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Income Shifting, Ownership, and R&D Density of Japanese Multinationals

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Abstract

Most countries scrutinize their taxation systems in order to prevent the leakages in their tax revenue from multinationals. Tax authorities depend on transfer pricing methods which help in deterring transfer pricing manipulations by multinationals intracompany transactions. In practice, the pricing methods are based on number of economical ratios of profits of comparable transactions of unrelated parties. However, tax authorities lack of ability in detecting the true market price of multinationals internal trade transactions (e.g., R&D, patents, royalties and services) is acquaint in transfer pricing literature. We analyze the impact of the tax rate differential and R&D expenditures, which are mainly driven by the high tax rate in the home country, on the income shifting activities. The empirical investigation is carried out by exploiting firm-level data on Japanese foreign direct investment activities during the period 2000 to 2009. The results infer that Japanese wholly owned multinationals with high R&D programs are more responsive to income shifting since their traded transactions are group-specific, unperceived and precisely incalculable by tax authorities. Moreover, the wholly owned affiliates of Japanese parent companies which employ low R&D expenditures and are located in high tax jurisdictions, are more sensitive to host countries' corporate income tax rates.

Keywords: Income Shifting, Transfer Pricing, Corporate Taxes, R&D, Intrafirm Trade.
JEL Classification: H25, H26, H32

Introduction

The continuous growth of globalization of business and investment activities has stimulated many researchers and policy makers to address the complexity of combined taxation systems of home and host countries to comprehend more in depth the overall impact of corporate tax rates on foreign direct investment (FDI) flows. Host countries compete in attracting FDI in order to increase their local market productivity and shape up their market performance. Particularly, they pursue the R&D intensive firms which promise potential technical advantageous developments and spillovers. However, the host country high statutory tax rate can potentially contribute in distorting the possible parent R&D companies' investments in their respected locations.

Income shifting behavior of multinational enterprises can be detected through the effect of taxation on large multinationals FDI activities and their characteristics. Parent companies specifications such as their affiliates' ownership shareholdings percentage and their R&D intensities increase the opportunities for multinationals to involve in transfer pricing manipulations and improve the multinational group chances to be inclined to more tax planning and their investments have less adversity to taxation comparing to other companies which are minority owned and having low or none R&D. Large companies have larger economies of scale and can finance

their investments through varied resources and their by increase their overall profits generated in the low tax affiliates locations. They are more flexible in handling their after tax profits among the group and cross jurisdictions. Therefore, their investments are less sensitive to taxation.

Most countries scrutinize their taxation systems in order to prevent the leaking out of their tax revenue from multinationals. Tax authorities depend on transfer pricing methods which help in deterring transfer pricing manipulations by multinationals intracompany transactions. In practice, the pricing methods are based on number of economical ratios of profits of comparable transactions of unrelated parties. However, tax authorities lack of ability of identifying the true market price of multinationals internal trade transactions particularly intangibles such as R&D, patents, royalties and services.

The Organization for Economic Cooperation and Development (OECD) provides the commonly agreed-upon practice that governs and specifies international transfer pricing, the Arm's Length Standard (ALS). It asserts that all business transactions between a MNE and its related parties be conducted similarly, in terms of prices, as other businesses transactions, as if they are set between unrelated parties, whenever transfer pricing manipulation exists (Article 9). The purpose of the ALS is to help solve the transfer-pricing problem by giving estimation of normal prices of traded goods or services among related parties. OECD member countries consider the OECD guidelines when assessing MNEs' transactions for taxation purposes. The specific guidelines include the comparable uncontrolled price method (CUP), the resale price method, the cost-plus method; the profit split method and the transactional net margin method (TNMM).

The CUP and resale price methods can be used to assess market prices of MNEs transactions of goods where prices can be observed. However, for intrafirm trade in intangibles or licensing and services, the CUP and resale price methods cannot be applied. The profit split method is used to determine the market price for such operations. The more unique tangibles and intangibles are, the greater the chance for MNEs to shift income (Feinschreiber, 2004). Other methods are mainly used to make close estimations to the market value of internally traded intangibles, via different profit ratios comparisons. [1] Generally, countries will choose methods according to multiple criteria and MNEs will then try to adapt to this choices.

The objective of this study is to investigate the impact of corporate income taxation on the multinational intrafirm trade activities through the various characteristics of the multinational such as ownership structure and R&D intensities. Furthermore, we evaluate that how the multinational with various R&D densities and ownership structure responds to different taxation measures.

Theoretical Review

Several researchers studied the effects of corporate tax rates on the demand for capital. Grubert and Mutti (1991) find that a decrease of corporate tax rate in a country from 20 percent to 10 percent would increase demand for capital in that country by 65 percent. Similarly, Hines and Rice (1994) conclude that a 1 percent reduction of corporate tax rate would increase FDI by 3 percent. Both studies provide evidence that corporate tax rates have significant influence on US MNEs' decisions in allocating their businesses.

