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本國多國籍企業租稅效率之創新衡量：以公開財務報表為基礎之次級資料分析

蔡明宏
國立中央大學企業管理學系副教授
朱俊傑*
國立中央大學企業管理學系博士研究生
財政部賦稅署稽核組稽核

摘要

由於多國籍企業跨國營運存在跨越國界調派資源以及匯集營收之特性，因各國複雜的稅法與稅制，致其管理當局慣以ROE衡量其跨國營運績效之方式，尚無法評估有關跨國營運獲利遭受各國課稅之侵蝕程度，亦引發其日後對其跨國營運績效衡量時，因忽略上述國際租稅因素，致產生無法反映其營運現金流量實際遭各國課稅侵蝕程度的缺失。因此，本研究乃建立衡量多國籍企業全球節稅指標模型，並按照台灣知名多國籍企業多年度財務報表資料，藉上述模型予以比較分析有關企業跨期全球租稅效率之表現。結果顯示各集團企業之境外直接投資國家愈多以及多角化營運程度愈高時，則其相對之全球租稅效率愈差，且當各集團控股層級數愈多時，亦出現全球租稅效率不佳之情形。

關鍵詞：多國籍企業、跨國營運、策略、節稅、全球租稅效率

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Innovative Measurement for The Tax Strategy Performance of the Main Taiwanese Multinational Enterprises: The Secondary Data Analysis Based on the Public Financial Statements in Taiwan

Ming-Hone Tsai
National Central University
Department of Business Administration
Chun-Chieh Chu
National Central University
Department of Business Administration
Taxation Administration, Ministry of Finance, R.O.C

Abstract

Multinational enterprises usually share the characteristics of being able to transfer resources and collect revenue internationally because of their cross border business operations. However, the complexity of international tax laws and tax systems have meant that the headquarters of multinational enterprises are not able to depend on simply using the return on equity (ROE) to obtain an accurate evaluation of their cross border business tax strategy performance. This is because the ROE fails to measure the degree of erosion of cross border transaction profits after taxation by the tax authorities of the source countries. This study builds a model for the measurement of a multinational enterprise's global tax strategy performance by creating the global tax efficiency index (G.TEI). The functioning of the model is tested on several years of annual financial data for several representative Taiwanese multinational enterprises (MNEs). The model is used to analyze and compare the tax efficiency of the related multinational enterprises from cross sectional and inter period points of view. The results show that the number of the foreign direct investment host countries, the diversification of the business operations and the layers of the holding structure of the MNEs are determinant to the global tax efficiency.

Keywords: *Multinational Enterprises, Cross Border Business Operations, Strategy, Tax Saving, Global Tax Efficiency*

INTRODUCTION

The measurements used for the optimization of the foreign direct investment (FDI) portfolio of multinational enterprises (MNEs) are usually a highly valued corporate strategy management issue. Apple Inc. and Google Inc. are two world-renowned U.S. MNEs that demonstrate good operating performance and tax saving strategy. For instance, Apple Inc. reported its global revenue to be 170.9 billion dollars in 2013, with a return on equity (ROE) and effective corporate tax rate of 30 percent and 26 percent, respectively. During the same period, Google Inc. reported global revenue of 59.825 billion dollars and an ROE and effective corporate tax rate of 14 percent and 16 percent, respectively. The effective corporate tax rates of both these companies were below the U.S. corporate tax rate of 35 percent. Clearly both of these U.S. MNEs maintained high profitability and tax saving benefits. Typically, in theoretical studies, it is the Return on Equity (ROE) that is used to evaluate the MNEs' integrated cross border operation efficiency with the focus on the combination of various sources of capital, on diversification among various industries and on geographic diversification among different jurisdictions.

However, in circumstances where the MNEs maintain cross border business operations, there is risk arising from the complicated tax laws and tax systems in the different source states and the complexity of cross border transactions between the related parties, both in relation to how the MNEs and associated independent enterprises are taxed. Unfortunately, the headquarters of the MNEs are often ignorant of the tax risk, which can lead to imbalanced results for their financial operations. They unconsciously compare the aggregate tax burden from their cross border business operations to the tax burden of those engaging in those operations in their resident countries, depending only on the ROE as an indicator to measure their cross border business operation performance. This can cause a mismatch in the principle of achieving cross border business operation efficiency for maximum profit after tax.

In addition to knowing the determinants for the MNEs' geographic diversification decisions, we need to take into account related operational

skills, operational environments, objectives, knowledge, markets and resources (Dunning 1998; Nachum, Zaheer and Gross 2008a). However, research and knowledge of appropriate solutions to issues related to international tax law and tax systems connected to the MNEs' FDI decisions are lacking, therefore, the measurement of the performance based on these decision definitely does not reflect the reality of the situation. The performance of the MNEs' FDI should be expressed appropriately based on after-tax operating profit which is critical to their liquidity and relevant to sustainability. There are some valuable cases which we can examine that illustrate the importance of after-tax operating profit as reported for business operation performance: first of all, in 2009, the well-known car manufacturer Toyota was assessed a 250 million dollar corporate income tax bill by the Australian Tax Office, the result of which drove the company's annual earnings into the red (Hagon 2010). The second case is that of the personal computer, digital and mobile communication device giant, Apple Inc. who reported after-tax earnings of 37 billion dollars in 2013. Their effective tax rate of 24.41 percent was obviously lower than the US corporate income tax rate of 35 percent. Last but not the least is the case of Google Inc. This high-tech MNE's extraordinary performance not only comes from its remarkable business operation efficiency, but is also enhanced by its sophisticated tax efficient business model and global profit allocation structure as. For instance, the MNE's worldwide revenue was reported to be 50.17 billion dollars in 2012. However, its effective corporate income tax rate was only 2.4 percent, far below the US tax rate of 35 percent (Ven den Hurk 2014). In summary, the critical point is that if the MNEs' FDI strategy is not evaluated based on international taxation laws such as tax treaties, transfer pricing regulations, corporate income tax rates and withholding tax rates in both the home country and the host country, it can create problems. The ignorance of international taxation factors related to the MNEs' after-tax profit can have serious consequences and lead to inefficient FDI decision-making.

Prior evidence has shown the importance of after-tax operating profit, and that the factors relevant to international taxation for both the MNE's home country and host country must be regarded as critical elements for

measuring the performance of the FDI decisions. Otherwise, FDI decision inefficiency will be inevitable. The MNEs' international taxation planning operations are not transparent and it is not possible to obtain tax return information due to overall protective regulations designed to protect the taxpayer as well as prevent disclosure of their financial information and so many limitations exist. Thus, the purpose of this paper is to develop a simple but robust model to measure an MNE's global tax efficiency, by using the capital for the entire enterprise group as a basis and comparing the capital of the parent company with its subsidiaries. This ratio is then used to calculate the weighted average aggregate effective tax rate, which is as an indicator for the measurement of their global tax efficiency. That is to say the model offers a function for evaluating how much of a tax burden is placed on each dollar of the MNE's investment. The goal is to build an effective indicator for precisely detecting the MNEs' global tax efficiency. The model is designed to enable management to understand the financial strategy performance of the MNE and to evaluate its sustainability. A study is also conducted in order to realize the effectiveness of the tax haven strategy adopted by Taiwanese MNEs. The main data sources are the top three Taiwan based MNEs with the largest amounts of assets across various industries, obtained from the Taiwan Economic Journal (TEJ) databank. Some conclusions are offered in the last section.

1. LITERATURE REVIEW

There are many articles and empirical studies dealing with how the differentiation of international taxation standards influences the MNEs' strategic decision making. However these have usually been focused on considerations of cross border investment location choices, limited by knowledge of the host country and the local market. In addition to knowledge of the host country, including its domestic tax laws, government intervention and cross border regulations, it is also necessary to analyze the substantial effect of domestic tax laws on the MNEs' cross border investment (Nachum et al. 2008b). In addition, the themes related to diversification of taxation should include decisions about investment amounts and geographic locations related to the MNEs' FDI, tax avoidance by moving substantial business operations from a high tax rate area to a low tax rate area, intra loans to associated

overseas enterprises, transfer pricing between the MNE's subsidiaries and the choosing of appropriate legal forms for foreign operations. All of the above factors are closely connected to international tax planning; however, they are usually ignored in the MNEs' integrated operational strategy formation process (Glaister and Hughes 2008a). In order to achieve the optimal cross border investment strategy decisions, MNEs should take into account of the related tax systems and international tax laws of both the home country and the host countries, when they engage in planning investment strategies.

