,793.55bn.[144]

2.2.5: Step 3 - Take Singles and Equal Random Sample into Account

After reviewing the previous two steps for the quantitative design, the issue of random sampling distribution[145] has been identified and will be addressed in this step.

For the measure of individual income tax revenue estimation according to family-based filing, the first and second step directly used the seven levels of annual income groups classified by the National Bureau of Statistics. When reviewing the measurement, the distribution of those seven income groups in the population is not equal. Group 1 represents the 10% of the population who earned the lowest annual income in the urban area; the second lowest earning group also takes up 10% of the total population. Groups 3, 4 and 5 occupies 20% of the total population, and Groups 6 and 7 are the two groups with the highest annual income, accounting for 10% of total population respectively. Since the proportion of Groups 3,4 and 5 earners are twice the number of individuals belonging to Groups 1,2,6 and 7, if a random person is selected from the total population, the probability for the person's income falling into Groups 3,4 and 5 is two times the probability of them falling into Groups 1,2,6 and 7.

In order to make the pair matching of couples randomly distributed, Step 3 for this research considers redistributing the family groups. Group 1 and 2 can be combined to form the new Group 1', accounting for 20% of the total population. The annual income for the new Group 1' is the average amount of the old group 1 and 2;

[142]Equivalent to AUD 699.8bn, the current exchange rate ratio between RMB and AUD is 5:1 as on 30 Sep.2016.
[143]Equivalent to AUD 4658.91bn, the current exchange rate ratio between RMB and AUD is 5:1 as on 30 Sep.2016.
[144]Equivalent to AUD 5358.71bn, the current exchange rate ratio between RMB and AUD is 5:1 as on 30 Sep.2016.
[145]Wonnacott T & Wonnacott R, Introductory Statistics. (New York: Wiley, 1972), at 296.

(9209.5+13724.7)*0.5=RMB 1,1467.10

At the same time, combining group 6 and 7 to create the new Group 5', also allows it to account for 20% of the total population. The annual income for the new Group 5' is the average amount of the old groups 6 and 7;

(43471+69877.3)*0.5=RMB 5,6674.15

Now the newly arranged groups with their Per Capita Total Income and Order ID are shown in the following table.

Table 21 Ranking of Per Capita Total Income of Urban Households (Rearrangement)[146]

Decile Groups	Per Capita Total Income of Urban Households(yuan)	Order ID
Per Capita Total Income of Urban Households, Low Income Households(0-20%)(RMB)	11467.1	1'
Per Capita Total Income of Urban Households, Lower Middle Income Households(20%-40%)(RMB)	18374.8	3
Per Capita Total Income of Urban Households, Middle Income Households(40%-60%)(RMB)	24531.4	4
Per Capita Total Income of Urban Households, Upper Middle Income Households(60%-80%)(RMB)	32758.8	5
Per Capita Total Income of Urban Households, High Income Households(80%-100%)(RMB)	56674.15	5'

Table 21 lists the 5 rearranged income distribution groups with their own order ID.

Once the 5 groups are formed, the next step is to select any two individuals from those five groups to form a family. There are 25 potential combinations with an equal occurrence possibility.

Table 22 All Possible combinations among 5 different groups

All Possible combinations among 5 different groups				
1',5'				
1',5	3,5'			
1',4	3,5	4,5'		
1',3	3,4	4,5	5,5'	
1',1'	3,3	4,4	5,5	5',5'

[146]National Bureau of Statistics of the People's Republic of China, <http://data.stats.gov.cn/easyquery.htm?cn=C01&zb=A0A0405&sj=2014>.

Table 22 is the summary of the possible combinations of the pair matching.

2.2.5.1 The Calculation Procedures

The other measurement methods and calculation procedures are exactly the same as Step 2 except for taking random distribution into account. Under the family based approach, for all of the 25 possible family combinations, Step 3 estimates the average family annual income per head and apply the corresponding tax rate to get the annual income tax amount per head. The research then multiplies the annual income tax per head by the total number of married people in the labour force in urban areas to calculate the total amount of income tax revenue. Step 3 also constructs the discounted cash flow method to calculate the total net present value of national individual income tax revenue.