The literature support the idea that high corporate taxation can distort the R&D planning of parent companies particularly on those high tax rate countries. Hines (1993) suggests that countries with high corporate tax rates hinder US R&D investments to be allocated at compared to low tax countries where the majority of US high R&D subsidiaries are situated. Moreover, Hines (1994) provide evidence that US multinationals prefer to operate their R&D

[1] For more review on transfer pricing method selection, see, for example, Feinschreiber, R., (2004) Transfer Pricing Methods: An Applications Guide

activities at home country rather than foreign affiliate as long as they can obtain tax free royalty payments while their foreign earned income is highly taxed. Previous studies have focused on the relationship between statutory corporate tax rate and the invested capital in foreign direct investments. Overesch and Schreiber (2008), for example, provide empirical evidence that multinational companies have higher chances of manipulating their R&D intensities transactions. Their results confirm that multinationals' investments which are more intense in R&D activities are reflecting less averse sensitivity to corporate taxations, since they have more flexibility options for their transfer pricing arrangements.

Grubert (2003) finds that R&D intensive US parent companies choose to invest in either very high or very low statutory tax rate countries in order to efficiently navigate their income shifting techniques through their real transactions. He indicates that US MNEs which are highly intense in R&D intrafirm trade are responsible for about 50% of the income shifting that transacted from high to low tax jurisdictions He suggests that R&D intensive companies are more driven by tax variations and income shifting since they considerably more involve with voluminous intrafirm transactions than other companies because of their intangible assets.

Huizinga and Laeven (2008) provide evidence that Germany, which has the highest statutory tax rate in Europe at that time, has suffered tremendous tax losses because of profit shifting behavior of multinational from Germany to other European countries. In a reverse manner, Hungary which had the lowest tax rate during the investigation period shows an increase of taxable income due to its tax incentives and the inward income shifting.

Desai et.al (2006) indicate that US MNEs which are more intensive in R&D intrafirm trade are more likely to involve in income shifting activities; the larger the investment of the MNEs group, the higher the income shifting from its high tax locations to the lower tax locations. Particularly, large firms which are more wholly-owned and have more R&D intra-group transactions with their foreign affiliates tend to be more profitable when they locate their active subsidiaries in tax haven countries in order to shift home country taxable income towards those tax haven locations. Larger R&D companies are more inclined towards income shifting through their considerable ability to relocate their taxable income to their tax haven jurisdictions and by increasing their tax shields. Multinationals which are characterized by their high intracompany trade and high R&D density are the most stimulated to establish tax haven affiliates in order to reduce their parents cost of deferral taxes.

Azemar, Corcos, and Delios (2009) examine firm-level data of 3614 Japanese MNEs scattered in 49 developing countries for a one year period; testing the influence of tax rate on wholly-owned and high R&D affiliates and joint ventures low R&D. Study results suggest that Japanese overseas capital investment in emerging countries is affected by foreign corporate tax rates. They find that large Japanese parent corporations with high R&D activity are more elastic to foreign tax policies than low R&D affiliates. Table 1displays the geographic distribution and related financial information on the Japanese foreign affiliates in our sample.

The remainder of the paper is organized as follows. In section three research design and methodology is presented. Section four describes the econometric model and data, followed by the empirical results in section five. Lastly, in section six the conclusion and policy implication is discussed.

Research Design and Methodology

In this section, we first discuss the dependent and independent variables that we will use in order to carry out analysis and establish the relationship between the corporate tax rates and intrafirm sales. Then, subsection 3.2 presents our models and estimation approach. Finally, subsection 3.3 offers description of the employed data in the analysis and the sample composition.

Explanatory and Dependent Variables

MNEs are diverse in their activities and their capital structure. It is logical to assume that MNEs direct ownership shareholding of their affiliates influence them and induce them to involve in income shifting planning in order to minimize their worldwide tax bills. Indeed, many countries provide foreign controlled companies certain tax incentives more generously to those R&D intensive companies. Moreover, taxes to some extent may be eliminated by possible tax planning techniques available for MNEs, for instance, redirecting high tax income to low tax income jurisdictions (Harris et al., 1993, Hines and Rise, 2004).

To examine the impact of corporate taxation on MNEs investment activities, we use number of measures to assess the profit shifting behavior of Japanese R&D intensive corporations. As a dependent variable we use growth in fixed assets as a proxy for real investment activities. Our model comprises of three groups of variables. The first category consists of the country specific variables which are included to the model to control for the country and market effects. Concerning the explanatory variables in the first category, we use the country specific GDP of host countries as a control variable in order to capture the effect of the relative market size. The larger the size of the market of a country, the higher the investment in fixed assets.

Distance also has an important impact on investment location decisions. Higher distance between home and host countries implies higher transaction costs of profit shifting and wider cultural gap. Therefore longer distance to the host country discourages fixed assets growth. Therefore, the distance variable measured by the natural log of the distance between Japanese parent company (home country) and the foreign host country of their affiliates in kilo meters is expected to be negatively correlated to the dependent variable.