The rest of this chapter is divided into three parts: The first part includes a discussion of the interaction between the integrated operation strategy and taxation strategy, aimed at identifying the relationship between the two strategies and which is dominant or subordinate. Researchers' opinions are also included for consideration, as well as the methods used and the purposes of the integration of the two strategies. The second part is an interpretation of what is tax efficiency for the MNEs and the principles for how to achieve it. The last part comprises an analysis and further discussion of the study in order to evaluate the influences of international taxation on the MNEs' cross border operation strategies in the past.

2.1 THE INTERACTION BETWEEN THE INTEGRATED OPERATION STRATEGY AND TAXATION STRATEGY

The considerations of investment scale and geographic locations for MNEs' cross border operational strategies not only include the functions related to allocations in their global supply chain, financing of foreign associated enterprises and the choice of legal forms for foreign operations and organization, but should also take into account the relevance of international taxation impact. To achieve the ultimate goal of maximum global after-tax profit an efficient taxation strategy has be to be taken into consideration in cross border operation strategy decisions. In summary, the two goals of pursuing maximum return on investment and minimizing the tax burden must be both are included in a cross border operation strategy. The MNEs should adopt strategic activities in order to harmonize their global business operation efficiency and global taxation efficiency.

We focus on the formation of an integrated operational and taxation strategy, with internal negotiation decisions, based on the presumption of achieving the optimum integration of the two aforementioned strategies. According to the findings from the qualitative analysis of a set of personal interviews with senior tax practitioners in seven U.K.-based MNEs and the results of quantitative questionnaires received from tax practitioners in 145 U.K. companies, we arrive at the following conclusions: (1) most of the data show that the mindset of the respondents is one where rational decisions can be made in order to obtain the optimal solution; (2) strategic decisions are given priority and tax decisions follow in the wake of strategic decisions; (3) corporate strategy is not the only one area of an MNE's operations affected by taxation considerations. In summary, the optimal strategy for MNE cross border operations should include an overall taxation strategy (Glaister and Hughes 2008b).

In regards to the taxation strategy of MNEs, some studies have argued that it needs to take into account the following elements of cross border investment such as jurisdiction; time periods; organizational forms; contractual forms; and corporate activities. These should effectively connect with an integrated operation strategy and taxation strategy. Tax planning for MNEs is a multifaceted issue. They must compete on a global basis and execute strategies to maximize the net present value of after-tax cash flows, i.e., the MNE seeks to minimize worldwide taxes. The optimal international taxation strategy is thus minimizing international taxation.

The decisions involved in designing an optimal international tax minimization strategy have to be made in conjunction with the overall global strategy of the company and the motivations for creating a multinational entity. Ultimately, the MNE's strategy must incorporate the legal risk, political risk and economic risk, and evaluation of competitive situations to choose the appropriate form of entity and its location. Clearly then, in developing strategies to maximize after-tax cash flow, both tax and non-tax factors must be considered (Yancey and Cravens 1998).

In regards to international tax rules and the tax laws of other countries which have the potential to influence a wide range of corporate and individual

behavior, the most obvious is the location and scope of international business activities, but domestic operations that are connected to foreign operations through various international tax provisions such as transfer pricing regulations and thin capital rule including international anti-avoidance legislation must also be considered (Hines 1999). In addition, some studies have shown that the pre-tax profitability of foreign affiliates is correlated negatively with the host country tax rates (Hines and Rice 1994).

The findings of the studies mentioned above are highly correlated to the declaration made at the meeting of G20 finance ministers and central bank governors in Moscow in July 2013, a declaration that emphasized that all global tax jurisdictions should take note of base erosion and profit shifting (BEPS) issues. In order to minimize BEPS, the meeting called on member countries to examine how their own domestic laws contribute to this and to ensure that international and their own tax rules do not allow or encourage MNEs to reduce overall taxes paid by artificially shifting profits to low-tax jurisdictions. In recent years, a large share of the outward FDI of emerging markets such as Brazil, Russia, India and China (BRIC), is being directed into a smaller number of specific tax havens and offshore financial centers. The establishment of investment-holding companies for taxation related purposes is frequently adduced as a key motivation for the round tripping of these investments. For instance, from 2007 to 2011, 40 to 74 percent of outward FDI from the BRIC countries was concentrated in only two to four tax havens (Buckley, Sutherland, Voss and El-Gohari 2013). The evidence shows that cross border operations are closely connected with international tax planning strategies. As noted, in practice, the taxation of corporate income encourages entrepreneurs and managers to structure and conduct their business operations in ways designed to avoid taxes (Hines 2001).

From previous examination of MNE taxation strategies in cooperation with their cross border operation strategy, it is clear that practitioners are increasingly calling for companies to develop coherent tax strategies. For instance, various events have conspired to push tax matters onto board agendas, but there is little evidence of an overall tax strategy, no well thought-through technically robust, philosophically coherent set of policies, principles and objectives (McCormick 2004).

Finally, from the viewpoint of the MNE, taxes are often simply seen as one cost among many, and like other costs, they may seek to reduce taxes in order to maximize profits. Whilst the corporate group is often indifferent to the country to which it pays taxes, it has an economic incentive to minimize tax payments overall, and maximize tax benefits. However, taxation strategy, no matter what its nature is a multifaceted issue. Therefore, MNEs wanting to execute an integrated operating strategy for maximizing enterprise value and returns cannot ignore the making of strategic goals designed to maximize the net present value (NPV) of after-tax cash flow. That is to say the role and importance of international tax planning strategy in an MNE's global operation strategy definitely should not be neglected (Vann 2002).

2.2 TAX EFFICIENCY FOR THE MNES AND PRINCIPLES FOR ITS ACCOMPLISHMENT

The definition of tax efficiency used in this study is mainly based on the tax planning practices of MNEs designed to achieve the lowest tax burden possible among those engaging in the same or similar types of global financial operations. This differs from the economic efficiency of taxation in economics and finance theories (Amromin 2002; Sanchez 2006; Amegashie 2009). Tax efficiency is defined based on the viewpoint of well-known international CPA firms such as KPMG or DELOITTE. It is emphasized that international taxation considerations are essential factors for multinationals to reach their goals of tax efficiency and cross-border business operation performance. They are dealing with global business operation issues such as global sourcing, contract manufacturing, shared services, process efficiency, cost optimization, capacity management, distribution network management, freight and logistics, sales and distribution and so on, and they are also concerned with tax considerations related to the above issues such as asset disposition, transfer pricing, profit repatriation, location of taxable events, permanent establishment issues and incentives. Effective tax planning is a critical factor for the successful cross-border operation supply chain management from the head office of the MSN. The participation of taxation experts to offer their views in each stage of the supply chain is needed. These experts can clearly identify potential tax saving interests and the potential pitfalls of the application of related tax laws. This leads to the motivation for

this study, to build an index for measuring the global tax planning strategy performance of Taiwanese multinationals. This tentative index can be used to determine possible global operating profits after taxes and to plan to be able to reach the goal of reducing the tax burden on each dollar of FDI returns by adopting tax planning strategies that are relatively lower than the tax burden on the same amount of investment for business operations in Taiwan thereby gaining a tax saving benefit. A tax planning strategy is an indispensable part of the MNE's own global operation strategy. The goal of the taxation strategy and the principles for achieving good performance are outlined below: (1) The goal of the MNE's global operations is generally to achieve the optimal supply chain, i.e., pursue the minimum cost or maximum profit for the entire MNE. In other words, the adoption of a global decentralization business model and the operation goals should maximize the after-tax operating profit by economic value added (EVA) (Presutti and Mawhinney 2007). The central head-office of the MNE needs to take particular account of the transactions between intra group members, major elements of which are the supply chain for the raw materials, the manufacturing facilities, the distribution network and the third party such as the customers, and whether these four major and highly interacting elements can fulfill the conditions for pursuing maximum after-tax operating profit. The critical point for the above considerations is not only to verify the effectiveness of the operational strategy for pursuing the maximum after-tax operating profit, but also being able to realize the related international taxation regulations and the domestic tax laws regarding corporate taxes on the profit arising from the above transactions and withholding tax on related dividends and royalties due to the after-tax profit distribution and intangibles such as licensing among the MNE group members between the home country and host countries. The international taxation laws and regulations are important factors influencing the tax efficiency in the MNE's cross border business operations. In summary, the key factors determining whether the MNE can accomplish the goal of maximum after-tax net operating profit based on the tax efficiency of its cross border business operations. (2) The second principle is the MNE's pursuit of the maximum after-tax operating profit for the optimum supply chain, and the causes of the functions provided by the major elements of the supply chain producing relative economic value added on the basis of open market

presumption. In other words, returns are expected to increase following an increase in risk. The risks usually following the functions performed can include market risk, risk due to loss of investment and assets, failure of R&D risk, risk of financing and management, and credit risk. Therefore, the performing of more functions is followed by higher relative risk, and higher economic value is added (OECD, Transfer Pricing Guidelines for Multinational Enterprises and Tax Administrations 2010a). Therefore, the basic precondition for accomplishing tax efficiency for the MNE is to place controlled supply chain elements with relatively high EVA as major functions or complex functions in low tax regions, in addition to setting controlled supply chain elements with relatively low economic value and auxiliary or simple functions in the high tax regions.

