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International tax trends and competition: Tax sensitivity of U.S. foreign investment abroad

He, Xiaohong, Ph.D.

The University of Texas at Dallas, 1991

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INTERNATIONAL TAX TRENDS AND COMPETITION: TAX SENSITIVITY OF U.S. FOREIGN INVESTMENT ABROAD

By

XIAOHONG HE, B.S., M.A., M.S.

DISSERTATION

Presented to the Faculty of
The University Of Texas at Dallas
in Partial Fulfillment
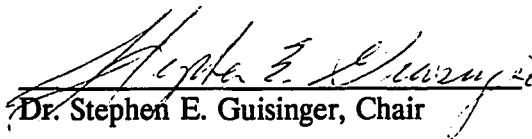of the Requirements
for the Degree of

DOCTOR OF PHILOSOPHY
in International Management Studies
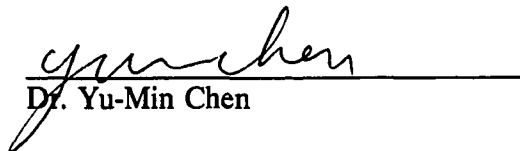
THE UNIVERSITY OF TEXAS AT DALLAS

September, 1991

INTERNATIONAL TAX TRENDS AND COMPETITION:

THE TAX SENSITIVITY OF THE U.S.

FOREIGN INVESTMENT ABROAD

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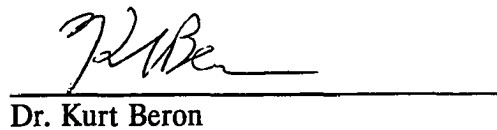
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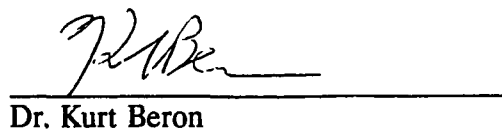# INTERNATIONAL TAX TRENDS AND COMPETITION:

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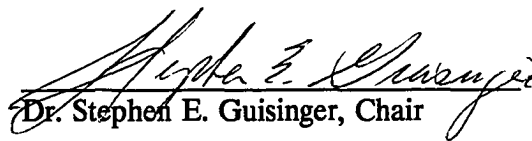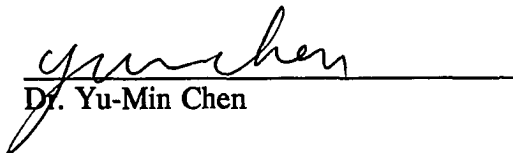
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Dr. Kurt Beron

DEDICATION

This dissertation is dedicated to my homeland China, and to my parents, Prof. Dongchang He and Prof. Chohbao Li, a source of inspiration and great spirits for success.

ACKNOWLEDGEMENT

The author wishes to acknowledge the supervising professor and committee chair, Dr. Stephen E. Guisinger. I do not believe that I would have made it to this stage without the constant encouragement and support from Dr. Guisinger. I also would like to thank professors Dr. Yu-Min Chen, Dr. David G. McKendrick, and Dr. Kurt Beron for not only serving on my committee, but also offering very helpful criticism and advice.

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To all of you, and to the many others who have given encouragement, I give my heartfelt gratitude and thanks.

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INTERNATIONAL TAX TRENDS AND COMPETITION: TAX

SENSITIVITY OF U.S. FOREIGN INVESTMENT ABROAD

Publication No._____

Xiaohong He, Ph.D

The University of Texas at Dallas, 1991

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The purposes of this study are to test the effectiveness of tax policy in attracting foreign direct investment and to examine the differences in tax policies between developing and developed country groups. The study finds that developed countries generally have higher effective tax rates and are more competitive in their tax policies, which tend to converge toward a group norm. Developing countries have lower average effective tax rates, less competition in their tax policies and tend toward divergent tax behavior--i.e. they tend to drift further apart from one another in terms of their tax policies. The study also finds that the tax sensitivity of U.S. foreign direct investment (FDI) is significantly greater within the developed country group than within the developing country group. In addition, the research explores the tax sensitivity of different sources of FDI. The study shows theoretically and empirically that FDI consisting of retained earnings and fresh investment respond differently to tax policy. These findings have implications for tax planning in general and tax arbitrage in particular.

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I. INTRODUCTION

The purpose of this study is to test whether tax policy is an effective instrument in attracting or repelling foreign direct investment (FDI). The taxation of foreign investment is widely recognized as an important factor in the operations of multinational corporations (MNCs). On a micro level, taxation affects all aspects of the MNCs' financial and investment decisions -- directing investment location, timing of intrafirm transfers and remittances, balancing the use of debt and equity, etc. From a broader perspective, tax policy toward foreign investment income has become more important. With a more integrated world economy and the rapid increase in the amount of capital crossing national borders, FDI has come to account for a sizable fraction of global investment[1] -- this phenomenon carries significant implications for a country's economic development and public policies.

There is no consensus on how and to what degree MNCs respond to tax policy. This

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[1] FDI, in dollars, is more than 30 percent of the total world trade in merchandise exports (FOB dollar value in 1987).

International trade also is following FDI. For example, 80 to 90 percent of U.S. and U.K. exports are associated with their MNCs, who are FDI parents and are involved heavily in intrafirm trade among their subsidiaries abroad.

1

study seeks to shed light on this issue by using a broad framework. It combines three approaches -- the determinants of foreign direct investment, the tax behavior of MNCs, and tax competition -- which taken together reveal important features of the relationship between taxation and FDI, otherwise insufficiently acknowledged under each separate approach.

Tax competition is becoming a more critical issue for national policy makers. However, studies such as those done by Bossons (1988) and Gravelie (1986) on tax competition, have focused mainly on the U.S.-inward rather than U.S.-outward foreign investment. This study tries to improve this by expanding the research on the U.S.-outward investment, and by applying different methodology.

Under the FDI determinants theory, such as, the research of Wheeler and Mody (1989), taxation was not the major focus. Instead, taxation was almost an afterthought arbitrarily included into the analysis. The evidence under this approach has been divergent. In this study, taxation is a central and an explicit variable. The tax behavior of MNCs has been studied on the firm level, but not from a policy perspective. Kopits (1976) and Horst (1979) made valuable contributions on the subject, but they did not take tax competition into consideration.

These limitations will be further elaborated upon in later chapters. The main point is that we do not know how and in what degree tax competition among nations influences MNCs' investment behavior, an especially important question given increasing global interdependence.

1.1 Major Contributions of the Research

This research is a first theoretical and empirical attempt to combine theories of tax competition, the determinants of FDI, and the tax behavior of MNCs into one research framework in order to study world tax trends, the pattern of tax competition, and the tax sensitivity of foreign investment abroad. As such, it distinguishes itself from previous research in terms of its conceptual approach, methodology, and sources of data.

1.1.1 Conceptual Approach

a. Most tax sensitivity research conducted in the past considered only the tax rates of host countries. This study will also consider "inter-country" relative tax rates, that is, the host country tax rate relative to a home country, or to a group of host countries (i.e., the country group in which each country shares similar economic characteristics). Thus, the tax sensitivity issue is studied under a broader framework of world tax competition,

global economic interdependence, and the behavior of the firm.

b. Prior tax competition research has not considered world tax trends, the pattern of tax competition, and the segmentation of the foreign direct investment market. In this study, world tax trends will be analyzed in order to answer the following questions. With greater economic integration, are national tax rates and policies converging or diverging? Are signs of tax competition evident in countries who use their tax policies to aggressively solicit new foreign investment? In particular, how do countries directly and indirectly compete with one another, and how effective and sensitive is tax competition in affecting volume and location of FDI crossing national borders? Do tax differentials among countries and over time make a difference in the rate and volume of international capital movements?

c. Unlike most previous research, foreign direct investment is further decomposed into reinvested earnings and new investment. This is important because of the different tax effects of the two.

d. A more insightful view is given about the historically dependent pattern of foreign investment. The questions of why current tax law has different tax impacts on retained earnings and fresh funds (new FDI), why FDI accumulates at its original location, and

why retained earnings are reinvested at their original location rather than being repatriated are explored by this research.

e. Tax sensitivity is investigated between developed and developing country groups and across individual countries.

1.1.2 Methodology

Besides linear regression analysis which most prior research in the field has generally used, this research will also use other statistical methods and models such as ANOVA, comparison of means with unequal variances, divergence and convergence tests, the Chi square test of goodness-of-fit, and a cross sectionally correlated and timewise autoregressive model. This should improve the confidence of the findings, since the data is grouped more effectively and treated more directly according to the objectives of each hypothesis than the linear regression technique allows.

1.1.3 Data

Except for the data from "The Survey of Current Business", the IRS data on controlled

foreign corporations has not been explored extensively in the field, but is used in this study to calculate the effective tax rate, rate of return, etc. The U.S. rate of return and effective tax rate on investment data used in this research from a National Bureau of Economic Research working paper.

1.2 Empirical Findings

The research examines the world tax trends on FDI and the pattern of tax competition. It finds that the developed and developing country groups have different trends and patterns. By applying these findings as given conditions, the tax sensitivity study is conducted. It shows that tax sensitivities are different between developing and developed country groups. The study also shows that FDI consisting of reinvested earnings and fresh funds investment respond differently to tax policies. Following the tax sensitivity study of reinvested earnings and fresh funds investment, this study examines the observation that a high percentage of FDI is composed of reinvested earnings, and that FDI is historically dependent upon the previous level of investment. These findings have implications for tax planning in general and tax arbitrage in particular.

1.3 Outline of the Research

The research is divided into six chapters. A brief review of the literature is in chapter II. A theoretical analysis of the research is in chapter III. Based on sections II and III, the working hypotheses are developed in chapter IV. The empirical studies and findings, which include models, methodology, the scope of the data, and the discussion of findings, are in chapter V. The conclusion and reference chapters are in chapters VI and VII.

II. REVIEW OF THE LITERATURE

Taxation and foreign investment have long been of central concern to economists, policy makers and researchers, since the transfer of capital from one country to another carries important consequences for the world economy. This literature review will focus only on a portion of the vast FDI research, and will ask the following three questions. First, how will each government's tax policy influence the location of foreign investments? Second, what difference can government tax policies make on the international capital flow in a multicountry world rather than a two countries world? Third, how sensitive and critical is the tax distortion to the change of direction or location of the capital flow? Through these questions, this review intends to identify the major limitations of these studies and present a research agenda.

The tax rate is one of many variables which affect a firm's investment decision. The importance of tax rates in an investment calculation is increasing due to the global availability of capital and greater equality in the quality of labor, the levels of production, and the rate of return on capital. Tax policy is thus often made on the margin to influence marginal investment decisions.

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The majority of the literature has been written by academics and government policy makers. As mentioned in the introduction, the question of how tax policy serves as an incentive or disincentive to the location decision of FDI has been pursued and studied in three ways. Each of them differs from one another conceptually and methodologically.

The first approach focuses on a vector of determinants of foreign direct investment in very broad categories and on whether taxation influences the location of FDI. Using this approach, all determinants are equally important in influencing FDI locations. Since the tax variable is not a major focus, how it influences a firm's investment decision is not clearly identified by this approach. Compared with other variables, taxation may not be as important as other economic variables. Simply, if a profit pie is bigger due to the favorable support of some fundamental economic variables, the pie may remain bigger after a greater tax slice is removed. Thus, in this context, the taxation issue may not be important at all. The effect of tax policy will become important in changing the investment location, especially when some economic variables are equal among alternative investment locations.

The second approach of MNCs' tax behavior assumes that the firm is indifferent as to which nationality it belongs, and it will maximize its global profit and minimize the tax

and tariff imposed by any national government. This multinational firm tax behavior has been studied specifically by this research.

The third approach, given the existence of international tax competition and economic interdependence, studies tax policy within a multicountry world. Much statistical research in the literature has focused on U.S.-inward FDI rather than on U.S.-outward FDI, and on the issue of what difference the host countries' taxation policies can make on the U.S.-outward FDI as economic interdependence and tax competition come into the scene.

This review will focus only on these three currents of academic effort on the issue of the taxation effects of FDI.