The Corruption index variable is also used as a country specific control variable. It takes a value between 0 and 10. The lower the score rate of a country the higher the level of public-sector corruption in a country.

The second category includes firm specific variables to control for the heterogeneity among the cross sectional unit. This group consists of total capital and R&D expenditure of the firm. The total capital of the affiliate is used to capture the firm size impact on real investment. In theory, larger firms are diversified and can enjoy the economies of scale which in turn leads to higher level of income than the smaller firms. Since, they are highly taxed induced and are more inclined towards income shifting. Furthermore, smaller firms will be disadvantageous in income shifting as they have a smaller amount to transfer compared to the larger one. Therefore, size of the firm as measured by the natural log of total capital is anticipated to have a positive relationship with the growth of fixed assets.

Another important issue is the parent company R&D activities. Parents R&D expenditures constitute a relevant variable in understanding MNEs income shifting behavior. It is used as a control variable for the unobserved heterogeneity among the multinationals. The R&D density variable is employed to investigate the responsiveness of R&D spending to fixed assets. It is proxied by the natural log of the ratio of R&D expenditure to total sales. For tax planning reasons the multinationals will seek to increase their R&D expenditures in fixed assets to reduce the tax liabilities. R&D expenditures by the firm are carried out in order to increase efficiency in the manufacturing activities, enhance the quality of the product and reduce the cost of production. An increase in the R&D expenditures causes a restructuring in the production process and expansion in the plant size. The higher the R&D expenditure, the higher the investments in fixed assets in order

to reduce the tax burdens. Therefore, the relationship between R&D density spending and fixed assets is expected to be positive.

The most influential determinant of intrafirm trade is the statutory tax rate. Intrafirm trade within a group of companies will intensify when affiliated companies are located in low corporate tax rates jurisdictions and parent companies income tax rates are higher. Therefore, the expected relationship between the fixed assets of the affiliate and the difference of the statutory tax rate between the host and home country (DSTR) is anticipated to be negative.

Ownership structure of multinational has a significant effect on the income shifting activities. Theoretically, profits of the parents are more strongly correlated with larger ownership stake of affiliates, since the incentive for parents is to shift income towards them rather than partially owned.

Third group of variables include two sets of interaction terms of statutory tax rate of host country with the ownership level, R&D density and taxation level. Each set contains four control variables based on their ownership structure, their R&D density and their taxation level. We separate affiliates by their parents ownership control either wholly-owned or minority–owned depending on the shareholding percentage. When the affiliate is owned by its parent by 51% or more, then it is considered as a wholly-owned affiliate. But, if it is lower than 51%, then it is regarded as minority-owned affiliate. First set includes the wholly-owned affiliates and the second set includes the minority owned affiliates.

Furthermore, we group affiliates according to their density in R&D expenditures, either high or low. To do so, we take the mean value of the R&D expenditures of the parent company and then set the values above average as high R&D affiliates (HRD) and lower than the mean value are considered as low R&D affiliates (LRD). Similarly, we distinguish between high tax affiliates and low tax affiliates by applying the mean value statutory tax rate in the host country as a weighted value, above the mean value is high tax rate subsidiaries and under the mean value are the low tax rate firms.

In the first model, we employ four different categories in interaction with the statutory tax rate (STR) (i)wholly-owned affiliates with high R&D, and high statutory tax rate affiliated firms STR(DWO*HRD*HSTR).(ii) wholly-owned affiliates, high R&D affiliates, and low tax affiliates STR(DWO*HRD*LSTR).(iii) wholly-owned affiliates with low R&D and high tax submission STR(DWO*LRD*HSTR). (iv) wholly-owned subsidiaries which exhibit low R&D activities and low tax liability STR(DWO*LRD*LSTR).

It is of immense interest to evaluate the impact of the statutory tax rate in interaction with affiliate certain characteristics such as R&D intensity level and taxation of jurisdictions. Therefore, in the first model, we include the statutory tax rate in interaction with four different controlled situations of the affiliate company.

Econometric Model

In order to carry out the empirical analysis and estimate the extent of R&D induced income shifting, the following econometric model is developed:

$$\ln(FA)_{i,t} = \mu + \beta_1 \ln(GDP)_{i,t} + \beta_2 \ln(TC)_{i,t} + \beta_3 \ln(DIST)_{i,t} + \beta_4 \ln(CINDX)_{i,t} + \beta_5 DSTR_{i,t} + \beta_6 \ln(R\&D)_{i,t} + \beta_7 STR(DWO*HRD*HSTR)_{i,t} + \beta_8 STR(DWO*HRD*LSTR)_{i,t} + \beta_9 STR(DWO*LRD*HSTR)_{i,t} + \beta_{10} STR(DWO*LRD*LSTR)_{i,t} + \sum_{j=1}^{13} \delta_j DUM_{i,j} + \alpha_i + \lambda_t + \varepsilon_{i,t}$$