The principle that is used to recognize the major, complex, auxiliary or simple functions performed by the controlled transaction participants (hereinafter, tested party) is comparison of the significance of the functions performed by the tested party to the related risk. The significance of the functions performed by the tested party is judged by the frequency of the function on both sides of the transaction and the nature and value of the function (OECD, Transfer Pricing Guidelines for Multinational Enterprises and Tax Administrations 2010b). To determine whether each controlled and uncontrolled function is comparable, the OECD suggests using enhanced functional and risk analysis to verify whether the return for the related transaction truly reflects the assets used and the risk. Functional and risk analysis is usually carried out to understand the structure and organization of the tested party, as well as the relationship between the functions performed by the tested party and the business operations of the MNE. The major functions performed by the tested party including any substantial difference in the functions performed between any independent enterprise and the comparable tested party should be identifiable. In order to reflect the real returns for the related functions performed, appropriate adjustment should be made for any existing substantial difference. The adjustment made is related to the revenue, costs, expense loss and profits of the intra MNE group members of which are involved in the related transaction. Therefore, the

results of the adjustment will definitely influence the after-tax net operating profit of the MNE and its tax efficiency.

Comparison of the function performed by the independent enterprise to the related party in the MNE is based on the "Transfer Pricing Guidelines for Multinational Enterprises and Tax Administrations" (hereinafter, Transfer Pricing Guidelines). It is shown that the related functions performed on both sides of the transaction are dependent on the degree of risk allocation for both sides. Therefore, to avoid tax risks arising from the adjustments made by the tax authorities in the host countries and even in the home country, the terms and conditions of MNE's related party transaction need to follow the arm's length principle (OECD, Transfer Pricing Guidelines for Multinational Enterprises and Tax Administrations 2010c).

In summary, to accomplish the goal of tax efficiency in the cross border supply chain operation the MNE needs to follow the Transfer Pricing Guidelines and adopt a strategy where their major or complex functions occur in the low tax region, and their controlled auxiliary or simple functions occur in the high tax region. This tax efficient strategy is used for international tax saving and effectively avoids the risk of violating the arm's length principle so as to counter the huge amount of tax and penalties assessed by the tax authorities in the host countries.

2.3 INTERNATIONAL IMPACT ON THE MNEs' INTEGRATION OF CORPORATE STRATEGY AND TAX STRATEGY

According to a report issued by the United Nations Conference on Trade and Development (UNCTAD) in 2007, MNEs undertook a large amount of cross border investment with an annual growth rate of 12.4 percent from 1990 to 2006, far beyond the economic growth rate of 5 percent for the same period. For instance, the statistics showed global cross border investment cash flows of more than 13 trillion dollars in 2006. Therefore, based on the influence derived from the cross border investment of MNEs, more and more academic researchers and legislators have chosen to examine tax systems and have paid more attention to their the influences. The existing differences between the tax rate and tax systems in many countries create an opportunity for tax arbitrage in favor of the MNEs, accomplished by means of strategic transfer

pricing choices for commodities and services, and transaction and debt financing strategies among the associated enterprises. Regardless of whether or not it is based on concrete evidence, MNEs strive to obtain tax benefits by using tax strategies to shift profits from high tax regions to low tax regions.

For this reason, the adoption of a tax arbitrage strategy by the MNEs, taxation policy makers are cautious in seeking the implementation of anti-avoidance provisions to limit those profit shifting activities, such as Transfer Pricing Regulations, Thin Capitalization Rules, and Controlled Foreign Company Rules. The results of one study confirmed that the MNEs' taxation strategy of profit shifting is motivated by tax avoidance (Dhammika and Nadine 2011). The OECD has recommended the Base Erosion and Profit Shifting (BEPS) action plan to its member countries as a way to prevent serious cross border tax avoidance behavior (OECD, Action Plan on Base Erosion and Profit Shifting 2013).

In addition, it has been argued that the MNE also strives to ensure tax saving by means of their holdings structure. For example, if the withholding tax is quite low or dividends repatriated to the parent company are exempt from taxes, the MNE will tend to directly own the controlled subsidiary. On the one hand, holdings in a group structure are generally established where they can at least potentially allow savings in withholding taxes. Operative subsidiaries tend to be held via subsidiaries located in countries with low withholding taxes for the country of origin of the superior foreign-based company unit. However, most intermediate subsidiaries do not have substantial operational functions. These so-called "paper companies" or "conduit companies" are special purpose entities established to obtain tax treaty benefits.

Subsidiaries having an actual physical operational function tend to be controlled by holding companies established in a tax haven. The existence of an intermediate subsidiary does not lower the overall tax burden, and in some cases the tax burden on repatriated profits for such a holding company is even higher than without it. However, the evidence shows that, even for a group structure with tax efficiency, tax efficiency in which cross border holdings structure is not significant. The factor determining the best location for

holdings establishment is still dependent on the location of the holdings operation. The existence of a bilateral tax treaty between the host countries for the holdings and the controlled subsidiary would certainly motivate the MNE to spread more investment. In summary, taxation does affect the MNE group structure, but given other influencing factors and especially given the need for priority, the influence has limits. The principle that the form of stakeholders' equity follows function remains, but it reveals that the function goes beyond saving withholding taxes or netting profits and losses. MNEs aim at saving taxes through their holding structure, but may retain irrational sovereignty in the setup of their business structure.

MNE set up holdings structures for tax saving purposes, possibly in contradiction to the sovereign management concept in its substantial commercial structure (Daniel 2012). Therefore, while the authority of the MNE faces a choice between the consideration of tax benefit and an exact and manageable group structure, they should take into account the principle that the form of the stakeholders' equity follows function. The organizational structure of the enterprise should be based on its substantial functions in order to avoid violating the principle of "substance over form", a principle usually followed by tax authorities investigating cross border tax avoidance, to avert the risk of taxation penalties in many countries. Tax planning by means of this type of enterprise organization structure without performing substantial functions would definitely have severe consequences that harm the tax efficiency of the cross border businesses operated by the MNEs.

In summary, the related studies have confirmed that MNEs adopt tax avoidance strategies such as profit shifting, the setting up of holdings structures, and offshore finance centers for the purpose of tax avoidance. Most of the taxation strategies involve using low tax countries or regions, "tax havens", to operate tax arbitrage strategies. Nevertheless, the complexity of tax laws and tax systems among the various countries is such that there has so far been a lack of exact measurement methods and indexes for evaluating taxation strategy performance. This study discusses the designing and building of a global tax efficiency model for the measurement of MNE taxation strategy performance. In addition, this study utilizes data on the gap between operating profits before-tax and net income after-tax for multiple

years for several well-known Taiwanese MNEs among representative industries in Taiwan. The global tax efficiency model is then used to conduct comparative analysis of the inter-period global tax efficiency of Taiwanese MNEs.

2. METHODOLOGY

The methodology is designed to effectively measure the global tax efficiency of the observed Taiwanese MNEs, and to realize the inter-period variation in their global tax efficiency in order to shed light on the continuity of the MNEs' tax strategy performance. This method is used with the global tax efficiency indexes for MNEs to measure their integrated taxation strategy performance.

The financial information used in the empirical study was obtained from the TEJ's Financial and Economic Databank System (hereinafter, TEJFED) and included information on Taiwanese MNEs such as the parent company's holding share ratio of the subsidiaries, invested capital, equity, operating profits and the net income of the MNE group's members. Since the financial data accessed from TEJFED are publically disclosed certified financial statements, the results from the tentative measurement of the global tax efficiency of the Taiwanese MNEs have reasonable assurance of credibility. The research period is from 2003 to 2011, and includes the first year (2004) when the Taiwan tax authorities enacted the "Regulations Governing Assessment of Profit-Seeking Enterprise Income Tax on Non-Arm's-Length Transfer Pricing".

The rest of the chapter is divided into three parts. The first part includes a description of the establishment of global tax efficiency and the measurement of the tax strategy performance. The second part describes the data sources, the sampling of the Taiwanese MNEs, and the overview of business operations for the selected Taiwanese MNEs. Finally, the third part includes a comparison and overview of the business operations of the observed Taiwanese MNEs.

3.1 THE ESTABLISHMENT OF GLOBAL TAX EFFICIENCY AND THE MEASUREMENT OF THE TAX STRATEGY PERFORMANC

There is still no exact point of view and related theorem to follow for the measurement of global tax efficiency. Therefore, this study proposes applying the "Global Tax Efficient Index" (G.TEI) model[1] to measure the performance of the MNEs' cross border tax efficiency. The theoretical framework of the G.TEI model is described below.