2.1 Determinants of FDI

2.1.1 Overview

The theory of determinants of FDI can be traced back to the theory of international

production. Under the market imperfection assumption[2], the firm will optimize its finance, investment, production, and distribution of profit decision mix globally by taking advantage of the imperfection in the global market. Focusing on market failure and following these theoretical roots, many empirical studies have attempted to discover the determinants of FDI. Some of these studies were: Root and Ahmed (1979) on the empirical determinants of manufacturing direct foreign investment in developing countries; Lung (1980) on the determinants of U.S. direct investment in the E.E.C.; Schneider and Frey (1985) on the economic and political determinants of FDI; and Wheeler and Mody (1989) on international location determinants of U.S. FDI. These researchers contributed greatly to our understanding of the factors influencing the direction of FDI by identifying the variables which influence the direction of FDI.

Yet, these findings fit only partially into the totality of vectors of the determinants of FDI. Therefore, there is a need for a general theory which is able to integrate the existing relevant knowledge on the determinants of FDI. On the theoretical side, Dunning's work (1977, 1979) seems to represent a major breakthrough. (See Agarwal's 1980 survey on the determinants of FDI.) His eclectic approach is a promising start towards the development of a general theory of FDI. Dunning hypothesized that the

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[2]. Under the market failure approach there are many influential and theoretical works by scholars such as Coase (1937), Aliber (1970, 1971, 1973), Vernon (1966), Hymer (1970), Horst (1972), Lessard (1979), Casson (1979), Buckly (1976), Magee (1969), Kindleburger (1969), and Arrow (1962), to name a few.

outcome of FDI was a function of ownership, internalization advantages of the FDI

parent, and location advantages of the FDI host. These three advantages were called

OIL. These three advantages must exist simultaneously in order for FDI to take place.

Following Dunning's ideas, a set of simultaneous equations can be formulated to

facilitate an empirical test:

FDI Demand function: $Q_d = a_0 + a_1 * P_d + F_d$

FDI Supply function: $Q_s = b_0 + b_1 * P_s + F_s$

where : a_0, b_0: constant.

P_d, P_s: price of FDI (Rate of the return on investment).

F_s, F_d: shift factors, which have potential effects on supply of FDI (ownership

and internalization factors) and the demand of FDI (location factors).

Dunning's work gives us a solid theoretical foundation for determining FDI by putting

all the previous research together, and advancing them by his OIL theory. It should be

noted that Dunning's theory is a general theory. Yet it is not designed to be a study of

each individual determinant. Hence there is a limit in applying it to the tax issue. It

cannot lead us to a unique empirical hypothesis of taxation.

2.1.2 Limitations and Remarks

The most fundamental shortcoming of the prior empirical literature of the FDI determinants is the lack of rigorous theoretical foundations. This is unfortunate for two important reasons.

First, unless there is a formal analytical model, there can be no genuinely logical way in which to hypothesize the appropriate type of determinants that belong to the attraction of the FDI calculus. The empirical literature fails to address the problem of how to specify a variable properly. For example, the principal component method used by researchers in sorting location determinants lacks theoretical reason for keeping one variable and dropping another, other than the statistical reason based upon the data. As a result, in the absence of a rigorous theoretical model, the choice of variables becomes entirely arbitrary.

Second, there may be no logical way in which to decide the appropriate form of the regression equation that is to be estimated. Hence, the decision to use a linear

regression or discriminate analysis or other alternatives (non-linear, simultaneous equations) becomes entirely arbitrary. Since there has been no list of determinants relevant for all situations, researchers have felt free to adapt lists and definitions of variables to fit the particular empirical situation being studied. Among these studies, very few tested the tax effect specifically on the investment flow. Hence, tax is one of several variables which appears in some models (see Wheeler and Mody's paper, 1989, as an example) parallel with other location variables without a theoretical base for solving following questions.

How to quantify a tax variable? How does tax affect the investment location decision (i.e., under which conditions it will have a direct impact and under which conditions it will have a secondary impact on FDI location decisions)? And if there is an effect, how does tax compare with other location variables and are those variables equally important in affecting FDI?

Three important conceptual points seem missing in the FDI determinants literature.

First, the tax effect may be a secondary consideration on the location decision. An investor may first look for a profitable project location based on economic and political

fundamental determinants such as host country's market size, infrastructure and political stability, and then compare the tax advantage among the projects with equal before tax profitability in different location alternatives. If this is true, by making a tax variable parallel to (or equally important with) all other fundamental determinants, research will fail to identify the secondary tax effect.

Second, there is no consideration of global competition, because the multicountry tax war dilutes the tax difference between the two country world. Under competition there is a pressure to lower the tax rate, and to conform to an international standard. Competition has led to a lower level of tax rates among countries than in a two country world. An effort to lower the tax rate may be an effort to keep capital from leaving a country rather than an attempt to attract more inward FDI. The tax differential between the home and host country will have no consequence, if the lowered host tax rate is still higher than the international tax level.

Third, there is no consideration of the world tax trends. A change in a country's relative tax rate (relative to its previous period) may follow the world trend. A change in an inter-country relative tax rate (defined as a country's tax rate relative to an average country group tax level) may be zero. Therefore, lowering a country's tax rate relative to its previous period may not change the capital formation in that country. It is an

inter-country relative tax change which makes a difference. It is not surprising, therefore, that the results on tax effect of investment are divergent and depend very much on data selection and the model tested. In summary, the research following this route is handicapped by a rather broad and generalized theory, aggregate data limitations, and unsatisfactory methodology.

2.2 Taxation and MNCs Behavior

2.2.1 Overview

The studies of taxation and MNCs behavior have focused on the linkage between tax and the decision making process of the firm. They have asked how a tax-advantaged investment works, what influences a foreign investment location decision of a firm, and what the economic welfare implications of these tax induced distortions are. The analyses are specifically conducted at the firm level.

Kopits (1976) presented a critical survey on taxation and MNCs behavior, which summarized the firm's tax behavior empirically and theoretically based upon the question of how international differences in taxes influence a firm's investment and

financial decisions, production, trade, and transfer pricing. He concluded that:

> ... the explanations of the firm's behavior
> follow two theoretical strains. The first
> encompasses the theories of international
> capital movements, namely, the differential
> return and the portfolio selection approaches.
> The second consists for the most part of
> adaptations of microeconomic theory of the
> domestic firm, based on profit maximization,
> size maximization and nonmaximization. Of all
> the theories examined, the neoclassical profit-
> maximization theory is the most amenable to
> ascertain the role of taxation in the decisions
> of the multinational firm. (Kopits, 1976: 659)

Kopits' work points in the right direction for tax study. Yet we need an even better

framework to further our empirical research.

Under the neoclassical profit-maximization theory, Horst's work (1979) provides us with

a complete model which integrates a series of a firm's taxation considerations, from

investment decisions to remittance and transfer decisions. Comparing the way of testing

the tax effect under the determinants of foreign direct investment theory, the Horst

model is at least empirically more mature. Many empirical studies have followed Horst's

model. The research survey done by Caves (1982) and Kopits (1976) concludes that the

statistical tests of the tax impact on MNCs' financial decisions is the same as the impact

of other economic disturbances. Yet, they do not see that the tax policy may be a

secondary impact on MNCs' investment decision making process, and that the competition in tax policies ultimately alters the tax impact on MNCs' investment decisions, given increases in economic interdependence among nations.

In Caves's (1982) economic literature survey on MNCs, he integrates the existing literature on tax behavior of MNCs and its economic welfare implications. He concludes that: "... corporation income taxes on MNCs' investments abroad can be analyzed for their normative effects on world welfare or on the national welfare of the sources and host countries separately." (Caves, 1982: 249) His analysis concludes that world welfare will be achieved, if and only if both capital export neutrality and capital import neutrality can be achieved simultaneously (i.e., if all countries employ the same tax rates).

For example, U.S. tax treatment is based on a foreign tax credit mechanism. In its pure form, this mechanism would insure that the net tax rate on all income of U.S. firms would be equal to the U.S. tax rate, no matter where the investment is located or how low the host country's tax rate is. This is called capital export neutrality. In practice, the U.S. tax is not collected until income is repatriated from abroad. This mechanism is called tax deferral. Caves has shown that a tax system of allowing tax credit with deferral on foreign investment creates tax export neutrality, and only deferral partially

(<u>not fundamentally</u>) apart from the neutrality. This conclusion led researchers to question whether host country tax policy matters, because the investor is going to pay whomever (host or home) imposes a higher tax rate sooner or later. In this way, the tax incentive provided by the host government vanishes.

Caves's view of a tax system of allowing tax credit with deferral has been questioned by Hartman (1984, 1985). Hartman shows that the absence of a foreign tax credit mechanism with deferral <u>fundamentally</u> departs from the tax export neutrality and is especially irrelevant to a matured firm's investment and dividend decisions. The matured firm is the one in a matured phase of its investment path, where marginal investment is made out of reinvested earnings. This conclusion conflicts sharply with conventional wisdom, because the home country tax acts as an avoidable cost. Hartman further argues that reinvestment decisions are conceptually different from new fund investment decisions. The tax export neutrality rule is irrelevant for reinvested earnings, because the cost of the fund from reinvested earnings is much less than that of the new fund. The tax mechanism differs totally from the case of reinvestment to the case of new investment. A detailed analysis is presented in section 3.1.2 case 2, under the current tax system of the tax credit with deferral. Hartman concludes that in order to maximize after-tax profits, a firm should finance its foreign investments out of foreign earnings to the greatest extent possible, in order to fully capture the tax advantages

provided by the tax deferral.

To confirm his arguments, Hartman empirically tests the tax effects on both the reinvested earnings and the investment of the new fund of foreign inward investment in the U.S (1965-1979). The results support his hypotheses that the tax effect is significant to the location directions of both reinvestment earnings and investment new funds; and that the marginal reinvestment decision of firms, which is reinvesting earnings at margin, has a different tax sensitivity from the marginal investment decision, which is made by firms' transfer of fresh funds from abroad at the margin (Hartman 1984). The result was again confirmed by the research done by Boskin and Gale (1986) on 1956-1984 data. A similar model was tested by Young (1988) on 1953-1984 data. Young's result found reinvestment earnings were significantly changed by the tax rate, while the investment of new funds were not. Following Young, Murthy (1989) tested the same data set using a different methodology (Maximize likelihood estimation rather than ordinary least squares). Murthy reached a conclusion similar to Hartman (1984).

2.2.2 Remarks

Reviewing the literature on taxation and MNCs' behavior, there are several comments to be highlighted.

First, research on the tax effect of foreign investment has been better conducted theoretically and empirically under the framework of the MNCs' tax behavior than under the determinants of FDI approach allowed. Taxation directly relates to the firm's investment behavior, and largely depends on the host and home country's tax law. The firm itself must decide whether it is in a foreign tax credit deficit or surplus position. The firm may behave differently even when facing the same home country tax law (see the analysis in 3.1.1 cases 1 and 2). A full understanding of the MNCs' tax behavior is a prerequisite to the analysis of tax impact on MNCs investment behavior. Theoretically, the key tax related decision variables of firms should be fully integrated into the firm's financial and investment decision framework in order to specifically capture the interrelationships.

The FDI determinants approach, which simply runs a tax variable and other location determinants (independent variables) against an investment flow (dependent variable) without understanding the MNCs' tax behavior, is not very reliable. The arbitrary choice and poor definition of dependent and independent variables and the lack of understanding of the aggregation data problem can make the results either distorted or arbitrary.

Besides work done by Horst (1979), Adler (1979) and Caves (1982), a more updated summary on the MNCs' tax behavior is required in order to further improve and advance it.

Second, MNCs' tax related transactions can be divided into two kinds of transactions, because each of them carries different economic consequences to host and home governments. Pure tax arbitrage transactions like transfer pricing will only affect rate of returns and earnings of subsidiaries, but not overall return to the parent firm. These transactions will affect the national welfare but not the world welfare. Home and host nations, based on tax revenue, must decide who will get a bigger slice of a fixed pie, while from a world welfare point of view, no more value is added to the arbitrage transactions. The transactions of investment funds through either reinvested earnings or new funds will actually change the location of the company's operations, and will affect employment, economic development of host and home nations, and world welfare as a whole. This is because of the different amounts of value added by allocating investment in alternative places.