We estimate the equation (1) where $\ln(FA_{i,t})$ is the natural log of fixed assets, which measures the real transactions, is used as the dependent variable of affiliate *i* at time *t*. *ln(GDP)* represents the specific effect of country *k* at time *t* which controls for the market size effect. Total capital, denoted by $\ln(TC_{i,t})$, is used to control for the company specifications. The $\ln(DIST_{i,t})$refers to the distance between parent and host country in order to control more for country specific effects. The tax rate differential variable indicates the tax difference between the affiliate *i* and its parent company at time *t* is denoted by $DSTR_{i,t}$, the corruption index $\ln(CINDX_{i,t})$is used to control for corruption and risk level of a country, and

R&D is the parent company R&D expenditures. The interaction terms STR(DWO*HRD*HSTR)$_{i,t}$ denotes the statutory tax rate in interaction with the wholly-owned intensive R&D affiliates located in high tax rate country at time *t*, STR(DWO*HRD*LSTR)$_{i,t}$ denotes the interaction between corporate tax rate and the wholly-owned low R&D density affiliates located in low tax rate country at time *t*,STR(DWO*LRD*HSTR)$_{i,t}$ refers to the impact of the statutory tax rate on affiliates that are wholly-owned with high R&D activities and located in high tax rate country at time *t*, and STR(DWO*LRD*LSTR)$_{i,t}$ indicates the sensitivity of fixed asset growth to the tax base of the wholly-owned affiliates with low R&D and located in low tax rate country at time *t*. $DUM_{i,j}$ is the industry dummies, α_i is the firm specific effect, λ_t is the time specific effect, and $\varepsilon_{i,t}$ is the error term.

The hypotheses for the first model are: (i) the more the high taxed wholly-owned affiliate intense in R&D, the higher the profit shifting is and the less the impact of taxation, (ii) the less the high taxed wholly-owned affiliate is involve in R&D, the less the profit shifting is and the more the impact of taxation

The first hypothesis states that the wholly-owned affiliates with high R&D and located in high tax jurisdiction will be less sensitive to the statutory tax rate of the host country, and will indulge in high income shifting as they can avail the opportunity to invest in fixed assets because of high R&D. Therefore, the relationship between growth in fixed assets of affiliates and STR(DWO*HRD*HSTR) will be positive.

Similarly, the second hypothesis suggests that the wholly-owned affiliates located in high tax zones with low R&D activities will be more responsive to the tax rate of the host country and therefore the parent will avoid shifting but there may be shifting from the affiliate to its parent company. Since, the expected relationship between fixed assets growth and STR(DWO*LRD*HSTR) will be negative.

For further investigation and to test the robustness of the results, in the second model the sample of the minority owned affiliates is used. Similar to the first model country specific GDP, size of the firm and R&D expenditure are used as control variables. Like model (1), four interaction terms of dummy variables are used to assess the impact of taxes on intrafirm trade. The variables for the interaction of minority owned affiliates with R&D and tax levels of affiliate take the same order but the wholly-owned affiliates are replaced with the minority owned ones. All these dummy variables are used to more analyze the influence of ownership and R&D density of MNEs on their income shifting behavior under the condition of their different taxation levels. Therefore, the second model is established according to equation (2):

$$\ln(FA_{i,t}) = \mu + \beta_1 \ln(GDP_{i,t}) + \beta_2 \ln(TC_{i,t}) + \beta_3 \ln(DIST_{i,t}) + \beta_4 \ln(CINDX_{i,t}) + \beta_5 DSTR_{i,t} + \beta_6 \ln(R\&D_{i,t}) + \beta_7 (DMINW*HRD*HSTR)_{i,t} + \beta_8 (DMINW*HRD*LSTR)_{i,t} + \beta_9 (DMINW*LRD*HSTR)_{i,t} + \beta_{10} (DMINW*LRD*LSTR)_{i,t} + \sum_{j-1}^{13} \delta_j DUM_{i,j} + \alpha_i + \lambda_t + \varepsilon_{i,t} \quad (2)$$

All variables are in natural log except for the tax difference and the dummy variables. Similar to the first model, the log of fixed assets denoted by $ln(FA_{i,t})$, is used as the dependent variable. All other variables being equal except for the interaction term dummy variables where we replace all the wholly-owned affiliates' variables with the minority owned affiliates' variables (DMINW). The interaction term STR(DMINW*HRD*HSTR)$_{i,t}$ denotes the statutory tax rate interaction with the minority owned intensive R&D affiliates located in high tax rate country at time *t*, STR(DMINWO*HRD*LSTR)$_{i,t}$ denotes the interaction between STR and the minority-owned low R&D density affiliates located in low tax rate country at time *t*, STR(DMINW*LRD*HSTR)$_{i,t}$ refers to the impact of STR on affiliates that are minority owned with high R&D activities located in high tax rate country at time *t*. $DUM_{i,j}$ is the industry dummies, α_i is the firm specific effect and λ_t is the time specific effect. $\varepsilon_{i,t}$ isthe error term.