It is assumed that κi is the ratio of share capital for the MNEs' group members, i.e., the ratio indicates each member corporation's share capital to the sum of the entire MNEs' group share capital. The operating profit is o_i, the non-operating profit is x_i, the net income after-tax is π_{ai}, the net income before-tax is π_{bi}, and the corporate tax rate is t_i, giving the following formulation:

$$\pi_{bi} = O_i + X_i = \frac{\pi_{ai}}{(1 - t_i)} \tag{1}$$

and

$$\text{G. TEI} = \Sigma k_i \times [(O_i + X_i) - \pi_{ai}]/\pi_{bi} \tag{2}$$

then

$$\begin{aligned} \text{G. TEI} &= \Sigma k_i \times (\pi_{bi} - \pi_{ai})/\pi_{bi} \\ &= \Sigma k_i \times [(1 - \pi_{ai}/\pi_{bi})] \\ &= \Sigma k_i \times \left[1 - \left(\pi_{ai}/\frac{\pi_{ai}}{1-t_i}\right)\right] \\ &= \Sigma k_i \times t_i \ , i = 0,1,2 \ldots, n. \end{aligned} \tag{3}$$

The TEJFED does not collect financial information for non-operating profit and losses by the MNEs; therefore, the computed G.TEI is the Adjusted G.TEI, denoted as

$$\text{Adjusted G. TEI} = \Sigma k_i \times (O_i - \pi_{ai})/\frac{\pi_{ai}}{(1-t_i)} \quad , i = 0,1,2 \ldots, n. \tag{4}$$

When i=0, it means that the host country is the home country for the MNE; on the other hand, when i=1, 2,…, n, it indicates that the host countries

[1] The "Global Tax Efficient Index" (G.TEI) model was tentatively built in this study.

are offshore.

In the above formulation, the Adjusted G.TEI is employed as the performance criteria for evaluating the MNE's cross border tax strategy. Empirically, the Adjusted G.TEI utilizes the concept of the aggregate weighted average effective income tax rate of the MNE. However, it does not mean the Adjusted G.TEI is exactly equal to the average effective income tax rate. Sometimes it may be larger than the overall income tax rate or even larger than 1, and the implication is reflected in a multinational's international tax planning strategy as existing tax inefficiency. If the Adjusted G.TEI is less than the home country's corporate income tax rate t_0, then tax efficiency for the MNE exists. On the other hand, if the Adjusted G.TEI is greater than t_0, then a cross border tax strategy is not tax efficient.

In addition there is a possibility of offshore subsidiaries operating at a loss or profits being tiny, but still yielding relatively large amounts of non-operating profit. If the net income after-tax is greater than the operating profit, an extraordinary phenomenon exists, where the total Adjusted G.TEI is less than zero. To fully reflect the actual tax burden on the MNE's cross border business operation income, the part where the Adjusted G.TEI is less than zero should be based on $\Sigma\kappa_i \times t_i$ and then the negative Adjusted G.TEI part should be recomputed. The residual part of the positive Adjusted G.TEI that departs from the negative part should be found. The result of the above calculation is the second adjustment of the negative total Adjusted G.TEI. For instance, in 2008, the Adjusted G.TEI of the Taiwan Cement Corporation Group (TCC) was originally -0.0059, however, following the above calculation to make adjustments, the result for the second adjustment of the negative total Adjusted G.TEI would be 0.1266, which is lower than the Taiwan corporate tax rate of 0.25. From this calculation we can see the cross border tax strategy performance of the TCC in 2008.

The reason for employing κ_i as the weight but not using the ratio for each member corporation's equity as the sum of the entire MNEs' group equity is that the equity will probably be negative in value. Thus, using the equity ratio as the weight to calculate the Adjusted G.TEI would then definitely cause a significant error which would be opposite to the real situation. For instance, if

a certain subsidiary S has equity of -10, and the total equity for the MNE group of S is 1,000, then the equity ratio would be -0.01. As the TEI of S is 0.1, its Adjusted G.TEI would be -0.001, which would be the opposite of the real circumstance. Therefore, this study employs κ_i as the weight to calculate the Adjusted G.TEI.

The net income after-tax is related to the computation of the Adjusted G.TEI. The index is used mainly to evaluate the tax efficiency of MNE cross border business operation. Therefore, if the member in the MNE has any net loss at all, it is not necessary to include this in the computation, because this loss would be non-taxable. In other words, member parts of the MNE with net losses should be excluded.

Table 1 shows the results of the computation of Adjusted G.TEI for the parent company T and its offshore subsidiaries TC, TH, TA and TV in the MNE and the measurement of the MNE's tax efficiency.

Table 1 Results of the Calculation of the Adjusted G.TEI

Company Name	TC	TH	TA	TV	T	Total
Nationality	China	H.K.	U.S.	B. V. I.	Taiwan	
(Tax Rate t_i)	(25%)	(16.5%)	(35%)	(0%)	(25%)	
(1) Share Capital	20	20	20	40	60	160
(2) Ratio of Share Capital (κ_i)	0.125	0.125	0.125	0.25	0.375	1
(3) Equity	30	50	-20	60	80	200
(4) Ratio of Equity	0.15	0.25	-0.1	0.3	0.4	1
(5) Operating Profit	6	8	4	6	10	
(6) Net Income After-tax	4.5	6	2	6	7.5	
(7) TEI (=【(5)-(6)】÷【(6)/ (1- t_i)】)	0.25	0.28	0.65	0	0.25	
(8) Adjusted G.TEI (=(2)×(7))	0.0313	0.035	0.0813	0	0.0938	0.2414

Note: The Adjusted G.TEI results are rounded after the fourth decimal point.

To sum up, the Adjusted G.TEI for the parent company T and its offshore subsidiaries is 0.2414, less than Taiwan's corporate tax rate of 0.25, which verifies the MNE's tax efficiency. The concept of the aggregate weighted average effective income tax rate is adopted in the Adjusted G.TEI. Since the

related financial data were accessed from the publicly certified financial statements, the Adjusted G.TEI can be regarded as an appropriate index for measuring the international tax planning strategy performance of Taiwanese multinationals.

3.2 DATA SOURCES, SAMPLING, AND OVERVIEW OF BUSINESS OPERATIONS FOR THE SELECTED TAIWANESE MNEs

This study is used publically available financial information collected from the TEJFED for the top 100 asset owning Taiwanese enterprises. The standard industrial classification code used by the Taiwan Stock Exchange (TWSE) to account for the characteristics of various industries, including the cement industry for the manufacturing of the infrastructure and main materials, and industries critical for Taiwan's economic development such as the petrochemical industry and semiconductor industry. We selected the following MNEs from the above industries meeting several conditions such as the longest number of years in operation or possessing the most offshore subsidiaries: the TCC, Formosa Plastics Corporation (FPC), and Taiwan Semiconductor Manufacturing Company Limited (TSMC), established in 1950, 1954, and 1987, respectively. Their share-holding ratio was over 50% for the number of offshore subsidiaries until 2011, with 96 subsidiaries for the TCC, 77 subsidiaries for the FPC, and 31 subsidiaries for the TSMC. There were a total of 2,355 applicable sample numbers for the associated enterprises of the Taiwanese multinationals from the years 2003 to 2011. The operating revenue for the three observed MNEs was 315,977 million N.T. dollars for the TCC, 2,380,526 million N.T. dollars for the FPC for and 755,020 million N.T. dollars for the TSMC. Altogether their combined revenues were 34.5 trillion N.T. dollars, approximately 24.13 percent of Taiwan's GNP in 2011. In summary, the observed MNEs in the study, whether from the point of view of industrial identification, the operation history, the degree of operation globalization or the output value, all complied with the most relevant indicators of the themes discussed in this study. Therefore, compared with the other MNEs in Taiwan the three observed MNEs are the most representative ones. We now briefly introduce the three Taiwanese MNEs' business.