It is also true that a firm, which gets around the impact of tax law by changing the composition of the financial mix of the transfer pricing, dividends, royalties, interest payments and so on, lessens the need to reallocate the real investment. Though there

is much research on transfer pricing, due to the limited scope of this paper and the problems being addressed, this study will focus more on tax effects of the capital movement transactions (i.e. investment). The omission of tax arbitrage transactions (i.e. transfer pricing, dividends, interest payments, etc..) in the analysis will not change the direction of the results.

Third, conceptually the tax effects on the reinvestment decision are different from the decision of investment of new funds. The reinvested earnings are more tax sensitive than investment of new funds. The reasons will be given in 3.1.2 Case 2 and shown by equations (3.11), (3.12) and (3.14). When reinvestment counts as a larger percent of a country's inward or outward foreign capital, the tax sensitivity analysis on aggregated capital data, which is the sum of the net equity investment, reinvestment earnings and intracompany transfers, will be diluted by the lack of understanding of the distinction between them. In addition, current empirical research on the issue has been conducted on the inward investments of the U.S. rather than outward investments with a tax competition consideration. Future research can be extended in this direction too.

Fourth, the historical dependence pattern of investment has been noted by many scholars in the field. Yet, very few insights have been provided. They only explain statistically why this pattern exists. The distinction between reinvestment earnings and

new investments may advance our knowledge on this proposition, since as FDI matures,

it tends to invest more in its original location, partly due to the tax advantage.

2.3 Economic Interdependence and Tax Competition

The effectiveness of the national tax policy depends on the existence of a well-

functioning national market. However when the market grows beyond national

boundaries and becomes increasingly global and integrated, is it going to function the

same way or more or less effectively? What difference will it make òn FDI, when a

nation's economy is relatively closed or relatively open to the world economy?

The rapid integration of the world economy is dramatically changing the effects of tax

policies and creating vigorous tax policy competition among nations. The integration of

the world economy has done many things, but in particular it transfers the motives

behind the tax policy. The diffusion process is faster than before, and it speeds the

process of the bidding war. Competition for industrial location has become fierce in

recent years. Many nations now offer tax holidays, and a variety of investment

incentives (see Guisinger 1979) to attract "foot-loose" manufacturing investment to their

shores.

In the developed world, Ireland, Britain, Belgium, France, and Italy all maintain aggressive "regional" tax policies designed to attract investment either within each country or outside a country. In the developing world, the Statute for the Encouragement of Investment has become popular. Established in Taiwan in 1965, in an effort to attract export-oriented manufacturing investment by relying on tax holidays, rapid depreciation, import-duty exemption, and various assistance in getting FDI established. Similar acts in the Philippines, Malaysia, Singapore, Thailand and Indonesia were introduced within three years. China has been following the same pattern aggressively since 1980. Similarly, smaller countries in the Caribbean area, known as tax havens, all maintain very low corporate tax rates and provide tax holidays to attract foreign investors. Despite the loose coordination within the Central American Common Market, stiff competition remains.

International mobility has now reached the point that the domestic monetary and fiscal policy cannot be formulated without international considerations in the developed world. While in the developing world, the effectiveness of the tax policy on foreign investment is no longer a matter of the tax differential between the developed home and the developing host countries, but the neighboring countries' tax rates as well.

With concentration on the developed economy, Richard Cooper (1974, 1986) expressed

the idea that competitive relationships among nations are like a "free-for-all" perfect competition. He wrote:

> ...that the competition with perfect market
> would lead to a complete erosion of many
> national policies. The tax arbitrage would
> penalize nations that attempt to maintain
> business taxes or regulation more severe than
> those prevailing elsewhere. Thus there would
> be strong pressure for each country to conform
> to the international norm. Government actions
> could be strongly conditioned by an
> environmental constraint. (Cooper, 1986: 110)

What would determine the international norm? He answers this question by applying Adam Smith's invisible hand idea that the competition among nations determines the norm. Putting aside the question of whether the norm is a social optimum or not, by following his argument it could be reasoned that, with a highly interdependent economy in the developed world, each nation would converge to the equilibrium norm in a faster way than that of the developing world where the market is relatively less open and has more business barriers for capital movement.

There have been a number of empirical and simulation studies on how other industrial countries responded to a change in the U.S. tax policy within an international tax competition context (Feldstein 1983, Gravelle 1986, Tanzi 1987, Bossons 1988, Musgrave 1988 and Fieleke 1988). Studies of tax competition have been limited to developed

countries. Yet, there is no research on the world foreign investment tax trend and the pattern of tax competition. There is little research on comparative tax studies that explore systematically the differences between developed and developing country tax policies. There is little research on the question of how international tax competition can make a difference at the margin in influencing the size and direction of these investment flows among the nations.

Will the situation be the same in the developing world? The answer is no. First, the economy in the developing world is less integrated and less interdependent, even though they are more open now[3]. To take the most obvious case of the financial market, the flow of capital in the developing countries is restricted in most cases. Second, the role of the government in developing countries is more influential in economic affairs than that of the developed nations. Putting aside the arguments that it may or may not need more government involvement in the early stages of development to protect infant industries, the results are the same. More artificial barriers exist to inhibit the flow of international capital and trade. Third, tax competition among them developing nations is more for funds from the developed nations rather than for funds from each other. Fourth, the developing nations' trend may be less convergent and much slower towards a tax equilibrium norm than that of the developed world, given a less integrated market.

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[3] Referring to Cooper's (1986) different definitions of open, integration and interdependence of an economy (see pp. 289-293).

This brief review of the existing literature suggests that research is needed on the tax sensitivity of foreign investment, both within the context of the international tax competition and from the angle of MNCs' tax behavior.

III. THEORETICAL ANALYSIS OF THE RESEARCH

MNCs' tax behavior depends on the host and home country's tax policies. Even firms facing the same home country tax policy may behave differently according to their tax credit surplus or deficit position. This analysis assumes that the home country's tax system allows a tax credit on foreign investment income and tax deferral until foreign investment income is actually repatriated, since it is consistent with the policies applied by most capital export countries like the U.S., Japan, the U.K., Sweden and West Germany.

The following analysis is based on and similar to Horst's (1979), Adler's (1979) and Hartman's (1984, 1985) approaches.

3.1 Taxation and Behavior of the MNCs

How and in what way does a tax-advantaged investment work and what form does it take to influence a foreign investment decision? On the theoretical front, what are the key decision variables, which are tax sensitive and need to be taken into the calculation

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to minimize the global tax payment for a firm? How do they interrelate to each other to affect a firm's investment transaction?

The firm's investment fund (I) can come from three major sources: debt (L), which may come as an outside loan (L_o) from the home lender and host lender, or as internal loan (L_p) from the intrafirm borrowing; new equity investment (I_n); and reinvested earnings (I_{re}).

$$I = L + I_n + I_{re} \quad \text{..} (3.1)$$

$$L = L_o + L_p \quad \text{...} (3.2)$$

MNCs subsidiary taxable income (E) is the gross revenue net of total payments (R) for interest, royalties, licence fees, headquarter services and compensations.

$$E = r_h I - i_o L_o - i_p L_p - h R$$

$$= (r_h - i_o)L_o + (r_h - i_p)L_p + r_h (I_n + I_{re}) - hR \text{......} (3.3)$$

Assuming that: $r_h > i_o$, and $r_h > i_p$.

Where: i_o = Interest rate of outside lender;

i_p = Interest rate of parent and intrafirm borrowing;

h = Proportion of royalties, service charges and
licence payment to a subsidiary's total investment;
and,

r_h = Rate of return on investment in host country.

Dividend (D) is the dividend payout ratio (p) multiplied by subsidiary income after tax.

$$D = p (1 - t_h) E \dots\dots (3.4)$$

where: t_h = host country corporation tax.

The next period reinvestment (I_{re}) is:

$$I_{re} = (1 - p)(1 - t_h) E \dots\dots (3.5)$$

Total withholding tax (W) is:

$$W = w_d D + w_l (i_o L_o + i_p L_p) + w_r h R \dots\dots (3.6)$$

where: w_d, w_l, w_r = withholding tax rates on dividends, debt, and

royalties payments.

Home country taxable income (E_p) is:

$$E_p = i_p L_p + h R + D/(1-t_h) \quad\text{...} (3.7)$$

The parent company's tax payable, (T_p), is the maximum of the tax due either to the host (T_{ch}) or the home (T_{cm}) country.

$$T_p = \max \{ T_{ch} , T_{cm} \}$$

$$= \max \{ W + t_h D / [p(1-t_h)], t_m E_p \} \quad\text{...} (3.8)^4$$

Consolidated earnings to the MNCs, (E_m), are the after tax income plus reinvestment earnings.

$$E_m = E_p - T_p + I_{re}$$

$$= E_p - \max\{ T_{ch}, T_{cm}) + I_{re}$$

$$= (i_p L_p + h R + p E) - \max\{W+t_h D / [p(1-t_h)], t_m E_p\} + I_{re}$$

$$\text{...} (3.9)$$

_____

[4] See Horst's (1979) basic model equations (1) to (21). By applying the same methodology, the one period model here, equations (1) to (9) attempt to be simpler and more straightforward explanation of the points.

To maximize E_m, there are seven decision variables (i.e., i_p, h, p, L_o, L_p, I_n, and I_{re}), which can be calculated in a firm's investment and remittance decision mix. There are also constraints imposed by host and home tax laws (i.e., t_h, t_m, w_d, w_l, and w_r, and additional five tax parameters[5]). In total, these twelve variables can be classified into three groups distinguished according to their characteristics.

Intrafirm financial parameters: i_p, h, and p. Investment decision parameters: L_o, L_p, I_n, and I_{re}. (E, in equation 3.9, is a function of L_o and I_n, defined by equations 3.1 and 3.3.) The above two groups of parameters are endogenous to firms.

Tax parameters: t_h, t_m, w_d, w_l, and w_r. (W, in equation 3.9, is a function of w_d, w_l, and w_r defined by equation 3.6.)
This group of parameters is exogenous to firms.

How does a tax induced remittance work and how does a tax induced marginal investment decision work? The first investment goal for a tax advantage is to find a good investment in which an economic profit is possible. That is why it is assumed r_h

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[5]. For simplicity, the other tax incentives, like a fast depreciation rule, carry forward of loss, and so on, are not included in the tax parameters, even though they also enter a firm's cash flow calculations. In later sections of the dissertation, it will be shown that the empirical study will employ the effective tax rate. Omission of these tax related incentives will not change the research result.

is greater than i_o and i_p in the equation 3.3 [6]. With this primary goal in mind, an investor will look for an investment opportunity with three sub-goals:

1. Avoidance of taxes or higher taxes from annual income of the investment by globally shifting funds whenever and wherever the capital import and export neutralities are violated;

2. Conversion of a high tax income into a low tax income by reshuffling the content of repatriations, by changing the leverage of the investment (by labeling the capital differently), and by delaying the tax payment; and

3. Creation of artificial losses to shelter income from another country's investment by applying excess tax credit to cover other investment tax liabilities on an overall basis.

How does a firm take advantage of these different tax shelters in international production? Two separate assumption must be made:

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[6]. This assumes that a rate of return on investment is always larger than the cost of capital.

3.1.1 Assuming Parent Needs Funds at Home.

If it anticipates a severe depreciation of the local currency, political risk, or needs funds to consume in the home country. A company will prefer to bring funds back from an overseas operation.

In general, for unrelated parties the royalties and licence fees are determined by market forces. Within MNCs, the price of the technology can be set arbitrarily so as to ascertain the tax-minimized royalty-interest-dividend mix. If the total repatriation fund is constant, the increase in one will decrease the other two.

Case 1: The parent's foreign tax credit position is in deficit[7], that is $T_{cm} > T_{ch}$, in the equation 3.8.

* If $t_h > t_m$, the MNCs will maximize royalties, interest payments, and dividend payments; and use excess credit to offset another country's tax liability.

* If $t_h < t_m$, MNCs will minimize dividend, interest and royalties payments.

The firm should avoid transferring income from a low to a high tax jurisdiction.

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[7]. Michael Adler (1979) discusses this decision rule (see p.183).

Case 2: The parent's foreign tax credit position is in surplus, that is $T_{cm} < T_{ch}$. The

parent needs to maximize royalties and interest payments, and minimize dividends.