The hypotheses for the second model are: (iii) the less the high taxed minority-owned affiliate intense in R&D, the more the profit shifting is and the more the impact of taxation.(iv) the less the low taxed minority-owned affiliate is intense in R&D , the less the profit shifting is and the less the impact of taxation.

The third hypothesis suggests that the minority owned affiliates with low R&D located in high tax countries are more sensitive to the impact of the statutory tax rate. Therefore, there will be shifting of income from the affiliate to its parent company. Since, expected sign of STR(DMINW*LRD*HSTR) will be negative.

Similarly, the fourth hypothesis states that the minority owned affiliates with low R&D, located in low tax countries are less sensitive to the impact of the statutory tax rates. Therefore, there will be less shifting of income from the affiliate to its parent company. Since, the expected sign of STR(DMINW*LRD*LSTR) will be positive.

$STR(DMINW*LRD*LSTR)_{i,t}$ indicates the sensitivity of fixed assets growth to the STR of minority owned affiliates with low R&D located in low tax rate country at time *t*. $\varepsilon_{i,t}$ is the error term.

Data

The sample used in this study contains information on 385 Japanese foreign affiliates in OECD countries owned by 198 publicly listed (Tokyo Stock Exchange) Japanese parent companies during the period 2000 to 2009. The data employed in the analysis has been taken from the Bureau of Van Dijk. The sources are Oriana, Osiris, and Amadeus database. Financial services sectors such as banks, financial and insurance companies are excluded because their liabilities are different from those of the manufacturing non financial firms. All the firms are classified in 14 industrial sectors using the two digit NAICS code. The descriptive statistic of the variables is presented in Table2.

Empirical Results

In this study we examine the income shifting behavior of Japanese multinational companies; we consider the ownership structure of the firms and intrafirm trade transactions within the group of company, which involve high R&D activities and their reaction to corporate income tax rates variations in home and host countries.

In the first stage we applied the Hausman (1978) specification test in order to evaluate the relationship of individual specific effect with the other explanatory variables. The test is used whether a fixed effects or a random effects formulation is more appropriate for the estimation of parameters.[2] The Chi-Squared value computed by Hausman (1978) is tabulated in Table3.

The test implies that the individual specific effects are correlated with the right hand side variables. The random effects estimates appear to be significantly biased with high probability. Therefore, the GLS estimation method is applied to the fixed effects formulated models.

Based on equation (1), the natural log of fixed assets is used as the dependent variable. Table 4 reports the empirical regression results of the first model. As expected most of the estimation coefficients have the expected signs. Specifications (1) to (5) show the results of the dependent variable.

First, the result in specification (1) shows a highly significant and positive impact of the control variable GDP which represent the market size of the host country. It indicates that the larger the size of the market of the host country, the greater the investments in that host country. It also suggests that investments depend on the size of the market.

[2]See Wooldridge (2002, pp. 288-291) for more detailed description of the Hausman test.

Concerning the distance variable, [3] the empirical results indicate that it is highly significant and has a negative sign. This infers that Japanese multinational investments are affected by long distance. The longer distance between Japan and the host country implies higher transaction costs and wider cultural differences.

The coefficient of the corruption index variable has a negative sign and statistically significant as expected. The index values ranges from 0 to 10.The higher the score indicates the low level of corruption in the host country and vice versa. It means that Japanese foreign direct investments are highly sensitive to the environmental variables of host countries such as political and legal aspects. The intensive R&D companies prefer to establish their R&D affiliates in a stable and transparent country even regardless of their higher taxation system. They are more driven by less risky jurisdictions. Larger affiliate firms are more intensive in income shifting. The coefficients of the capital variable have a positive and statistically significant impact on the fixed assets growth of the affiliates, indicating that intrafirm trade is more active in affiliates associated with larger invested capital.

Our interest is with the tax rate differential variable. The result confirms our prior expectation of the negative relationship between the growth of fixed assets and the tax differential between the host and home country. The coefficient is highly statistically significant. This implies that investment decision of Japanese MNEs is highly sensitive to the corporate income tax rate of host countries. It can be interpreted that as in specification five that on average a 1 percentage point increase in the tax differential results in a decrease of Japanese real investment in host country by 1.1 percent.

[3]The distance variable is the individual specific variable which is time invariant. Since, in the fixed effect model specifications of model 1, its coefficient cannot be estimated. However, we regressed within the group mean of ln(FA) on the log (DIST) in the GLS environment.