Calculation Procedure under Random Distribution for Households

This section adopts the new arranged matched pairs and the corresponding Order ID and Per Capita total income. The full calculation is shown in Table 2.20.

Table 23: Total Individual Income Tax under Family Filing Approach in 2012 for Random Distribution

Table 4.20 Calculation of Total Individual Income Tax Under Family Filing Basis in 2012 (RMB) for Households Random															
Decile Groups	Per Capita Total Income of Urban Households (RMB)	Order ID	Marched Pairs	Family Member A Annual Income	Family Member B Annual Income	Sum of family annual Income	Average Annual Income per person	Income per month per person	Income Tax per month per person	Annual Income tax amount per person	Numbers of people in the labour force in the urban area (Million)	Total Income Tax (Million)			
0-20%	11467.1	1'	1',5'	11467.1	56674.15	68141.25	34070.625	2839.2188	0	0	271.61	0			
20%-40%	18374.8	3	1',5	11467.1	32758.8	44225.9	22112.95	1842.7458	0	0	271.61	0			
40%-60%	24531.4	4	1',4	11467.1	24531.4	35998.5	17999.25	1499.9375	0	0	271.61	0			
60%-80%	32758.8	5	1',3	11467.1	18374.8	29841.9	14920.95	1243.4125	0	0	271.61	0			
80%-100%	56674.15	5'	1',1'	11467.1	11467.1	22934.2	11467.1	955.59167	0	0	271.61	0			
			3,5'	18374.8	56674.15	75048.95	37524.475	3127.0396	0	0	271.61	0			
			3,5	18374.8	32758.8	51133.6	25566.8	2130.5667	0	0	271.61	0			
			3,4	18374.8	24531.4	42906.2	21453.1	1787.7583	0	0	271.61	0			
			3,3	18374.8	18374.8	36749.6	18374.8	1531.2333	0	0	271.61	0			
			4,5'	24531.4	56674.15	81205.55	40602.775	3383.5646	0	0	271.61	0			
			4,5	24531.4	32758.8	57290.2	28645.1	2387.0917	0	0	271.61	0			
			4,4	24531.4	24531.4	49062.8	24531.4	2044.2833	0	0	271.61	0			
			5,5'	32758.8	56674.15	89432.95	44716.475	3726.3729	6.78	81.36	271.61	22098.19			
			5,5	32758.8	32758.8	65517.6	32758.8	2729.9	0	0	271.61	0			
			5',5'	56674.15	56674.15	113348.3	56674.15	4722.8458	36.69	440.28	271.61	119584.45			
											RMB	9445.5094	Million		
											RMB	94.46	Billion		

Table 23 is the demonstration of the calculation procedures about the total individual income tax amount in 2012. The amount is RMB 94.46bn.

The research inflates the amount to 2013:

$$94.46*(1+0.1045) = \text{RMB } 104.33\text{bn}$$

The research then inflates the amount to 2014:

$$104.33*(1+0.1031) = \text{RMB } 115.09\text{bn}^{147}$$

[147]Equivalent to AUD 24.39bn, the current exchange rate ratio between RMB and AUD is 5:1 as on 30 Sep.2016.

Step 3 then compounds the amount of total income tax revenue for married taxpayers into the next 10 years and constructs the discounted cash flow analysis to work out the NPV of the national income tax revenue under a family based filing approach.