3.2.1 The TCC

This MNE's holdings of its associated enterprises shares were over 50 percent globally of a total of 123 companies as of 2011. There were 27

Table 2 Global business operations and the holdings structure of the TCC

Host Country (Area)	Total Number of Associated Enterprises	Description of Business Operations of Associated Enterprises & The Group Holdings Structure	
		Classification of Main Business	Holding Layer (Number of Associated Enterprise)
Taiwan	27	1. Core Business: Mining, Cement Manufacturing, Selling and Processing of Asphalt and Gypsum	0(1), 1(3), 2(1)
		2. Secondary Business: Buying and Selling of Gravel, High Performance Firebrick, Refineries and Petrochemical Raw Materials	1(11), 2(2)
		3. Cross industries: Trading, Electricity, Manufacturing and Sales of Lithium Batteries, Construction, Culture and Information Services	0(1), 1(4), 2(2)
		4. Holding Business: Investment Holding	4(1)
		5. Miscellaneous Business: Unknown	4(1)
China	36	1. Core Business: Limestone Mining, Clay Mining and Sales, Cement Manufacturing and Distribution, etc.	5(10), 6(6), 7(2), 8(2)
		2. Secondary Business: Management of Cement products, Manufacturing and Selling of Cement Production Equipment, Electrical Equipment, etc.	3(2), 4(1), 5(2), 6(1)
		3. Cross industries: Development and Manufacturing of Software, Maintenance and After Sales Service of Precision Instruments and Equipment, etc.	3(2), 4(1), 5(1)
		4. Holding Business: Investment Holding	2(1), 6(1)
		5. Miscellaneous Business: Unknown	5(2), 6(1), 8(1)
Hong Kong	36	1. Core Business: Packing and Sales of Cement	5(3)
		2. Secondary Business: Investment in Businesses Related to Cement Manufacturing, Shipping	3(1), 6(1)
		3. Cross industries: Land Lease, Property Leasing via Subsidiary	1(1), 3(1)
		4. Holding Business：Investment Holding	2(3), 3(2), 4(14), 5(3), 6(3), 7(1)
		5. Miscellaneous Business: Unknown	4(1), 5(1), 6(1)
British Virgin Islands, Cayman Islands, Canada, etc.	24	1. Core Business: Cement industry, Mining	1(2)
		2. Secondary Businesses: Trade; Management of Materials Processing at Factories in China, Ship Transportation, Shipping, etc.	2(1), 3(4)
		3. Cross industries: Investment, Trade, Enterprise Consultancy, Battery Manufacturing Industry and Investment, etc.	1(1), 2(1), 3(1), 4(1)
		4. Holding Business: Investment Holdings, General Investment, Offshore Investment, etc.	1(1), 2(5), 3(3), 4(3)
		5. Miscellaneous Business: Unknown	4(1)

Taiwanese parent and subsidiaries, and 96 offshore subsidiaries. According to the TEJFED, the TCC group includes subsidiaries of the TCC and the China

Synthetic Rubber Corporation (CSRC). However, the CSRC is partially owned by the chairman of the board of TCC. The percentage of the personal holdings is only 19.92 percent. The TCC does not have absolute control with share-holdings of less than 50 percent, therefore, was incapable of effecting tax strategies, so the CSRC, its four domestic subsidiaries and 18 offshore subsidiaries were excluded from the computation of the Adjusted G.TEI of the TCC group. The identification of the holdings structure in the TCC group defines the parent as the base layer, and the subsidiary controlled directly by the parent company as the first layer, the subsidiary controlled directly by the subsidiary is defined as the second layer, and the subsidiary controlled directly by that one defined as the third layer, and so on. The table below shows the registration nationality, the main business operation brief, and the controlled holding layer.

3.2.2 The FPC

This MNE's operations are mainly diversified; therefore, for consideration of operating the mutual affairs of its associated enterprises it established a general administration in 1968. The MNE's holdings of its associated enterprises globally were they had over 50 percent of shares in at total of 116 companies at the end of 2011. There were 39 Taiwanese subsidiaries, and 77 offshore subsidiaries. The table below shows the registration nationality, the main business brief, and the controlled holding layer.

Table 3 Global business operations and the holdings structure of the FPC

Host Country (Area)	Total Number of Associated Enterprises	Business Operation Description of Associated Enterprises & The Group Holdings Structure	
		Classification of Main Business	Holding Layer (Number of Associated Enterprise)
Taiwan	39	1. Core Business: fundamental chemical products manufacturing, manufacturing and sales of hydrochloric acid chemical products, etc.	1(15)
		2. Secondary Business: Memory I.C. and its accessories, transportation of petroleum and petrochemical products, and sales of petroleum etc.	1(10), 2(3)
		3. Cross industries: IC packaging and testing, enterprise management instruction, service business, etc.	1(4), 2(3)
		4. Miscellaneous Business: Unknown	1(2), 2(2)

Table 3 Global business operations and the holdings structure of the FPC (Cont'd)

Host Country (Area)	Total Number of Associated Enterprises	Business Operation Description of Associated Enterprises & The Group Holdings Structure	
		Classification of Main Business	Holding Layer (Number of Associated Enterprise)
China	48	1. Core Business: manufacturing and sales of hard tape and electroplating tape, manufacturing and sales of CCL, manufacturing and sales of engineering plastics, etc.	2(36), 3(7)
		2. Secondary Business: manufacturing and sales of the body, parts, end product and accessories of umbrellas, sales of DRAM, import and export trade, re-export business, etc.	2(3), 3(1)
		3. Cross industries: Trade	2(1)
Hong Kong	9	1. Secondary Business: sales of glass fiber yarn, sales of printed circuit boards.	1(2), 2(3)
		2. Cross industries: trade, services business, investment.	1(2), 2(2)
Other countries or areas (including U.S., British Virgin Islands, etc.)	20	1. Core Business: manufacturing and sales of chemical products, manufacturing and sales of soft tape, latex skin and foam tape, etc.	1(4), 2(1)
		2. Secondary Business: oil exploration, sales of semiconductor products, design and marketing of I.C., etc.	1(4), 2(6)
		3. Cross industries: port dredging, technical services, etc.	1(1), 2(1)
		4. Holding Business: investment	1(3)

3.2.3 The TSMC

This company established a dedicated integrated circuit (IC) foundry on February 21, 1987 at the Hsin-chu Science Park, Taiwan, and the first of its kind in the world. Today, this company is the world's largest dedicated semiconductor producer, providing the industry's leading processer technology and the largest portfolio of process-proven libraries, IP, design tools and reference flows. The company is engaged mainly in the manufacturing, selling, packaging, testing and computer-aided designing of integrated circuits and other semiconductor devices and the manufacturing of masks.

This MNE held over 50 percent of the shares in a total of 30 companies and associated enterprises globally at the end of 2011. They had 4 Taiwanese subsidiaries, and 26 subsidiaries were established overseas. The table below shows the registration nationality, the main business operations, and the controlled holding layer;

Table 4 Global business operations and the holdings structure of the TSMC

Host Country (Area)	Total Number of Associated Enterprises	Description of business Operations of Associated Enterprises & The Group Holdings Structure	
		Classification of Main Business	Holding Layer (Number of Associated Enterprise)
Taiwan	4	1. Core Business: R&D, design, manufacturing and sales of renewable energy and energy saving related technology and products; R&D, design, manufacturing and sales of solid state lighting devices and related applications and systems, etc.	1(2)
		2. Secondary Business: manufacturing of electronic components, wholesale and retail of electronic materials, R&D and testing of RF identification system.	2(1)
		3. Miscellaneous Business: Unknown	1(1)
British Virgin Islands	2	Cross industries: investment business	1(2)
China	1	Core Business: semiconductor foundry	1(1)
Other countries or areas (Including U.S., Cayman Islands, Germany, etc.)	23	1. Core Business: manufacturing, sales, testing and CAD of I.C. and other semiconductor devices.	3(1)
		2. Secondary Business: sales of solar energy related products, marketing and engineering support, etc.	1(3), 2(4), 3(1)
		3. Cross industries: investment business and investment in new technology, etc.	1(5), 2(5)
		4. Miscellaneous Business: Unknown	1(2), 2(1), 4(1)

The table above shows that 15 subsidiaries of this MNE group were controlled directly by the TSMC with A holding share rate over 50 percent. Among these subsidiaries some were located in the Cayman Islands and British Virgin Islands, where their classification of the main business is tagged as investment business and investment of new technology business by the TEJFED, however, the TSMC Partners (British Virgin Islands) and Venture Tech Alliance Fund III, L.P. (Cayman Islands) held 50 to 100 percent of the shares of TSMC Technology, Inc. (U.S.), TSMC Development Inc. (U.S.), Venture Tech Alliance Holdings, L.L.C. (U.S.) and Growth Fund Limited (Cayman Islands). The evidence shows that the international tax planning strategy of the TSMC was similar to that of the TCC, and the FPC, where they established holding companies in tax havens such as the Cayman Islands and the British Virgin Islands.

3.3 COMPARISON OF THE OPERATIONS OVERVIEW BETWEEN THE MNEs

For in-depth realization of the ratios of shared capital, the main business identification and the holding structure of Taiwanese MNEs in relation to the establishment of subsidiaries in Taiwan and overseas, it is necessary to summarize their cross border operational details in Tables 2 to 4. The top three ratios of share capital for registry countries or areas where subsidiaries were established in 2011 are examined, focusing on the main business identification (i.e., Core Business, Secondary Business, Cross Industries and the Holding Business) and the number of the subsidiaries across each holding layer.