To get a deeper insight of the impact of the statutory tax rate on income shifting behavior, various interaction terms of control variables are included in the model. The interaction of term STR with the wholly-owned, high R&D affiliates which are located in high tax countries STR(DWO*HRD*HSTR) indicates a highly statistically significant positive impact on the growth of fixed assets in the affiliates. This implies that if the host country statutory tax rate is high then the affiliates are more inclined towards income shifting, as they are increasing their earnings in the fixed assets in order to avoid the higher tax rate in the host country. The estimated coefficient is significant at the 1% level in column (2). Moreover, we also find a high statistically significant impact of the interaction term of the wholly-owned R&D intensive affiliates which are located in low tax countries (DWO*HRD*LSTR). In such a position the MNEs will be indifferent to taxes since low tax rates represent more incentives for the MNEs to shift more to low tax jurisdiction. Specification two indicates that wholly-owned MNEs with high R&D activities are less affected by taxation since they can apply transfer pricing with more flexibility compare to the less intensive R&D multinationals. Therefore, they are also less responsive to tax variations and increase their fixed assets in the low tax jurisdictions. This result is in line with Overesch and Schreiber (2008). However, when we include the wholly-owned with the less intensive R&D affiliates which are located in high tax zones (DWO*LRD*HSTR) to the regression model, the coefficient becomes negative and statistically significant as in column (2),(3) and (5). This result confirms our hypothesis more and indicates that more elastic responsiveness of low R&D density MNEs to high statutory tax rates. The corporate subsidiaries will be more indulged in shifting their R&D expenses to the higher tax jurisdictions. But, the estimated coefficient is positive when we plug in the variable which indicates the interaction of STR with the wholly-owned affiliates which are less involved in R&D programs and their tax rates relatively low. Indeed in such a situation multinationals will have the opportunity to channel more profit in form of management fees, loyalty payments and dividends to their

lower tax subsidiaries to reap out more escaped income as much as it could, and thereby, the group company overall taxes decline.

Similarly, the results of the second model are portrayed in Table 5 which provides more insight to the R&D intracompany trade response of minority owned affiliates to tax level variations. Second model is estimated to verify the robustness of the results of the first model. The regression results of the first two groups of variables are identical to the first model.

Concerning the third group of variables, the interaction term which reflects the intensive R&D minority-owned affiliates in high tax rate locations, STR(DMINW*HRD*HSTR), reported in column (4) and (5), shows the responsiveness of intrafirm trade to taxes. The impact of this interaction term is significantly positive. The result confirms that the tax rate sensitivity diminished when affiliates are more active in R&D. This shows that income shifting is driven by the group-specific transactions. However, we find a negative yet statistically insignificant impact of the interaction term of the statutory tax rate with minority-owned R&D intensive affiliates which are located in low tax countries STR(DMINW*HRD*LSTR), with a very small magnitude. This shows that Japanese MNEs are less inclined to increase their investments in fixed assets in the high R&D minority affiliates. Desai et al.(2004) provide evidence that US parent companies prefer to establish their foreign affiliates as wholly-owned entities rather than partially owned in order to efficiently utilize tax planning opportunities particularly when the company has intensive R&D activities so that intangibility permit will enhance tax arrangements and profitability margin. Our result is also in line with Azemar et al. (2009) who find that MNEs parent companies are less responsive to investment with their intensive R&D joint venture companies. Regarding the growth of fixed assets of minority owned affiliates with low R&D density that are located in high tax rate jurisdiction (DMINW*LRD*HSTR) declines as the statutory tax rate is increasing. The MNEs will be sensitive to taxes, since high tax rates represent less incentive for the MNEs to shift to high tax jurisdiction and hence growth in fixed assets will fall with the increase of taxes. It suggests that minority-owned MNEs with low R&D activities are more sensitive to tax variation compared to wholly-owned ones. The estimated coefficient is positive in the case of STR(DMINW*LRD*LSTR), representing the impact of statutory tax rate of the non wholly-owned affiliates which are less intensive in R&D and their tax rates are relatively low on the growth of fixed assets. The coefficient is positive and statistically significant, suggesting that the multinationals still have the opportunity to channel profits even if it is minority-owned. Therefore, the low tax rate represents incentives for income shifting for both minority and wholly-owned affiliates. This may be due to the conflict of interest concerning MNEs' ownership status. Overall results show that the results of model 1 are consistent and robust.

In summary, the results show that investment decisions are not only influenced by the local corporate tax rate and parent company statutory tax rate, but other firm specific factors such as R&D and ownership structure of may also cause the income shifting activities to vary. Unlike the minority-owned companies, the wholly-owned high R&D multinational should have more scope and variation with flexibility to assess, manage, and utilize their transfer pricing and income shifting arrangements.

Conclusion

In this study, factors that induce the Japanese listed non-financial Multinationals intrafirm trade and their income shifting behavior towards different taxation policies in various countries. It provides a deeper insight concerning multinationals income shifting behaviors regarding taxation, which has attracted considerable interest of many governments' agencies and policy makers, as high tax rates causes less capital inflow and hence causes distortion in the balance of payments

This paper investigates the Japanese multinationals income shifting behavior through their intrafirm trade activities and in light of their ownership status and their R&D density. It utilizes a panel data of 385 Japanese foreign affiliates located in 19 OECD countries over the period 2000 to 2009. In term of econometric methodology, the fixed effect generalized lease square model (GLS) is estimated to establish the relationship between intrafirm sales and its determinants such as tax rate, R&D density, ownership structure, etc. In this study, the main concern of interest is to estimate the impact of STR in interaction with other firm specific characteristics, i.e. R&D expenditures and ownership structure to get better understanding of the multinationals intrafirm activities in different controlled status of affiliates.