Table 24: Present Value of Individual Income Tax (RMB billion) from 2014 to 2024 for Households for Random Distribution

Year	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Forecasted Amount	115.09	124.83	135.4	146.87	159.31	172.79	187.42	203.29	220.51	239.18	259.43
Present Value	115.09	116.67	118.27	119.889	121.53	123.2	124.89	126.6	128.34	130.1	131.88
NPV									RMB 1356.5billion		

Under the family-based filing approach for the randomly distributed matched pairs, the final step applies the singles rate to the total income tax revenue for 2014 to calculate the amount for a one-person household. There is no change between Step 2 and Step 3. The amount for the NPV of single households is RMB 23294.55bn,[148] and the amount for the NPV of households under family-based filing approach under the random distribution is RMB 1356.5bn. The total amount of net present value is RMB 24,651.05bn.

2.3 Discussion of the Results from the Pilot Study

2.3.1 Summary for the Pilot Study

Based on the results from Module 1 and Step 3 of Module 2, the forecasted value for the total individual income tax revenue under the existing income tax filing status is RMB 86,940.62bn, [149] whereas the amount under the family-based filing approach is RMB 24,651.05bn.[150] If the government undertakes the individual income tax reform, it will only receive approximately 28.4% of the total tax revenue compared with the of the current approach. There is a significant gap between the revenue before and after the changing of the filing approach. This means there is a breach of the principle of "revenue neutrality." The government will only provide the tax benefit to the taxpayers when the policy changes do not bring in a negative effect. From a revenue approach, it is not appropriate for the Chinese government changing its income tax filing method from individual based to family based.

2.3.2 Implementation of the "Revenue Neutrality" Criteria

"Revenue neutrality" is selected as the criteria to assess the appropriateness for the People's Republic of China (PRC) to consider family based individual income tax filing of income tax returns. Based on the "revenue neutrality" criteria, changes of the filing approach for individual income tax should not materially affect the national individual income tax revenue in the PRC. If, finally, there is a significant difference in the estimated amount of national income tax revenue under the family filing approach and the individual based approach, the significant revenue gap would breach the "revenue neutrality" criteria.

[148]Equivalent to AUD 4658.91bn, the current exchange rate ratio between RMB and AUD is 5:1 as on 30 Sep.2016.
[149]Equivalent to AUD 17,388.12bn, the current exchange rate ratio between RMB and AUD is 5:1 as on 30 Sep.2016.
[150]Equivalent to AUD 1475.32bn, the current exchange rate ratio between RMB and AUD is 5:1 as on 30 Sep.2016.

2.3.3 Results

Results from the pilot study reports that the projected revenue from allowing family based individual income tax filing would be at a level that is closer to 30% of revenue collectable if the PRC does not allow family based individual income tax filing. This result breaches the "revenue neutrality" criteria. This result suggests that policy makers in the PRC need to take careful considerations of costings before proceeding with the reform.

Apart from the administrative aspect, the research costed the administrative reform plan proposed by scholars who suggested the family-based filing approach. The amount of individual income tax liability relates to the vital interest of each individual. The change of filing approach should ideally result in a lower individual income tax burden for taxpayers after the reform. On the other hand, tax is the major source of government revenue.[151] From the results of the pilot study, the proposed reform plan will result in significant reduction in the national individual income tax revenue, which breaches the criteria of "revenue neutrality". When there is a substantial national revenue loss after a reform, and the reform process is very complex as considering a lot of demographic and fiscal issues, there is not enough motivation for taxation authorities to continue the reform.

2.4 Conclusion

A review of the literature shows that Chinese scholars and commentators suggest that the PRC could learn directly from the US, and adopt their global income tax system and allow family based filing of individual income tax returns. The literature does not provide reasons for this suggestion.

This paper reports results from a feasibility study to assess whether the PRC could adopt the suggestions proposed by the prevailing literature. The study is performed based on a "revenue neutrality" [152] analysis that compares projected revenue from existing policies, and that collectable if China allows family based individual income tax filing.

[151]Thuronyi V, ed, *Tax Law Design and Drafting*, (Washington DC: International Monetary Fund, 1996), at 531.
[152]Bradford DF, *Taxation, Wealth, and Saving*. (Massachusetts: MIT Press, 2000), at 167.