3.3.1 The TCC

The top three ratios of share capital for the registered countries or areas for the TCC were, in sequence, China, Taiwan and Hong Kong. In addition, in regards to the number of holding layers of the subsidiaries in the three tax jurisdictions, the largest number was seven layers in China and Hong Kong, respectively, with just three layers in Taiwan. This means that the deepest holding structure was set up by the TCC in China and Hong Kong; the structure was relatively flat in Taiwan. In addition, there were a number of subsidiaries in each holding layer in the three jurisdictions, with 17 subsidiaries established in the first holding layer in Taiwan; there were 14 subsidiaries established in the fourth holding layer in Hong Kong, followed by 13 registered in the fifth holding layer in China. The main business operation in China was considered the core business, with mainly secondary business operations in Taiwan, in charge of the business holdings in Hong Kong. Details appear in the table below.

Table 5 The TCC Group's Ratio of Share Capital and Operation Overview in the Main Investment Countries or Areas

Host Country (Area)	Ratio of Share Capital	Classification of Main Business (Number of Subsidiaries)	Subordinate to the Holding Layer (Number of Subsidiaries)
China	0.3647	1. Core Business (20) 2. Secondary Business (6) 3. Cross industries (4) 4. Holding Business (2)	Layer 2 (1) Layer 3 (4) Layer 4 (2) Layer 5 (13) Layer 6 (8) Layer 7 (2) Layer 8 (2)
Taiwan	0.3031	1. Core Business (4) 2. Secondary Business (12) 3. Cross industries (6) 4. Holding Business (1)	Layer 1 (17) Layer 2 (5) Layer 4 (1)
Hong Kong	0.1240	1. Core Business (4) 2. Secondary Business (2) 3. Cross industries (2) 4. Holding Business (26)	Layer 1 (1) Layer 2 (4) Layer 3 (4) Layer 4 (14) Layer 5 (6) Layer 6 (4) Layer 7 (1)
Other countries or areas (Including British Virgin Islands, Cayman Islands, Canada, Philippines, etc.)	0.2082	1. Core Business (3) 2. Secondary Business (4) 3. Cross industries (4) 4. Holding Business (9)	Layer 1 (4) Layer 2 (7) Layer 3 (7) Layer 4 (2)

3.3.2 The FPC

The top three ratios of share capital for the MNE's subsidiaries were located in Taiwan, China and Hong Kong, respectively. There were two layers of holdings structure for the subordinate subsidiaries in the three jurisdictions. This meant that all three jurisdictions had a flat holdings structure status. The allocation of the number of subsidiaries in each holding layer in the above three jurisdictions were as follows: 40 subsidiaries registered in the second holding layer in China, followed by 29 subsidiaries established in the first holding layer in Taiwan, and 5 subsidiaries registered in the second holding layer in Hong Kong. Obviously the MNE's subsidiaries were concentrated in a certain holding layer. In addition to the main business operations in China and Taiwan, both operating core businesses, the following was in charge of the business holdings in Hong Kong. For details related to these statements please see the table below.

Table 6 The FPC Group's Ratio of Share Capital and Operation Overview in the Main Investment Countries or Areas

Host Country (Area)	Ratio of Share Capital	Classification of Main Business (Number of Subsidiaries)	Subordinate to The Holding Layer (Number of Subsidiaries)
Taiwan	0.4767	1. **Core Business** (15) 2. **Secondary Business** (13) 3. **Cross industries** (7)	Layer 1 (29) Layer 2 (6)
China	0.2513	1. **Core Business** (43) 2. **Secondary Business** (4) 3. **Cross industries** (1)	Layer 2 (40) Layer 3 (8)
Hong Kong	0.1902	1. **Secondary Business** (5) 2. **Cross industries** (4)	Layer 1 (4) Layer 2 (5)
Other countries or areas (Including Australia, British Virgin Islands, etc.)	0.0818	1. **Core Business** (5) 2. **Secondary Business** (10) 3. **Cross industries** (2) 4. **Holding Business** (3)	Layer 1 (12) Layer 2 (8)

3.3.3 The TSMC

The top three ratios of share capital for this MNE were, in order, in the British Virgin Islands, China and Taiwan. The largest number of holding layers for the subsidiaries in the top three jurisdictions was in Taiwan with two layers followed by single layer setups in the British Virgin Islands and China, respectively. There was not a significant number of subsidiaries in any of the holding layers. In addition, the main business operations in the British Virgin Islands were regarded as cross industries and holding businesses. The core businesses were mainly in China and Taiwan. Details of the ratio of share capital and operation overview of the MNE are described in the table below.

Table 7 The TSMC Group's Ratio of Share Capital and Operation Overview in the Main Investment Countries or Areas

Host Country (Area)	Ratio of Share Capital	Classification of Main Business (Number of Subsidiaries)	Subordinate to The Holding Layer (Number of Subsidiaries)
British Virgin Islands	0.5877	1. **Cross industries** (1) 2. **Holding Business** (1)	Layer 1 (2)
China	0.1849	1. **Core Business** (1)	Layer 1 (1)
Taiwan	0.1159	1. **Core Business** (2) 2. **Secondary Business** (1)	Layer 1 (2) Layer 2 (1)
Other countries or areas (Including Cayman Islands, Canada, Germany, Japan, etc.)	0.1115	1. **Core Business** (1) 2. **Secondary Business** (8) 3. **Cross industries** (9) 4. **Holding Business** (1)	Layer 1 (8) Layer 2 (9) Layer 3 (2)

In summary, Tables 5 to 7 give an overview of the global main investment allocations including the ratio of share capital, the main business operations of the subsidiaries and the number of subsidiaries subordinate to the holding layers of the MNEs. The analysis indicates the following: 1. the highest ratio of share capital for distribution of MNE subsidiaries was 0.5877 for TSMC's foreign direct investment in the British Virgin Islands, while the second was 0.4767 for FPC's direct investment in Taiwan. China was the main host country for the TCC, the FPC, and the TSMC. The highest ratio of share capital for MNE investment in China was 0.3647 for the TCC, followed by 0.2513 for the FPC, and then 0.1849 for the TSMC. From the observations we can see that the FDI for the Taiwanese MNEs was mainly located in tax havens such as the British Virgin Islands. It is also shown that the global operations strategy for the TSMC was mainly focused on the consideration of aggressive international tax planning. In comparison, the global operations strategies for the FPC and TCC were focused on the high tax rate zones such as China and Taiwan. 2. The allocation of major global operations for the MNEs is briefly described: (a) In the British Virgin Islands, the main operations of the TSMC were cross industry businesses and business holdings. The main operations of the TCC and FPC were holdings businesses, secondary businesses, and cross industry businesses in Hong Kong. (b) The MNEs were in charge of a variety of businesses in Taiwan. For example, the TCC mainly operated secondary businesses, while the FPC and the TSMC focused on their core business operations. In China, the MNEs mainly operated core businesses. 3. According to the TSMC data, the least number of holding layers for the MNEs was just one layer in the British Virgin Islands as well as in China. The second least number of layers was the two set up by the FPC in Taiwan, China and Hong Kong. In addition, the largest number of layers of holdings structure was established by the TCC for the second to the eighth layer in China, and for the first to the seventh layer in Hong Kong.

In summary, analysis of the three Taiwanese MNEs showed the overall ratio of share capital and operations overview in their main investment countries or areas as of 2011. We are able to obtain an initial understanding of offshore investment for the TCC and the FPC, regarded as traditional industries in Taiwan. Focusing on the host country or area such as China, and

the main business operation (core businesses) we look at the holding layer structure in China, have no more than seven layers and two layers, respectively. The TSMC is regarded as a high-tech industry company in Taiwan. Its offshore investments were primarily in the British Virgin Islands. The main businesses operated in the area were cross industries and holdings businesses with only a one layer holdings structure.

After an overview of the global investment and business operations for Taiwanese MNEs we now analyze their tax efficiency by means of the global tax efficiency index (G.TEI).

3. EMPIRICAL RESULTS AND ANALYSIS

Above we learn from the analysis of the main categories of business operations and the holdings structure of cross border investment where the relatively high ratios of share capital of the MNEs' subsidiaries were located from 2003 to 2011. To further understand the multinational taxation strategy performance of the MNEs during this period, we evaluate their tax efficiency by means of the G.TEI created for this study.

This chapter is divided into two parts. The first part discusses the empirical results, and the second part the construction of the Adjusted G.TEI data for the MNEs during the above research period.

4.1 THE EMPIRICAL RESULTS

The Adjusted G.TEI data were obtained for Taiwanese MNEs such as the TCC for the period from 2003 to 2011. The global tax efficiency for the MNEs is measured, and the Adjusted G.TEI summarized in the following table and figure.