The empirical result reveals that Japanese wholly-owned multinationals with high R&D programs are more responsive to income shifting. Moreover, the foreign wholly-owned affiliates of Japanese parent companies, with low R&D expenditures and are located in high tax jurisdictions are more sensitive to host countries' corporate income tax rates, suggesting that high R&D intensive affiliates transactions are group-specific, unperceived and precisely incalculable by tax authorities. However, minority-owned affiliate's income shifting activities are insensitive to the tax variation when they are R&D intensive.

Larger affiliate firms are more intensive in income shifting. The coefficients of the capital variable have a positive and statistically significant impact on the fixed assets of affiliates, indicating that intrafirm trade is more active in affiliates associated with larger invested capital.

Concerning the distance variable, the empirical results indicate that it is highly significant and has a negative sign. This infers that Japanese multinational investments are affected by long distance. The longer the distance between Japan and the host country implies higher transaction costs and wider cultural differences.

The coefficient of the corruption index variable is negative and statistically significant. It means that Japanese foreign direct investments are highly sensitive to the environmental variables of host countries such as political and legal aspects. The intensive R&D companies prefer to establish their R&D affiliates in a stable and transparent country. They are more driven by less risky jurisdictions.

As policy implications, the results could be of some assistance to governments and policy makers to enhance the planning of R&D tax incentives and give insights into the behavior of MNEs towards tax liabilities. The study confers that as tax authorities aim to detect and suppress profit shifting activities but the resources of tax authorities are very limited. They cannot audit all firms with a high intensity. Therefore, it is more efficient and less time consuming simply to suggest to condition this intensity on the level of the shareholding between the parent and the subsidiary (assuming that profit shifting is overall inefficient for the economy and should be avoided). Thus, the intra-company transactions of a parent firm with foreign fully-owned subsidiaries should be audited with a maximum intensity. The intensity should fall with the lower level of the shareholding. Moreover, R&D intensive multinationals can be controlled by lowering the rate of home country tax base in order to harpoon and encourage more repatriation of foreign source income.

Table-1

Japanese Foreign Affiliates Host Country statistics

Country	No. of Observations	No. of Affiliates	Fixed Asset(mean)	Total Capital (mean)	R&D (mean)	Percent
Australia	100	10	65.74	192.77	0.84	2.17
Belgium	350	35	73.00	137.91	3.12	9.13
Canada	10	1	127.40	451.17	2.65	0.65
Switzerland	30	3	190.89	264.73	8.29	0.65
Chile	30	3	2898.48	4549.40	0.00	0.65
Czech Rep.	50	5	28.15	40.16	9.91	1.96
Germany	270	27	25.11	295.70	0.91	6.09
Spain	110	11	48.96	168.98	7.96	3.04
Finland	40	4	1.01	87.43	9.83	0.87
France	520	52	3.06	17.96	3.96	14.35
Great Britain	40	4	6732.57	7773.10	0.06	1.3
Italy	200	20	8.50	37.65	2.49	5.43
South Korea	1350	135	1.78	7.18	3.82	35.22
Netherland	190	19	950.64	1706.37	0.48	5
New Zealand	70	7	5.93	113.88	24.94	1.74
Poland	10	1	181.30	264.38	4.39	0.43
Portugal	60	6	8.65	20.87	210.57	1.52
Sweden	100	10	0.86	10.09	3.20	2.17
United States	320	32	366.36	536.79	0.41	7.61
Total: 19	3850	385	11718.38	16676.51	297.84	100

Japanese controlled foreign affiliates in 2009. Only manufacturing companies which at least owned by 51% by their parent companies are considered. Financial and insurance companies are excluded from the sample. Figures are in USD millions.

Table2

Descriptive Statistics

Variable	Definition of variables.	Mean	Median	Max.	Min.	Std. Dev
GDP	In billion US dollars.	2069.42	1172.95	14296.9	81.14	3151.37
TC	Total Capital♦.	63.24	55.8	100394.2	3	6.67
FA	Total fixed assets♦.	12.61	13.06	2771.5	1.95	1.81
DIST	Distance in km.	6552.06	9195.4	17362	943.8	4231.89
CINDX	Corruption index◊	6.65	6.9	9.4	4.3	1.35
DSTR	Tax rate difference	-7.97	-9.54	-25.87	2.41	-4.69
STR	Foreign statutory tax rate	32.11	30.8	43.28	15	4.84
R&D	R&D spending over sales	1.62	1.05	435.79	0	10.19

The Panel comprises of 10 years, 3850 observations. Tax-rate differential is the difference between the statutory tax rate at the host (affiliate) and the Japanese (parent) location.