In sum an optimal solution should be where $T_{cm} = T_{ch}$, i.e.,

$$t_m E_p = W + t_h D / [p(1-t_h)].$$

3.1.2 Assuming Parent Is Indifferent About the Funds Location.

The parent company will be indifferent about where overseas earnings are placed,

either domestically or abroad. For example, if there is a severe depreciation of the local

currency and an increase in the political risk of the host country, the parent company

may want to withdraw funds from that country and invest in another country rather than

bring the funds back home.

Case 1: The parent has the choice of reinvesting earnings in the host country, or a new

host country, or alternatively repatriating it and investing at home. Which of the three

alternatives should the firm choose? How can tax differentials make a difference?

* If one dollar is repatriated and invested at home, the

rate of return (r^m) will be:

$$r^m = (1 - t_m) (1 + r)/(1-t_h) \quad ....(3.10)$$

where: r = home average rate of return on capital.

* If one dollar is deferred a year, reinvested in the host country, and then repatriated,

the rate of return[8] (r^*) to the parent will be:

$$r^* = (1 - t_m) [1 + r_h (1 - t_h)] / (1 - t_h)...(3.11)$$

where: r_h = host rate of return on capital.

* If one dollar is deferred a year, reinvested in another country and then repatriated,

the rate of return (r^{**}) to the parent from the new host country will be:

$$r^{**} = (1-t_m) (1-w_h)[1 + r_{nh} (1 - t_{nh})] / (1-t_{nh})....(3.12)$$

where: r_{nh} = new host rate of return on capital.

w_h = withholding tax of the host from which the

fund is transferred.

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[8]. David G. Hartman (1984) presents these two equations (10) and (11) for reinvestment decision alternatives.

The marginal investment decision will depend on which return r_m, r^*, or r^{**} is bigger. It is not difficult to see from equations (3.10), (3.11) and (3.12) that as long as r^m, r^*, and r^{**} are not equal and capital, with all other conditions remain the same, will move to the place where the rate of return is the highest. Hence, the decision of where the funds should go will be directly influenced by r^m, r^*, and r^{**}.

By applying equations (3.10) (3.11) and (3.12), we can analyze the tax sensitivity of r^m, r^*, and r^{**}. To make the analysis easier, we will study the relationship between the rates of return (ROR) to parent and the host countries tax rates. The study is assuming that:

i. $r = r_h = r_{nh}$.

ii. t_m remains the same for equation (3.10) to (3.12).

iii. $t_h = t_{nh}$.

Tax sensitivity is the first derivative of each parent rate of return with respect to host country tax rate in each of the equations (3.10), (3.11) and (3.12). In a graph, the tax sensitivity is also a slope of each curve.

Table 3.1 Comparison of Tax Sensitivities of Parent RORs

ROR Equation No.	Slope	Intercept
Invest back at home: r^m of (3.10)	$(1+r)/(1-t_h)^2$	$(1+r)(1-t_m)$
Reinvest at host: r^* of (3.11)	$1/(1-t_h)^2$	$(1+r_h)(1-t_m)$
Reinvest at another host: r^{**} of (3.12)	$(1-w_h)/(1-t_{nh})^2$	$(1-w_h)(1+r_{nh})(1-t_m)$

Fig. 3.1 Comparison of Tax Sensitivities of Parent
       Rate of Returns on Reinvested Earnings.

r^m, r^*, & r^{**}
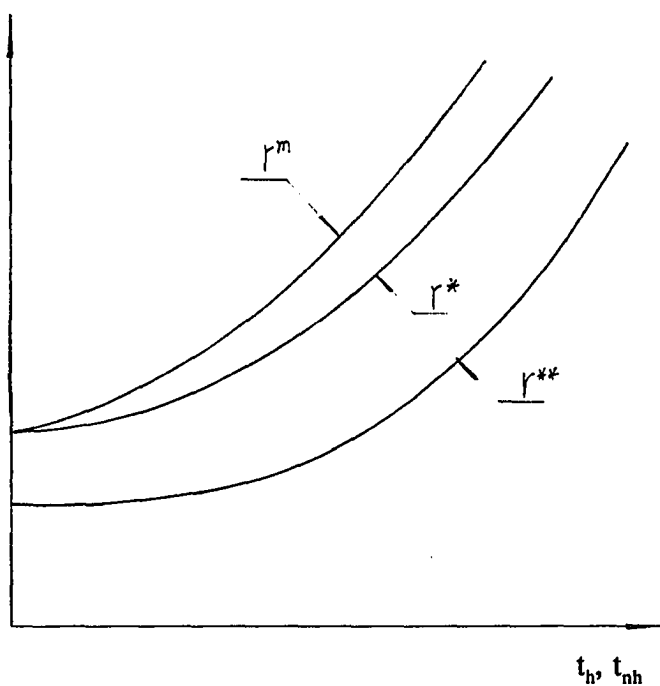
From the above analysis and the graph, it can be shown that the reinvestment of earnings at either of the host countries are less tax sensitive than at home.

Case 2: When the parent makes an overseas investment decision, what is the difference, if the investment is made from new funds or reinvested earnings? What are the tax consequences for the two?

First, as Hartman showed (1984) the decision to invest fresh funds or investing retained earnings are mutually exclusive. The cost of capital using retained earnings is lower than that of fresh funds, because fresh funds from the parent to the foreign subsidiary have not accumulated any foreign tax credit. When fresh funds and their earnings are repatriated, they will need to pay withholding tax and foreign corporation income tax; while in the case of reinvested earnings, the tax liability on the investment of deferred earnings has already been reported. The further earnings from reinvestment can be free from the home country's tax law. There is no reason to repatriate the earnings for less rather than to reinvest it for a maximum return in host countries.

Second, how does the parent raise the after-tax rate of return (r^* or r^{**}) on reinvested earnings (I_{re}) without losing revenue from the previous investment and without

changing the tax liability (T_p) on the previous earnings? The rule is stated clearly by equations (3.10), (3.11) and (3.12). The trick is to locate investment in a country with a higher after tax rate of return (r^* or r^{**}) than that of the home country (r^m). At time period one, further earnings generated from a reinvested dollar do not accumulate any additional tax liability. The parent obtains a higher earning than if it had invested at home without changing the previous dollar amount of retained earnings and tax liabilities at time period zero.

Also as in case one, we can compare the tax sensitivity between a rate of return on investment of new funds and a rate of return on reinvested earnings in equations (3.11) and (3.12).

A rate of return on investment of new funds can be computed from equations (3.1) to (3.9) by setting the debt variable, L, equal to zero. In the resulting equation, Em, or the consolidated earnings to a parent company, is:

$$E_m = [hR + pE] - \max \{ T_{ch}, T_{cm} \} + I_{re} \quad \dots\dots\dots\dots(3.13a)$$

Here we assume the optimal tax payment, T_p, is obtained when:

$$T_{ch} = T_{cm}.$$

$$E_m = [hR + D/(1-t_h)] - \{ W + t_hD / [p(1-t_h)] \} + I_{rc}$$

$$= (hR + pE) - (W + t_hE) + I_{rc}$$

$$= (hR - W + I_{rc}) + (p - t_h) E \quad \text{................(3.13b)}$$

where: $E = D/[p(1-t_h)]$ (see 3.4).

The rate of return on an investment of new funds, r', is:

$$r' = (1-t_m) E_m / I_n$$

$$= (1-t_m) \{(hR - W + I_{rc}) + (p - t_h)E\} / I_n$$

$$= (1-t_m)(hR - W + I_{rc})/I_n + (1-t_m)(p-t_h)(1+r_s)$$

where: $r_s = E /I_n - 1$. $\quad \text{....................} (3.14)$

r_s is a subsidiary rate of return. Assuming: $r_s = r_h$.

Comparison of tax sensitivities of parent rate of return on reinvested earnings and investment of fresh funds.

Table 3.2 Comparison of ROR's Tax Sensitivities of
Reinvested Earnings and Fresh Funds Investment.

ROR Equation No.	Slope with Respect to Host Country Tax RAte (t_h)	Slope with Respect to Host Country Rate of Return on Capital (r_h)
Reinvest at host:		
r^* of (3.11)	$(1-t_m)/(1-t_h)^2$	$1 - t_m$
Reinvest at another host:		
r^{**} of (3.12)	$(1-t_m)(1-w_h)/(1-t_{nh})^2$	$(1-t_m)(1-w_h)$
Invest fresh funds:		
r' of (3.14)	$-(1-t_m)(1+r_h)$	$(1-t_m)(p-t_h)$

Fig. 3.2 Comparison of ROR's Tax Sensitivities of Reinvested
Earnings and Fresh Fund Investments

r^*, r'

t_h

r_h
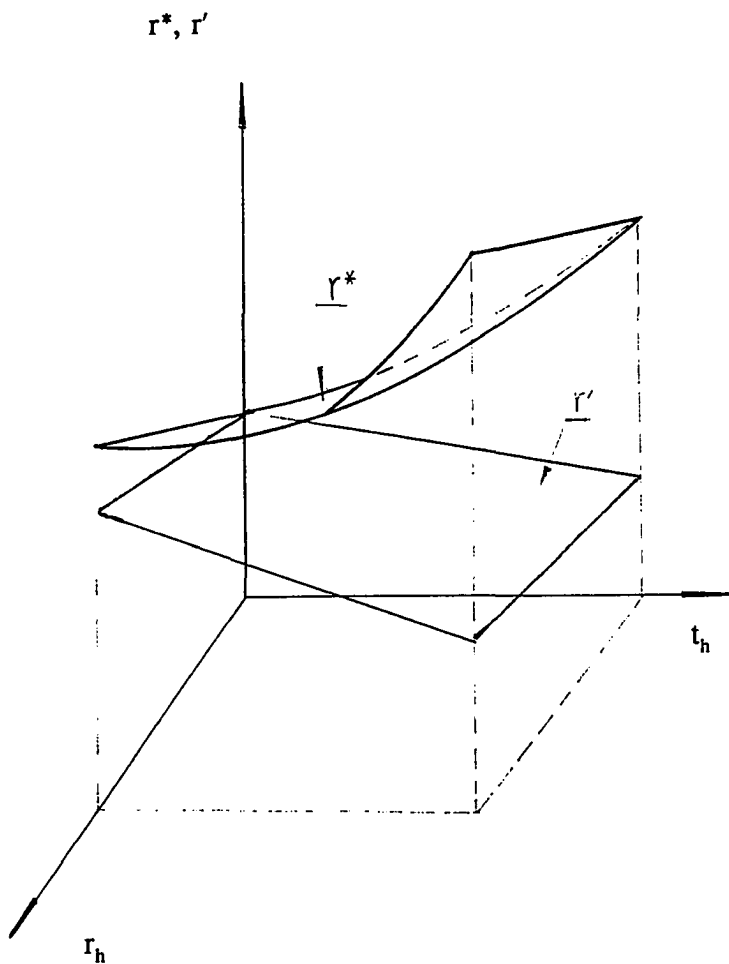
Where intercept b:
(when $t_h = 0$, $r_h = 0$)

$$b^* = 1 - t_m$$

$$b' = (1 - t_m)[\frac{hR - W + I_{rc}}{I_n} + P]$$

B* may be larger or
smaller than b'.

A comparison of the slopes of equation (3.11) and (3.12) with the slope of (3.14), shows that the tax sensitivities of returns (r^*, r^{**} and r') respond to different variables. The tax sensitivities of r^* and r^{**} are functions of the host country's tax rate, while the tax sensitivity of rate of return on fresh funds investment, r', is a function of the host country's rate of return on capital. The implication of this finding is that the return on new fund investment is sensitive to the host rate of return on capital, while the return on reinvested earnings is not. Second, it shows that with an increase in t_h, r^* is much more sensitive to the tax rate than r' is. It seems as investments mature, the rate of return on reinvestment is more sensitive to the host country's tax rate, t_h, but not so much to the host rate of return on capital, r_h. If this is true, what are the policy implications for the host country's government?

3.1.3 Highlights of the analysis

Compared with the FDI determinants approach, this analysis provides a broader base of knowledge and leads to better empirical study models by addressing the problem from the angle of MNCs' tax behavior.

a. As emphasized by Hartman, firms involved in foreign operations can be distinguished as matured and immature firms. The matured firm is self-generating in its investment

path, where the marginal investment is made from retained earnings. An immature firm

relies on funds from its parent. Due to the tax advantage, firms reinvest retained

earnings to a maximum. Past statistics indicate (Fig. 3) that a high percentage of U.S.

outward investment has been made from retained earnings (up to 100% in 1981 and

1982).