4.1.1 The Global Tax Efficiency of the MNEs

Table 8 Adjusted Global Tax Efficiency Index

Year \ Subject	TCC's Adjusted G.TEI	FPC's Adjusted G.TEI	TSMC's Adjusted G.TEI
2003	1.0901	0.2063 *	0.1033 *
2004	0.7141	0.0515	0.1927 *
2005	0.3098	0.2262 *	0.2059 *
2006	0.1838	0.1979 *	0.0048

Table 8 Adjusted Global Tax Efficiency Index (Cont'd)

Year \ Subject	TCC's Adjusted G.TEI	FPC's Adjusted G.TEI	TSMC's Adjusted G.TEI
2007	0.0643	0.2188 *	0.0142
2008	0.1266 *	0.2562 *	0.0244
2009	0.1490	0.1524	0.0220 *
2010	0.2084	0.1728 *	0.1236 *
2011	0.2001	0.0908	0.0243

Notes: 1. The Adjusted G.TEI for TCC in 2008 was initially -0.0059. To solve for the unreasonable negative value for the Adjusted G.TEI, the solution was based upon $\Sigma\kappa_i \cdot t_i$ for TCC in 2008 and the negative part of the Adjusted G.TEI recalculated to be 0.0837. The residual G.TEI of 0.0429 that departed from the negative part of the Adjusted G.TEI was then added to find the secondary adjustment integrated Adjusted G.TEI, 0.1266, which was still lower than Taiwan's corporate tax rate of 0.25 in 2008. Therefore, the performance of the cross border tax strategy for TCC was good.

2. The Adjusted G.TEI for FPC in 2003, from 2005 to 2008, and in 2010 were all initially negative in value. The above method was followed to recalculate the negative part of the Adjusted G.TEI for these years to give the resulting secondary adjustment integrated Adjusted G.TEIs which were 0.2063, 0.2262, 0.1979, 0.2188, 0.2562 and 0.1728. The values of the secondary adjustment integrated Adjusted G.TEIs were lower than the Taiwan corporate tax rates of 0.25, and 0.17 respectively, except for the years 2008 and 2010. Therefore, the cross border tax strategy performed well for the FPC in the remaining years.

3. The former Adjusted G.TEI for TSMC from 2003 to 2005, 2009 and 2010 were all negative in value. Following the method mentioned previously, the negative part of the Adjusted G.TEI for these years was recalculated and the results for the secondary adjustment integrated Adjusted G.TEI were 0.1033, 0.1927, 0.2059, 0.022 and 0.1236, all lower than the Taiwanese corporate tax rates of 0.25 and 0.17 respectively. Therefore, the performance of the cross border tax strategy for TSMC in these years was good.

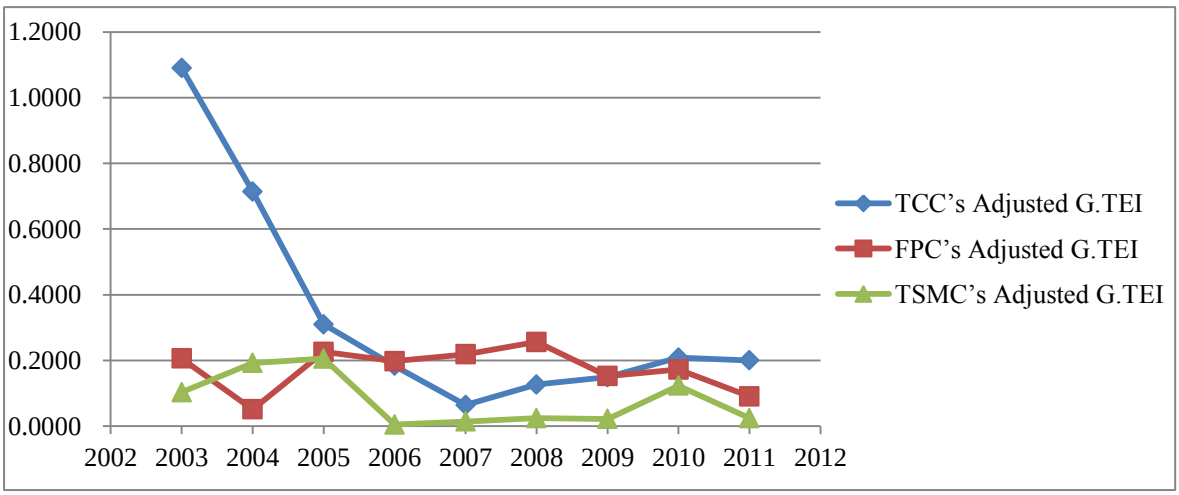

Figure 1 Adjusted G.TEI for the MNEs from 2003 to 2011

From the above table and figure, the tax efficiency of the MNEs can be clearly seen. The Adjusted G.TEIs for the TSMC from 2003 to 2011 was

relatively stable in the range from 0.005 to 0.2, and the level of the Adjusted G.TEI was relatively lower than the other two Taiwanese MNEs.

4.2 ANALYSIS AND DISCUSSION

4.2.1 Analysis

From Table 8 and Figure 1 it can be seen that the TSMC demonstrated the best performance in terms of the global tax efficiency of the top three Taiwanese MNEs from 2003 to 2011. The global tax efficiency performance of the TSMC was superior to that of the other two MNEs. Its Adjusted G.TEI was in the interval from 0.0048 to 0.2059. The level was obviously lower than the other two MNEs, and all values were below the Taiwan corporate tax rate for this period. Therefore, it can be concluded that the TSMC reached the goal of an advantageous tax strategy performance. The individual global tax efficiency performance of the other two MNE is described below.

4.2.2 Discussion of the Two MNEs

In relation to the issue of global tax efficiency performance for the other two MNEs during the period from 2003 to 2011, the Adjusted G.TEI of the two MNEs were higher than the Taiwanese corporate tax rate during this period. The details are summarized and described below.

1. The Adjusted G.TEI of the TCC during the period from 2003 to 2005 was obviously higher than the Taiwan corporate tax rate of 25 percent. In addition, the Adjusted G.TEI values were a little bit higher than the Taiwan corporate tax rate of 17 percent from 2010 to 2011. This would cause the problem of tax inefficiency for this MNE during the above period which is also shown by further analysis of the annual financial report: (a) The Adjusted G.TEI values were 1.0901, 0.7141, and 0.3098 from 2003 to 2005, respectively, obviously higher than the Taiwan corporate tax rate of 25 percent. This result was due to the huge amount of non-operating losses or expenses born by the parent company and some of its Taiwan subsidiaries and its BVI subsidiaries during this period. The operating profit deducted from the aforesaid non-operating losses or expenses still came out of the small net income before-tax, which caused the numerator

(the balance of the operating profit minus the net income after-tax included both of the amount of tax and the non-operating losses or expenses) to be greater than the denominator (the net income before-tax) of the Adjusted G.TEI in 2003. The numerator was quite large in 2004 and 2005. Therefore, the Adjusted G.TEIs of TCC from 2003 to 2005 was significantly higher than the Taiwan corporate tax rate of 25 percent. (b) The Adjusted G.TEIs were slightly higher than the Taiwan corporate tax rate of 17 percent from 2010 to 2011 because of the situation described above, i.e., the parent company and some of its Taiwan and BVI subsidiaries had non-operating losses or expenses during this period; in addition some Chinese and Hong Kong subsidiaries also had non-operating losses or expense situations similar to their Taiwanese and BVI's associated enterprises.

2. The Adjusted G.TEIs of the FPC were slightly higher than the Taiwanese corporate tax rate in 2008 and 2010. The major reason for the aforesaid situation was due to the Taiwanese parent company and some of its Taiwanese, Chinese and Hong Kong subsidiaries having large amounts of non-operating losses or expenses during the period which caused the Adjusted G.TEIs to increase and become higher than the Taiwan corporate tax rate.