Notes: ♦ indicates that figures are in millions US dollars. ◊ indicates Corruption Perceptions Index (CPI) from Transparency International (TI). Countries are ranked from 0 (very corrupted) to 10 (very transparent).

Table3

Hausman Test Results

Dependent Variable	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Model 1	3340.647	9	0.000
Model 2	5181.483	9	0.000

The table reports the results of the Hausman specification test for model 1 and 2 specified in section 3.2 Chi-Sq. statistic is the Chi-squared calculated value and Prob. is the p-value of calculated statistic.

Table 4

Dependent Variable	Natural Log of Fixed Assets				
Explanatory Variables:	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*
Intercept	-3.421***	-3.394***	-3.403***	-3.413***	-3.401***
	(-93.572)	(-95.083)	(-95.630)	(-92.320)	(-94.112)
Log (GDP)	0.276***	0.275***	0.276***	0.276***	0.275***
	(155.764)	(158.529)	(159.742)	(148.659)	(153.573)
Log (TC)	0.021***	0.023***	0.022***	0.023***	0.024***
	(20.343)	(21.364)	(21.027)	(21.175)	(21.587)
Log (DIST)	-0.032***	-0.025***	-0.025***	-0.033***	-0.025***
	(-18.811)	(-15.262)	(-15.871)	(-18.722)	(-14.826)
Log (CINDX)	-0.088***	-0.120***	-0.123***	-0.091***	-0.125***
	(-10.646)	(-15.433)	(-16.105)	(-10.710)	(-15.994)
DSTR	-0.010***	-0.011	-0.010***	-0.010***	-0.011***
	(-24.583)	(-26.400)	(-26.042)	(-24.540)	(-25.998)
Log (R&D)	0.001**	0.001*	0.001**	0.001*	0.001*
	(2.222)	(1.797)	(2.190)	(1.843)	(1.865)
STR(DWO*HRD*HSTR)	-	-	-	0.027***	0.014**
	-	-	-	(4.258)	(2.289)

STR(DWO*HRD*LSTR)	-	0.012***	-	0.014***	0.016***
	-	(2.719)	-	(3.034)	(3.335)
STR(DWO*LRD*HSTR)	-	-0.038***	-0.038***	-	-0.035***
	-	(-9.823)	(-9.730)	-	(-8.562)
STR(DWO*LRD*LSTR)	-	-	0.001	-	0.006*
	-	-	(0.368)	-	(1.731)
R-squared	0.449	0.451	0.451	0.450	0.451

Note: the dependent variable is the natural log of total fixed assets. Figures in parenthesis represent the t-statistics values. (***), (**), and (*) represent the significance level at 1%, 5% and 10% respectively.

Wholly-owned Japanese Multinationals

Table 5

Minority-owned Affiliates

Minority-owned Affiliates	**The Natural Log of Fixed Assets**				
Explanatory variables:	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*
Intercept	-3.421***	-3.459***	-3.472***	-3.397***	-3.443***
	(-93.572)	(-92.432)	(-92.525)	(-90.926)	(-88.670)
Log (GDP)	0.276***	0.278***	0.279***	0.275***	0.277***
	-155.764	-151.664	-151.738	-151.999	-145.673
Log (TC)	0.021***	0.021***	0.021***	0.022***	0.022***
	-20.343	-20.042	-19.6	-20.579	-19.892
Log (DIST)	-0.032***	-0.031***	-0.030***	-0.033***	-0.031***
	(-18.811)	(-17.099)	(-16.968)	(-18.869)	(-17.087)
Log (CINDX)	-0.088***	-0.085***	-0.085***	-0.091***	-0.088***
	(-10.646)	(-9.779)	(-9.962)	(-10.813)	(-10.319)
DSTR	-0.010***	-0.010***	-0.010***	-0.010***	-0.010***
	(-24.583)	(-24.284)	(-24.838)	(-23.869)	(-23.978)
Log (R&D)	0.001**	0.001**	0.001**	0.001**	0.001**
	(-2.222)	(-2.197)	(-2.315)	(-2.167)	(-2.281)
STR(DMINW*HRD*HSTR)	-	-	-	0.039***	0.033***
	-	-	-	(5.700)	(4.635)
STR(DMINW*HRD*LSTR)	-	-0.001	-	-0.001	-0.003

	-	(-0.097)	-	(-0.018)	(0.569)
STR(DMINW*LRD*HSTR)	-	-0.018***	-0.018***	-	-0.012**
	-	(-3.874)	(-3.883)	-	(-2.513)
STR(DMINW*LRD*LSTR)	-	-	0.012***	-	0.012***
	-	-	(2.889)	-	(2.832)
R-squared	0.449	0.449	0.449	0.45	0.45

Note: the dependent variable is the natural log of the total fixed assets. Figures in parenthesis represent the t-statistic values. (***), (**), and (*) represent the significance level at 1%, 5% and 10% respectively.

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