Fig. 3.3 U.S. FDI Abroad
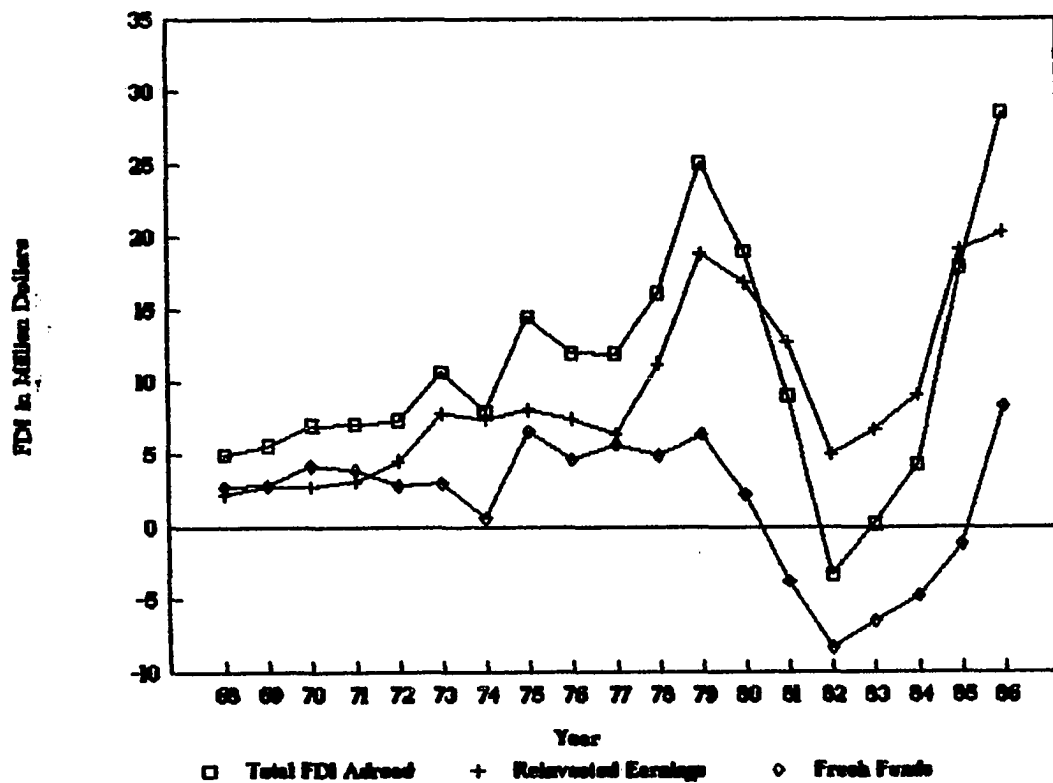
The above argument leads to the hypothesis that a mature firm will invest its retained earnings to a maximum until r^m equals r^* or r^{**}, given that the local currency does not depreciate and the political situation in the host country does not change. This explanation also leads to testing the hypothesis of an historical interdependence in the pattern of FDI.

b. The analysis of the comparison of the tax sensitivity of returns between fresh funds and reinvested earnings (See section 3.1.2, case 2) leads to two questions: Is this analysis true empirically? If it is true, what are the policy implications for developing countries?

c. Given tax competition and, interdependence among the host countries, what is the effect of r^{**} and t_{nh} on the direction of retained earnings and new funds?

d. Capital export neutrality is irrelevant for reinvested retained earnings. The idea that a tax system with foreign tax credits and deferrals basically conforms to the export neutrality principle leads many researchers to think that the effect of the host country's tax policy under this system does not make much difference. In the case of retained earnings, this is not true. It is fundamentally deviated from the capital export-neutrality principle. Theoretically, reinvested earnings are more tax sensitive than the investment

of fresh funds.

3.2 The Research Focus

This research is going to extend previous research in the following ways:

(1) In the view of tax competition and economic interdependence, the tax differential effect on FDI is a multilateral effect, not a bilateral effect. This is because multilateral tax competition leads to a lower tax level than does bilateral tax competition, and it will influence the tax effect of FDI. Therefore, a study of world tax trends towards foreign direct investment income by country groups and by industrial sectors is needed. This study will provide a better understanding of the pattern of tax competition and its impacts on world capital flows in general.

(2) It will put tax sensitivity into a broader framework of world tax competition and world economic integration.

(3) Given the fact that a high percentage of the U.S. outward investment is composed of the reinvested earnings of incorporated affiliates, research needs to decompose net capital outflow into reinvested earnings and fresh investment. Due to the conceptual

differences between these two kinds of investments, aggregate research which mixes these two will dilute the influence of tax policy on the reinvestment decision making process of MNCs.

(4) By identifying the mechanism of reinvestment earnings, it will further the understanding of why foreign investments tend to be historically dependent. This is because later investments are made to a maximum of retained earnings as a firm's foreign operation becomes matured, given that t_h is not increased.[9]

(5) All the previous research assumes that the tax sensitivity of foreign investment is constant across all countries. Due to the divergent nature of each country, constant sensitivity is not realistic and not very helpful to policy makers. The pattern of sensitivity between groups and among individual countries needs to be studied.

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[9]. From the previous analysis, with an increase in host country tax rate, the r* will decrease in a very sensitive way. The tax advantage of earning higher return from reinvestment earnings and avoiding the home country's tax payment on further earnings on it will vanish.

IV. WORKING HYPOTHESES

Why do firms go overseas? Most explanations of MNCs' behavior are due to the imperfect international market of products, factors and technology. Yet, we have little knowledge on how government barriers, such as taxes and tariffs, effect the financial behavior of the firm. What effect do these interventions have on the location of investment? Before answering these questions, it is almost impossible to progress without having some knowledge of the true meaning of the national borders of the capital flow.

The world market is divided into developed and developing markets by each group members' economic and political characteristics. They are different in terms of market structure, openness to the rest of the world and the extent of government intervention in the economy. If the world market is divided, the tax sensitivity of FDI will be different, and so will the government tax policy and firm strategies.

In order to answer these empirical questions and to further complete our understanding of MNCs' tax behavior, we have divided our hypotheses into two groups.

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4.1 Tax Trends and Competition

Since tax competition is a main focus in this group of hypotheses, it is important to provide a more formal definition of competition. Guisinger (1985) studied government incentive policies in a dozen developed and developing countries and found substantial evidence of competition for foreign investment. Investors do not go abroad simply to take advantage of favorable taxes. However, once the decision has been made to make a foreign investment, many investors do examine alternative sites, especially for export-oriented investments, creating an opportunity for governments to compete with one another. Guisinger defined competition as "the independent actions of countries to attract a socially profitable volume of foreign investment in the face of offers from other countries with similar attributes" (Guisinger 1985: 11).

The independent actions of governments to lower corporate tax rates may occur for reasons other than tax competition. Lower statutory corporate tax rates may stimulate domestic investment or may be part of a tax simplification reform. Lower corporate tax rates by themselves cannot serve as conclusive evidence that tax competition exists. However, the narrowing of differences in tax rates among countries over time suggests that countries learn from one another, even if they do not compete directly. Convergence strongly suggests the existence of a diffusion process that needs to be

understood.

Convergence penalizes nations that attempt to set tax rates higher than elsewhere. Following the competitive equilibrium analogy, strong pressures exist for each country to conform to the international norm and act like price-takers. Developed countries are more likely than developing countries to have both outward-oriented and market-oriented economies. Thus, the following hypotheses are posited:

H1: For a developed country group, the pattern of tax

competition tends to be convergent and stable.

Within a developed country group, the free movement of capital puts pressure on government to adjust their tax policies toward group norm. The group tax level is reached in a convergent and stable way. The new equilibrium level of the tax rate within the group is quickly reached and continuously adjusted, because of the quickly available information transfers and the relatively free movement of capital among them.

H2: For a developing country group, the pattern of tax

competition tends to be divergent and volatile.

Since capital is less mobile, developing country governments feel less pressure to modify

their tax rates. Developing country tax rates thus show greater variation around the

group mean and greater movement over time. Divergence from the group mean may

not translate into greater or lesser capital inflows because government controls and

other barriers may inhibit capital movement.

H3: The overall tax level among developed countries is

higher than for developing countries.

In developed countries, the need for government revenue establishes a floor for tax

rates. It is hard for tax competition to drive rates below this floor. Developed countries

have large tax revenue requirements for social welfare programs and their taxpayers

have incomes that can absorb heavier tax burdens than taxpayers in developing

countries. Besides these countries also have larger budget deficits and gross domestic

products, suggesting greater pressure for high tax rates.

H4: Tax levels across industrial sectors show different

patterns in the two country groups.

The tax level across the industrial sectors has a different pattern between the two

country groups. It reflects that a country's priorities are different at different stages of economic development. In the developing world, a government normally gives high priority to the manufacturing industry (which is always viewed as a sector leading to advanced technology and a path to the self-generating transaction period) and gives lower priority to the service industry. In the developed world, more harmonized tax rates that cross sectors should be expected due to the matured industrial development prevailing in the economy.

4.2 Tax Sensitivity of Foreign Investment Abroad

The phrase "Foreign Investment Abroad" is used here to imply outward, rather than inward foreign direct investment.

> **H5: FDI is sensitive to a host country tax rate.**
>
> **H5a: FDI is sensitive to a country group relative tax rate.**
> This is a difference between a host country tax rate and a host country group average tax rate.
>
> **H5b: FDI is also sensitive to a home-host country relative tax rate.** This is the tax difference between an host and a home country.

Under tax competition, capital movement is not only sensitive to a host country tax rate, but also sensitive to the inter-country relative tax rate. This is further divided into a country group relative tax rate and a home-host country relative tax rate. A country group relative tax rate is defined as the difference between a host country's effective tax rate and a developing (developed) country group average tax rate. A country group in which every nation has similar economic conditions to the host country also will compete for FDI. A home-host country relative tax rate is defined as the difference between host and home effective tax rate.

The sensitivity of host country tax rate should be different from a country group relative tax rate. Tax competition leads to a lower average tax rate in a country group than if there is no competition. When a country lowers its tax to attract investment, other countries may follow. These activities will lead to a lower average group tax rate. Therefore its country group relative tax rate may remain the same and there will be no change in investment flow. The result of lowering the tax rate may simply be to keep the investment from leaving a country rather than attracting additional investment.

The sensitivity of host country tax rate also should be different from a host-home country relative tax rate. Given a capital export neutrality policy, fresh funds investment should not be influenced by a host country's tax policy, until the host country's effective

tax rate is higher than the home country's effective tax rate. Under this condition, the firm will pay tax up to the rate imposed in the home country. Therefore, the direction of fresh funds investment may not be sensitive to the host country tax rate, but will be sensitive to the host-home country relative tax rate. Yet, the direction of reinvested earnings are affected by a host-home country relative tax rate for the following reason.

H6: The tax sensitivity of reinvested earnings is geater than that of fresh funds.

Under a tax system allowing tax credit and tax deferral in a two-country world (host and home), reinvested earnings at time zero may be invested either back home or in the host country. As long as the host country's after tax rate of return on capital is higher than the home country's, the investment will take place in the host country, assuming that investors are indifferent to where the wealth is located. (see equations 3.10, 3.11 and 3.12).

At time period one, without any change in the tax liability of the retained earnings at home, the same amount of reinvested earnings will yield more by further investing in the host country than if it had been invested at home. If an investor is indifferent to where his funds are placed, this "snowball" can grow indefinitely. This is how additional

amounts of profit earned from reinvested earnings can escape the home country's tax law, and serve as an interest free loan. Therefore, capital export neutrality no longer applies in this case. In the case of fresh funds investment, given the same conditions, capital goes towards a location with higher consolidated earnings. Equations (3.11), (3.12) and (3.14) demonstrate that fresh funds investment is less sensitive to tax than reinvested earnings, and is sensitive to a host rate of return on capital, while reinvested earnings are not.

H7: Tax sensitivity of FDI in a developed country group is higher than in a developing country group.

This hypothesis follows from the tax competition model. The degree of openness in developed countries leads to rapid capital adjustment in reaction to small changes in tax rates and, in turn, tends to narrow tax differences among countries. In the developing world, lower taxes do not always translate into higher capital flows because of restricted capital flows, heavy government intervention, and other business barriers.