In summary, the Taiwanese MNEs had Adjusted G.TEIs that significantly higher than the Taiwanese corporate tax rate during the period from 2003 to 2011. The factors, which caused this, were mainly due to the parent company and subsidiaries experiencing huge amounts of non-operating losses or expenses over the relevant period. Further analysis of the MNEs was carried out to find out why they established quite a large number of subsidiaries in tax havens such as the Cayman Islands and British Virgin Islands. It is quite surprising that although the corporate income tax rate was 0% in the tax havens, there were still differences for some of the subsidiaries established there. Non-operating losses or expenses caused the differences in the operating profit and the net income after-tax. These had a serious impact and acted against the principle of international tax planning by shifting the profit from high tax zones to low tax zones. The reason for the tax inefficiency of the TCC was mainly because its tax strategy violated the principle of international tax planning. The MNE should transfer profits to the

tax haven but not the losses. The reason that the high Adjusted G.TEI occurred in the FPC in 2008 was, as pointed out in the annual report for the year, mainly due to the impact on the operating performance of the European financial crisis and the collapse of the price of international crude oil. This caused demand to shrink dramatically and the price of the chemical petroleum products fell sharply in the third quarter of 2008. Therefore, the MNE implemented a policy of shutting down or reducing output to reduce the deficit and ease the pressure on its huge amount of inventory. The results of this business operation strategy was a reduction in the operating profit of about 10.2 billion N.T. dollars and an increase in non-operating losses or expenses of about 78.08 percent compared to the previous year of 2007. Therefore, the other reason for the MNE's lack of tax efficiency was related to deterioration in the environment outside its operations.

4.2.3 Discussion of the TSMC

The reason that the TSMC had the best global tax efficiency performance of the Taiwanese MNEs is shown by the factors described below.

1. Analysis of the domains and the type of cross border business operations, the legal form of the subsidiaries and the holding layers shows us the difference between the TSMC and the other two MNEs: (a) The TSMC operated diversified businesses such as core businesses, secondary businesses, cross industries and holdings business globally. Its operation performance was amazing, especially in contrast to TCC, which suffered serious losses from a number of its subsidiaries that operated core businesses and suffered deficit increases in 2009. The FPC also showed poor global operation performance due to failures in cross industry operations. In contrast to the TCC and FPC, the TSMC was efficient and capable in comprehensive business operations. (b) The legal form of the TSMC’s subsidiaries such as Venture Tech Alliance Holdings, Wafer Tech in the U.S. is that of a Limited Liability Company (L.L.C.), that is they are regarded as independent legal entities by law in the U.S. The economic responsibility for the L.L.C. is limited by the amount of investment of its members. The U.S. tax law regulates that the L.L.C. should produce independent tax reports annually. The annual operating profit is transferred

to the members of the L.L.C. based on the “Pass Through” principle, meaning that the L.L.C. is regarded as transparent under U.S. tax law, and the responsibility for tax payment is on the members. The tax treatment of the L.L.C. in the U.S. is obviously different from the other legal form of enterprise said the Incorporation or Corporation (INC) and also the “Company”, one of the legal forms of enterprise in Taiwan. No matter whether it is an “INC” in the U.S. or a “Company” in Taiwan, they are both regarded as taxpayers by the tax laws. As for the subsidiaries of the other two MNEs, there was no such similar entity such as the L.L.C. established in the U.S. (c) The holdings structure for the TSMC was divided into 3 layers. The subsidiaries operated by the main business in the first layer performed such functions as research, development, design, manufacturing and marketing, sales, procurement and investment. The subsidiaries operating the main businesses in the second layer performed functions such as manufacturing, distribution and retail, research and testing, sales, engineering support and investment. The subsidiaries operating the main businesses in the third layer performed such functions as manufacturing, sales, test, design, and customer service. Relatively, the most layers of a holdings structure for the other two MNEs was 8 for TCC and the second most numerous was 3 for the FPC as well as the same amount of layers in the TSMC.

2. For the global tax efficiency, the Adjusted G.TEIs of TSMC from 2003 to 2011 all fall in the interval of 0.0048 to 0.2059 and relatively lower than the Taiwan corporate income tax rate during this period. In particular, the Adjusted G.TEIs of TSMC showed all below 0.1236 after 2006. The global tax efficiency for TSMC compared to the other two MNEs as shown by their Adjusted G.TEIs were obviously higher than the Taiwan corporate income tax rates during the period. From this, it can be concluded that the TSMC has significant global tax efficiency.

In summary, in terms of global operation performance and global tax efficiency, the TSMC was superior to the other two MNEs. The analysis came to the following conclusions: (1) operational failure of core businesses or cross industries would definitely cause poor global business operation performance and global tax inefficiency. In order to reach the goal of global

tax efficiency, one should focus on proper global business operation performance. (2) MNE's should effectively use tax havens in their international tax planning strategies, which would allow them to reach the goal of global tax efficiency. For instance, the TCC has quite a large number of subsidiaries established in tax havens such as the Cayman Islands and British Virgin Islands, however, most of the deficits occurred causing them to lose the tax saving function of the tax haven and resulting global tax inefficiency. (3) Companies should take advantage of the legal form of an enterprise entity such as the L.L.C. for its tax saving function, to contribute to reaching the goal of global tax efficiency. On the one hand, the L.L.C. can be effectively used to reduce any integrated tax burden at all, while on the other hand; it can avoid the risk of double taxation. Recently, as we know, Google and Apple have begun using the legal form of the L.L.C. as part of their international tax planning and the performance for this tax strategy is obviously amazing throughout the world.

4. Conclusions and Suggestions

The motivation for this study was to develop a method for measuring an MNE’s operation performance. In the past, the ROE has been used with inappropriate financial ratios but this method fails to compare the aggregate tax burden for cross border operations and the relative tax burden in the home country. All of these factors combine to make it impossible for the MNE to evaluate the degree to which its cross border business operational profits might suffer from tax erosion in the host (source) country. The consequence of ignoring the effect of international tax factors can impact the MNE’s cross border business profit and significantly affect the MNE’s measurement of cross border investment decision performance. It can be incapable of reflecting the real status of its operating cash flows and suffering from taxes on the profits by the source country. This study proposes a method to measure the performance of MNE’s cross border tax strategy by means of the Adjusted G.TEI and to alleviate the insufficiency of using the ROE to measure its operation performance.

The major contribution of this study is the measuring of the relative aggregate effective tax rate for each dollar of investment by MNE by means

of the Adjusted G.TEI. A lower value of the Adjusted G.TEI represents higher global tax efficiency.

For instance, the TSMC's headquarter could hypothetically understand that its Adjusted G.TEI increased gradually from 2003 to 2005 (see Table 8) showing the results of 0.1033, 0.1927 and 0.2059. Suppose that the head office was satisfied with the Adjusted G.TEI of 0.1033 in year 2003 and pursued any possible effective solution for its taxation strategy based on its global operation strategy, such as the global supply chain management policy. They then used the effective taxation solution to align with the supply chain management strategy in the year 2004. The Adjusted G.TEI would probably not be higher than 0.1927 in the 2004. Similarly they could make an alignment with the MNE's global supply chain management strategy and its appropriate taxation strategy in the year 2005 and similarly, the Adjusted G.TEI in that year could be expected to be reduced below the actual amount of 0.2059. From the above tentative hypothesis of the functioning of the Adjusted G.TEI, we learn that if the MNE adopts this as an indicator to regularly monitor its global taxation planning performance, then it could consistently achieve a better taxation strategy.

The results of the empirical study show the more the foreign direct investment host countries and the higher degree of business operation diversification following a relatively higher Adjusted G.TEI. In addition, more layers in the MNE's holding structure meant that the Adjusted G.TEI was also higher and this meant that the global business operations suffered from global tax inefficiency. First of all, the result obtained in this study of more foreign direct investment host countries inducing global tax inefficiency is consistent with related research conclusions. International management has limited concerns with the costs of governance in foreign ownership modes. However, according to transaction costs and internalization theories for multinational enterprises, companies make foreign direct investments (FDI) when the combined costs of operations and governance are lower for FDI than for market or contract based options, such as exports and licensing. Yet, ex post governance costs remain a conjectural construct, which has evaded empirical scrutiny, and the lack of focus on the implications of these costs constitutes a challenge for management in multinational companies

(Tomassen, Benito and Lunnan 2012). Therefore, the phenomenon of the numbers of the FDI host countries have negative impact on the MNE's global tax planning performance indicates that significant governance costs exist in the MNE's global operation management. Secondly, the higher degree of business operation diversification causing global tax inefficiency was met with the related study discussion for communication is a real barrier to organizing international production as it hinders knowledge transmission. A premise for multinational production is the transferability of intangible assets over space. While developments in communication and transportation technologies are often credited for the rapid growth of multinational corporations, many surveys of top business executives consistently rank face-to-face meetings as the most effective channel for transmitting knowledge at a distance (Cristea 2015). Accordingly the communication issue is critical for MNEs to engage in multinational manufacturing. The implication is that a higher degree of cross-border business operation diversification makes the MNE suffer global tax inefficiency due to the communication cost. Third, more layers in the MNE's holding structure led to the MNE's global business operations suffered from global tax inefficiency. The finding could be supported by a study revealing possible negative consequences of using complex group structures as general obscurity provokes agency costs (Wagener and Watrin 2014).

Finally, to sum up, the target for promoting global tax efficiency can be reached by means of a focused business operational strategy and an appropriately designed global holdings structure.

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