This difference is due to the comparatively perfect competition with unrestricted capital flow entering and exiting developed countries. The effective degree of openness leads to rapid capital adjustment in reaction to small changes in tax rates and, in turn, tends

to narrow tax differences among countries.

In the developing world the economies are less well integrated and less interdependent than those of developed countries, even after a decade of a generally liberalizing trend. For example, most developing countries still restrict inward flows of capital. Also, developing country governments are more intrusive into their economic markets than governments of developed nations. More artificial barriers exist to inhibit the flow of international capital and trade. Finally, the economies of developing countries are characterized by rigidities and inelasticities of supply that make policy variables in general much less sensitive. These lead to an uneven tax level among developing countries and a lower level of tax sensitivity of foreign investment.

H8: FDI is historically dependent.

Foreign investment abroad tends to be historically dependent. Current levels of FDI are dependent on previous investment levels, because later investments are made from the reinvested earnings, and in part because of the tax advantages of deferral.

H9: Tax sensitivity of FDI varies not only between developed and developing country groups, but also among individual countries.

In previous research, studies of tax sensitivity have relied primarily on a single equation, such as:

Capital = b (Tax) + e.

The tax sensitivity coefficient, b, has been assumed constant across all countries. It can only reveal that tax is sensitive, but it gives few hints to the policy makers as to how different it will be when capital goes to different countries or regions. Tax sensitivity, b, may have a distribution and a pattern varying by country. We only observe certain, b, from an unknown distribution. Yet, the distribution or the pattern can be revealed by further statistical research.

It should be noted that most of these hypotheses have not been stated in the previous literature. This research is the first attempt to integrate the three academic approaches (FDI determinants, MNCs' tax behavior, and economic interdependence / tax competition) into a single framework to advance our

understanding of the effects of tax policy on MNCs' behavior.

V. EMPIRICAL STUDIES AND RESULTS

5.1 Scope of the Data

Worldwide data on the topic is not available. The present research is based on

the U.S. outward investment data (1968-1982) in order to test the stated hypotheses.

The data come from the U.S. Foreign Investment Abroad of Controlled Foreign

Corporations (Subsidiaries) during 1968-1982 published by IRS.[10] Controlled foreign

corporations are foreign subsidiaries, whose voting stocks are more than 50 percent

controlled by U.S. parent corporations, with total assets of $250 million or more. The

time series and cross section data cover 65 countries, 5 industrial sectors, and seven sub-

manufacturing sectors for 6 non-consecutive years between 1968-1982 (because the data

are only available from the IRS for these six years).

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[10] For example, according to the IRS, for 1980 over 90 percent of the assets and profits earned abroad came from these foreign subsidiaries of "large" U.S. corporations with total assets of $250 million or more.

Also according to the IRS, the amount of foreign source taxable income is substantial, some understatement does exist. In spite of the understatement, taxable income reported by corporations with foreign tax credits was nearly 60 percent of the taxable income for all U.S. corporations.

Since the U.S has been the world leading capital export nation (for instance, its FDI accounts for more than 30% of the world total in 1985 and 1986), the U.S. data have been used by this study to estimate the world wide effective tax rates on FDI.

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The major sources of the data:

(1) Foreign direct investment outflow data (which can be further broken down into reinvested earnings, equity and intercompany transfers), various issues of The Survey of Current Business, U.S. Department of Commerce, 1968-1982.

(2) Assets, foreign income taxes, and current earnings and profits before tax data of controlled foreign corporations, Statistics of Income: U.S. Corporations and Their Controlled Foreign Corporations, Internal Revenue Service, various issues 1968-1982.

(3) U.S. real rate of return on investment capital and effective tax rate at the corporate level data, The Effects of Tax Rules on Nonresidential Fixed Investment: Some Preliminary Evidence (1953-1984), Martin Feldstein, National Bureau of Economic Research Working Paper Series No. 1857.

(4) GNP per capita data, World Bank Annual Report, World Bank, 1968-1982.

5.2 The Market Structure and the Tax Competition

5.2.1 Tax Trends and Levels

The effective tax is the measure of the host country tax rate used in this study. The effective tax was computed as the ratio of the net foreign income taxes paid to the current earnings and profits before taxes. These effective tax rates were calculated for each of 65 countries for the years 1968, 1972, 1974, 1976, 1980 and 1982. (See Appendix 8.1)

The means and standard deviations of developing and developed country[11] groups' effective tax rates in each year were calculated. The results are summarized in the following table (TABLE 5.1) and graphically duplicated in Figure 5.1.

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[11] "Developing" and "developed" classifications are consistent with the World Bank definition of "industrial countries" and "developing countries", respectively.

TABLE 5.1 MEANS AND STANDARD DEVIATIONS OF EFFECTIVE TAX RATES

DEVELOPED COUNTRIES:

YEAR	M	Mean $\bar{X}_m$	Std Dev S_x
1968	17	0.408	0.129
1972	17	0.331	0.077
1974	13	0.324	0.086
1976	17	0.348	0.092
1980	13	0.336	0.069
1982	17	0.351	0.117

DEVELOPING COUNTRIES:

YEAR	N	Mean $\bar{Y}_n$	Std Dev S_y
1968	45	0.260	0.179
1972	47	0.270	0.161
1974	17*	0.228	0.120
1976	44	0.280	0.156
1980	15*	0.208	0.118
1982	37	0.299	0.166

*: Due to the availability of data in
that year, the sample size is reduced.
N,M: Number of observations of two groups.

FIG. 5.1 World Tax Trends of FDI

Developed vs. Developing Countries
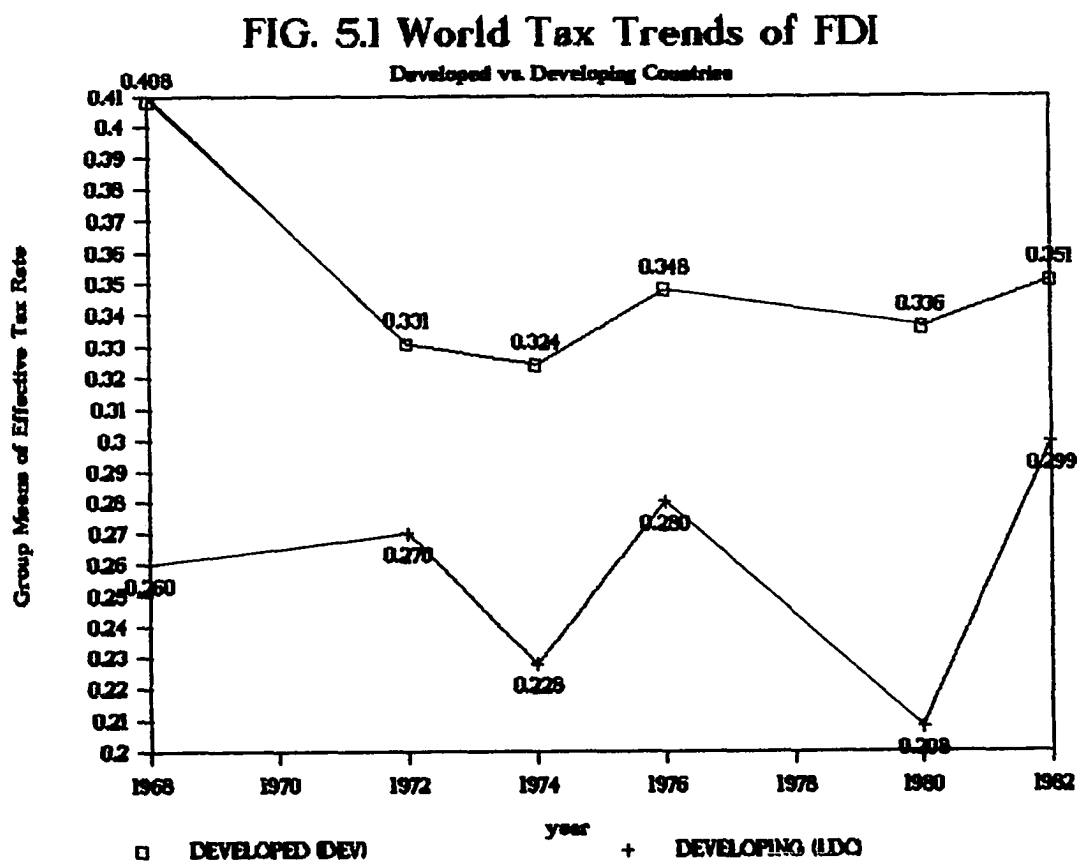
Asterisks indicate that the means are different in the indicated year at a significance level

(α_0) of 1 percent (*), or 2 percent (**), as obtained from the t test.

Comparison of the means and standard deviations between developed and developing

country group in each year revealed that the standard deviations of the developing country

group (S_y) are larger than the developed country group (S_x). Thus, the statistic, U, was

calculated to compare the means (μ_x, μ_y) with unequal variances (σ_x^2, σ_y^2). The statistic,

U,is defined in equation (5.2.1) and has a t distribution with m+n-2 degrees of freedom[12].

The testing hypotheses are:

H_0: $\mu_x = \mu_y$ (the means of the two groups are equal),

H_1: $\mu_x \neq \mu_y$ (the means of the two groups are NOT equal).

The test statistic, U, is calculated as:

$$U = \frac{(m + n - 2)^{1/2}(\bar{X}_m - \bar{Y}_n)}{(1/m + k/n)^{1/2}(S_x^2 + S_y^2 / k)^{1/2}} \quad \text{........(5.2.1)}$$

Where: $k = (\sigma_x/\sigma_y)^2$, and is estimated by $\hat{k} = (\bar{S}_x/\bar{S}_y)^2$.

The t test indicates if the means of country groups are significantly different from each other.

The results reveal that developed countries have higher average effective tax rates than

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[12] DeGroot, Morris H. Probability and Statistics, Second Edition (page 510).

developing countries. Developing countries' tax rates have higher variances in each year, and appear to be more volatile during 1968 to 1982, than the developed countries' tax rates. These results confirm the tax trend hypotheses.

5.2.2 Pattern of Tax Competition

(a) Convergence and Divergence Test

To analyze the dynamic features within each country group, the convergence and divergence test devised by Ken Messere for an Organization for Economic Cooperation and Development (OECD) tax revenue study (Cnossen, 1983) was applied. Convergence holds when countries with above-average tax ratios in a base year increase them by less than the average increase of all countries between a base and terminal year. Similarly, those with below-average ratios in the base year increase them by more than average increase between the same two years. Divergence occurs when the contrary holds.

Because of missing data in some years, the sample size for this test was reduced to twenty eight countries[13]. Among thirteen developed countries, only two exhibited divergence while the other eleven displayed convergence. Among the fifteen developing countries, the

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[13] It is assumed that the missing data is random.

reverse pattern held: eleven showed divergence while only four showed convergence.

(b) Chi-square test of goodness-of-fit.

A Chi-square test was used on the data obtained above to verify that developed countries tended toward convergence and developing countries toward divergence. The data population consists of two types. Let P_i denote the probability that an item selected at random will be of type i (i = 1, 2). It is assumed $P_i \geq 0$ and that the sum of P_i equals 1. P_i^0, for i=1, 2, is prior probability such that $P_i^0 > 0$ and that the sum equals 1.

The hypotheses are as follows:

$$H_0 : P = P_i^0 \text{ for } i = 1, 2 ,$$

H_1 : Hypothesis H_0 is not true.

Applying the following statistic, Q, proposed by Karl Pearson:

$$Q = \sum_{i=1}^{2} \frac{(N_i - n P_i^0)^2}{n P_i^0} \qquad \text{............(5.2.2)}$$

where: N_i: Actual number of observations with

probability P_i. $i = 1, 2$

n : The sample size.

Pearson shows that when n becomes large, Q converges to the Chi-square distribution with one degree of freedom in this case.

Assuming the prior probabilities:

the prior probability of convergence $P_1^0 = 0.5$,

the prior probability of divergence $P_2^0 = 0.5$.

Developed country group:

$N_1 = 2, N_2 = 11$, and $n = 13$.

$Q = 6.23$

Developing country group:

$N_1 = 4, N_2 = 11$, and $n = 15$.

$Q = 3.26$

From the table of Chi-square distribution with one degree of freedom, the tail area

corresponding to the Q = 6.23 of developed group lies between 0.01 and 0.025. Hence, the

null hypothesis H_0 should be rejected at level of significant α_0 = 0.025 for the developed

group. By the same computation, α_0 = 0.075 is obtained for the developing country group.

The Chi-square test confirms that the developed country group is convergence-oriented,

while the developing country group is divergence-oriented. The tax competition hypotheses

are supported by these results.

5.2.3 Tax level studies by industrial sectors.

ANOVA[14] is applied to analyze the data by sectors. The effective tax rate serves as a

response variable and industrial sectors as class variables. There are five overall industrial

sectors: service, mining, manufacturing, wholesale and retail trade, and finance (which

includes insurance and real estate). The manufacturing sector is further divided into seven

sub-sectors: food, chemical, petroleum, primary metals, machinery, electronic and vehicle.

The research is conducted at the level of both industrial sectors and sub-manufacturing

sectors to see whether there are significant differences among sectors (See Appendix 8.2).

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[14] In the tax trends analysis of the section 5.2.1, the variances are not the same between country groups. Hence, the statistic U is applied. Here it is assumed that the variances are the same between sectors within each country group, and the observations from each sector are independent. Therefore, ANOVA is applied to the analysis.

By considering all the countries together, the study does not identify the statistical differences among the five industrial sectors in 1974 and 1980. By taking each country group together, the study only finds that within the developing country group in 1974, the effective tax rate on the service sector was very high and statistically different (at 0.10 level) from the mining sector. There was a 13 percent difference of means between the two (see Table 5.2). The study does not identify the difference among five sectors within both country groups in 1974 and 1980.

To make it easier to see, the tax levels across industrial sectors within each country group in 1974 and 1980 are plotted. In Fig. 5.2, within each country group crossing five industrial sectors in 1974, the more uniform tax rates are observed in the developed country group. A higher tax rate in the service sector is observed for the developing country group, while an overall higher tax level existed in the developed group.

However the differences in patterns (except for absolute tax level) between the two country groups disappeared in 1980 (Fig. 5.3). It should be noted that there was a low tax rate observed in the manufacturing sector of the developing countries' group in 1980, but it was not statistically significant when compared with the trade and finance sectors in the developing countries' group.

The Friedman and Kendall ranking tests were also conducted between the two country groups, across the five industrial sectors and the seven sub-manufacturing sectors, in 1974 and 1980. The test found that different patterns existed between country groups, when all sectors were pooled together. This yielded the same results as ANOVA. However, it did not find the systematic pattern among the five or the seven sectors, when it pooled all countries together.

Table 5.2: Comparison of the Effective Tax Rate Crossing Sectors

Year	Mining	Service	Finance	Trade	Manufacture
Developing Country Group:					
1974	0.212*	0.344*	0.257	0.232	0.244
1980	0.285	0.273	0.229	0.221	0.217
Developed Country Group:					
1974	0.298	0.303	0.303	0.357	0.307
1980	0.383	0.396	0.335	0.341	0.338

Asterisks indicates means of two sector are significantly different from one another within a country group of the year, $(\alpha_0 < =0.10)$ obtained from the F test.

Fig. 5.2 TAX LEVEL CROSSING SECTORS
DEVELOPED & DEVELOPING IN 1974

Fig. 5.3 TAX LEVEL CROSSING SECTORS
DEVELOPED & DEVELOPING IN 1980
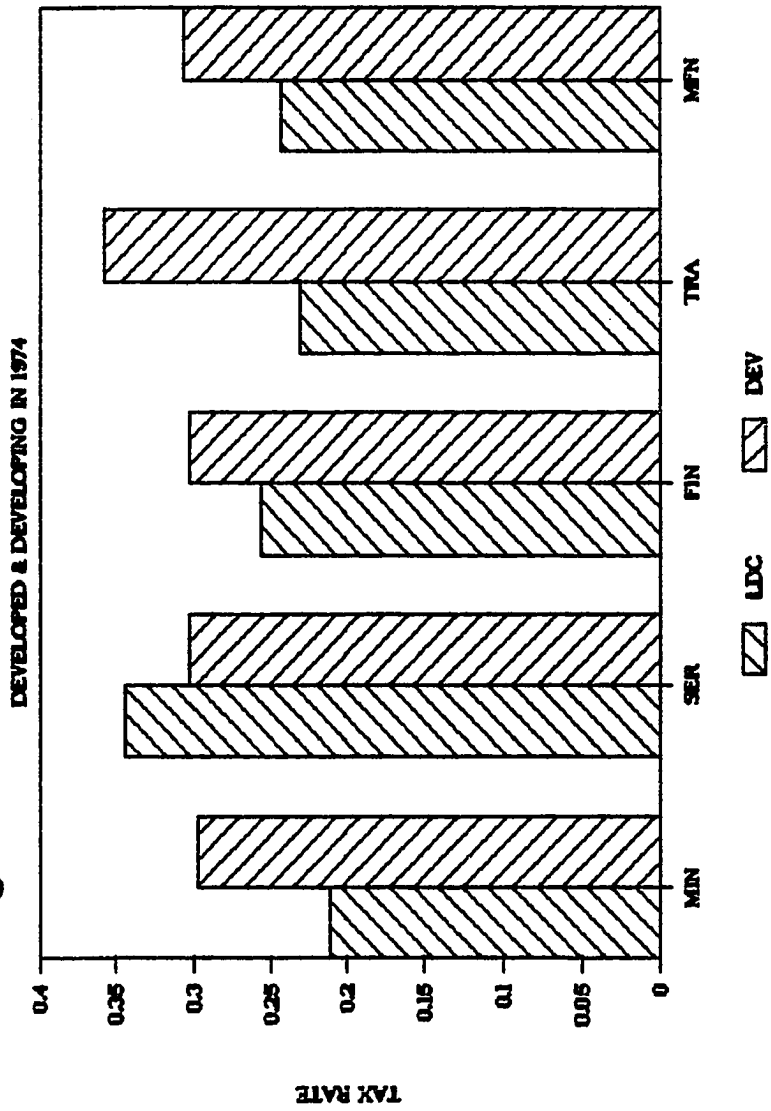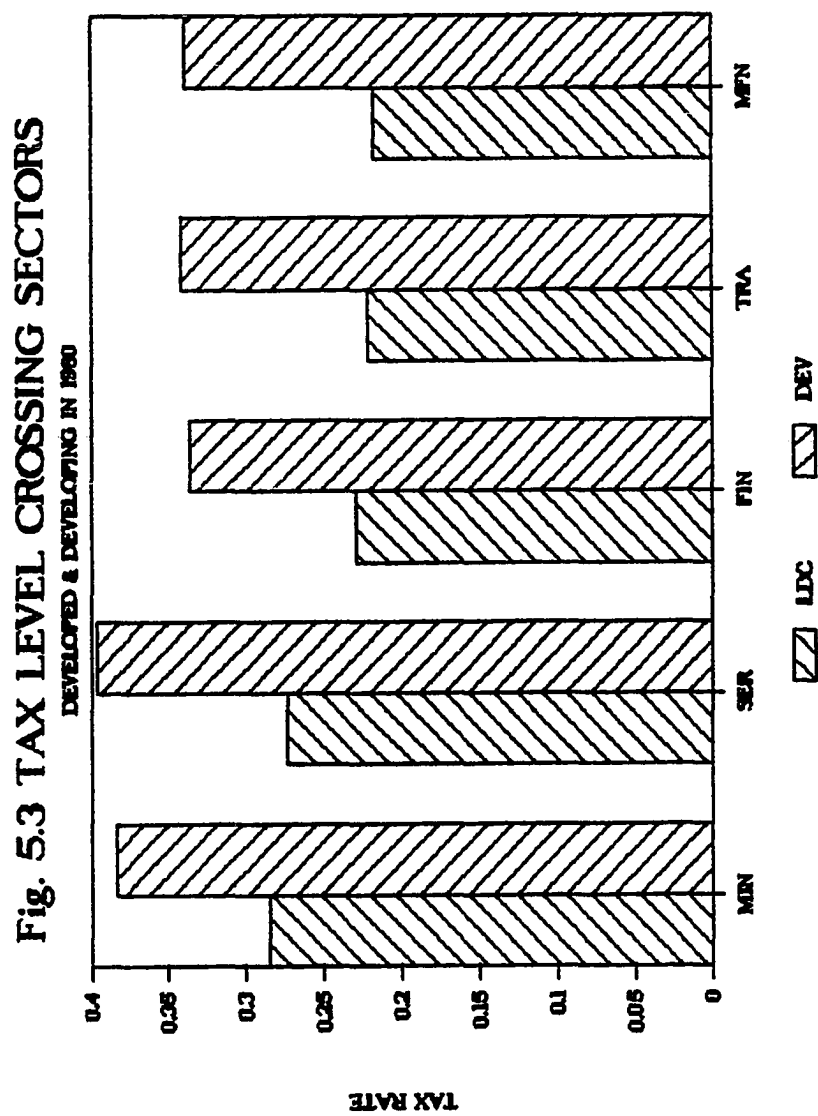
By applying ANOVA and testing the model across the seven sub-manufacturing sectors, the study found that the petroleum manufacturing sector is lower than the other sectors at the 0.05 significance level in 1974. Both the primary metals and petroleum manufacturing sectors were lower than the others at the 0.05 significance level in 1980, when all countries were pooled together. The study also was conducted within each country group. Within the developing country group, the study did not show any significant differences among seven sectors in 1974, but showed certain differences at the 0.05 significance level in the primary metal sector. Within the developed country group, the study found differences existed at the 0.05 significance level in the petroleum sector of 1974, and the primary metals and petroleum sectors of 1980.

Viewing Table 5.3, and figures 5.3 and 5.4, it also can be observed that across the seven manufacturing sub-sectors there were lower tax rates in the resource oriented investments, such as primary metals and petroleum manufacturing within both country groups. In 1974, due to the oil crisis, the tax rate in the petroleum sector was down to the lowest level among resource-poor developed nations. The petroleum and primary metals sectors remained the two lowest tax rates in 1980 (Fig. 5.3). It may also imply that firms paid the lowest taxes on these sectors due to higher production costs. It does not necessarily mean that statutory tax rates were lower in these sectors. Firms in those sectors may have had higher accounting losses in those years and higher cash flows at the same time. It is

interesting to see how investments would take advantage of the favorable depreciation and depletion rules prevalent in these sectors.

By randomly picking two period data (1974 and 1980) and doing the analysis, it showed that tax patterns between two country groups across five industrial sectors tended to have similar patterns over time. Hypothesis number four is not supported by the data.

Table 5.3: Comparison of Effective Tax Rates Across Seven
Manufacturing Sub-sectors.

Year	Vehicle	Electronic	Machinery	Primary Metals	Petroleum	Chemical	Food Mfgr.
Developing Country Group:							
1974	0.245	0.296	0.268	0.236	0.202	0.235	0.223
1980	0.281	0.217	0.251	0.143*	0.190	0.228	0.229
Developed Country Group:							
1974	0.370	0.362	0.382	0.306	0.212*	0.390	0.375
1980	0.372	0.339	0.388	0.307*	0.276*	0.349	0.374

Asterisks indicates means of these sectors are significantly different from others within a country group of the year, ($\alpha_0 < = 0.05$) obtained from the F test.

Fig. 5.4 TAX CROSSING MFN-SUBSECTORS
DEVELOPED & DEVELOPING IN 1974

Fig. 5.5 TAX CROSSING MFN-SUBSECTORS
DEVELOPED & DEVELOPING IN 1980
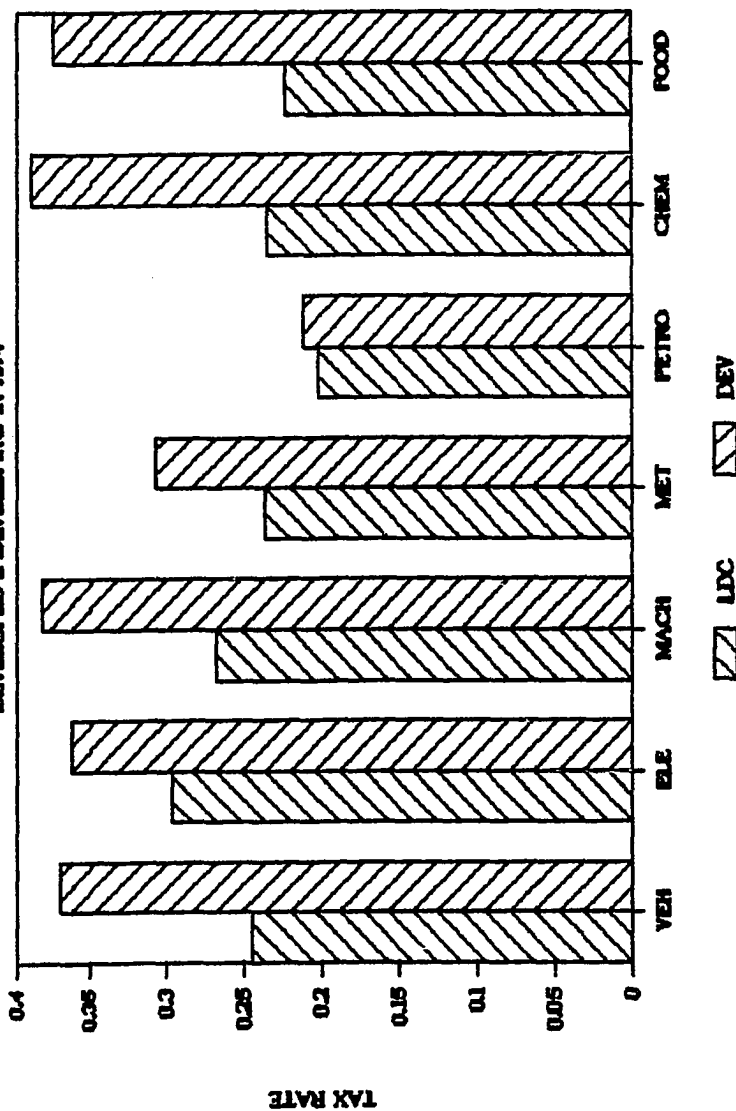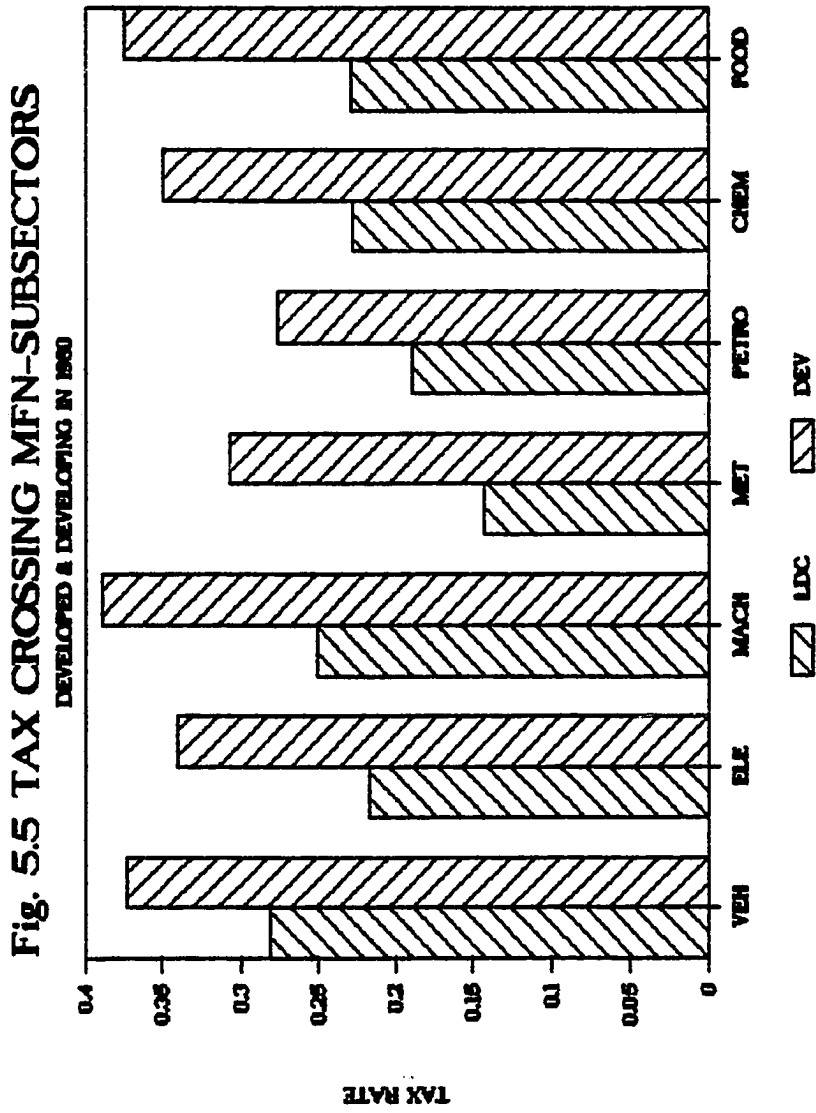
5.2.4 Summary of Findings.

From the above analysis, a clearer picture is presented. It shows distinctive features of two separate market structures. The developed country group had a higher tax level, was more competitive and convergent in nature, and closer to perfect competition than the developing country group. The developing country group had a lower tax level, but higher business barriers and tighter government control. It was less free economically and created a divergent, less economically interdependent, and less competitive market within the developing country group. Based on these different characteristics of the two groups, the tax sensitivity analysis was conducted under different market structures.

Within industrial sectors, the study did not identify significant differences among the five industrial sectors, but found lower taxes prevailed among resource oriented sub-sectors, when the manufacturing sector was divided into seven sub-sectors.

Since there were no significant differences, except tax level and pattern of competition, across the five industrial sectors between the two country groups, the tax sensitivity study was conducted at the overall level rather than at the industrial sector level.

5.3 Tax Sensitivity of Foreign Investment Abroad

5.3.1 Considerations Regarding Model Building.

A set of multiple regression models were built to test the six hypotheses, previously developed in the chapter IV. Based on the theoretical analysis in chapter III (referring to equations 3.10-3.13), the rate of return on foreign investment abroad is a function of host and home countries' expected rates of return on capital, host and home countries' tax rates on the income of the foreign investment, as well as neighbor host countries' tax level. Hence the tax rates and the rates of return will serve as the major independent variables of the model.

For testing the effects of the FDI historical interdependence pattern and the impacts of investment maturity on the attraction of later coming investment, the assets level (AS) is employed as the other independent variable.

Besides tax rate, rate of return and the assets level, many other factors also affect the direction of the foreign investment flow. This research does not try to include all variables which influence the location decision of foreign investment abroad. In this, it differs from investment determinants studies. The models instead focus on tax sensitivity. One may

argue that this study omits important variables. Yet, as long as omitted variables are not correlated with or are independent of the tested variables, omitting them is not going to affect the estimation of the correlation coefficients significantly.

As mentioned earlier, Dunning (1977, 1979) examined many factors of why firms invest their resources overseas, and classified those factors into three categories -- ownership, internalization and location factors (OIL). Yet, most of these factors are extremely difficult to quantify. This study focuses on the tax effects, and controls other major variables such as rate of return and GNP per capita, which is a market size indicator. The models have arguments similar to Hartman (1984).

According to the previous theoretical tax effect analysis, foreign direct investment is not only influenced by host country tax rate, but also affected by tax differences between home and host countries (because the capital export neutrality principle is not held for reinvested earnings), and by the tax differences between host country tax rate and host country group tax level. As we assumed, the host country group has similar economic conditions as the host country, the countries within the group also may compete for the same investment by using tax policy. Thus the tax sensitivity study is conducted under three scenarios or three sets of models.

In order to examine the separate tax effect on reinvested earnings and flows of fresh funds respectively, retained earnings (RE) and fresh funds (EQ) are employed as two dependent variables.

Although theoretically the expected tax rate, expected rate of return, and lagged assets level would be more relevant than the realized rates and current assets level, the tested models employed the realized numbers and current year assets level due to limitations of the data.

In order to choose a proper statistical model for a time series cross-sectional analysis, the characteristics of the research were considered. A series of alternative statistical models may be employed according to the characteristics of the problem. Non-constant variances between countries (heteroskedasticity or HET) exists, because the nature of each country differs. Cross sector regression equations may be seemingly unrelated (SUR), although the equations are not interdependent as simultaneous equations, because of the existence of competition for FDI among countries, given the current economic interdependent environment. Autocorrelation may also exist, because of the observed historical dependence of FDI.

Kmenta (1971) suggested four statistical models for time series cross section analysis. Depending on the nature of the problem in question and the way it violates the classical

assumptions of Ordinary Linear Square (OLS), a researcher needs to choose a model accordingly. A cross-sectionally heteroskedastic and time-wise autoregressive model assumes cross-sectional independence. It is not designed to deal with seemingly unrelated problems. An error components model assumes the regression disturbance is composed of three independent components, one with time, another with cross-section and third varying in both dimensions. It also assumes the existence of serial correlation. The error components model may be applicable. Yet, it is not very straightforward in the interpretation of results, compared with other models. A covariance model or dummy variable model assumes that each cross-sectional unit and each time period is characterized by each of its special intercept. The model does not consider each special slope. A cross-sectionally correlated and time-wise autoregressive model (which is similar to the Park Model and assumes the existence of heteroskedasticity, mutual correlation and autoregression) is applied to this research.

For detecting the tax sensitivity patterns across countries, the Park model[15] and Seemingly

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[15] The Park model is based on three assumptions in which the random errors are heteroscedastic, contemporaneously correlated, and first-order autoregressive. However, the computer procedure for the Park Method is designed to analyze a time series data with a constant interval. The data used in this research is a non-constant time interval series spanning 15 years. Hence the Durbin-Watson (D/W) statistic is calculated for a subset of the data that had a constant time interval. The results show that the D/W statistics for this series were sufficiently similar to the D/W statistics for the non-constant time intervals. It indicates that we can relax the time interval constraint for this analysis.

Unrelated Regression model[16] (SUR) should both be used for the computation of an overall constant sensitivity and a sensitivity specific for each country. Because the number of observations for each country are limited and there is a lack of degrees of freedom, the Seemingly Unrelated Regression model is not applicable to this research at this stage. However, the tax sensitivity difference between developed and developing country groups was estimated by using the Park Model.

From the previous tax trend analysis, the developed countries' tax level is demonstrated to be higher than the developing countries' level. However, FDI went more to developed countries than to developing countries. This phenomenon does not mean that tax has no effect on the location of capital flows. As we saw earlier, the developing and developed markets have different market structures. Besides, as argued earlier, tax is a secondary variable among other investment location factors, i.e., when the fundamental economic conditions are similar among the location countries of each country group, the tax variable is critical to direct the location of FDI. Thus, these models will also be conducted within each country group.

We also need alternative models because there is no applicable theory that can uniquely

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[16] Seemingly Unrelated Regression is also called joint least squares, or Zellner's method. It is a technique that uses estimates of the covariance of the residuals across equations to increase the efficiency of the estimates. It can be used to estimate the tax sensitivity of each country in order to obtain an overall pattern across countries.

define test model for this topic. If most of the proposed models evidence points in the same direction, confidence in the hypotheses will be increased and the unknown puzzle will be more complete.

These empirical tests were based on twenty two countries' data, from 6 time periods during 1968 to 1982 (see Appendix 8.3). The data include 10 developed countries and 12 developing countries.

5.3.2 Symbols and Abbreviations

RE: Reinvested earnings of incorporated foreign affiliates. Money amount is in millions of U.S. dollars.

EQ: Equity and intercompany account outflows which are the result of equity and debt transactions between U.S. parents and their owned foreign affiliates. Money amount is in millions of dollars.

TA: Effective host country tax rate on controlled foreign corporations which is the ratio of foreign income tax to current earnings and profits before tax. This rate is not necessarily representative of a foreign statutory tax rate, because, for instance, the current earnings and

profits were generally not the same as whatever "taxable income" base was used by host countries under their own tax laws. However, the tax ratios of taxes to earnings are the closest approximations of the relative tax burdens in the various host countries that were derived from data reported on IRS Form 2952. Note that the withholding tax is ignored, because it affects the firm's decision in the form of a direct tax credit, the same way as the home country tax.

TM: The mean of the effective tax rate of each country group obtained from the table 5.1.

HTA: Home country tax rate, which is the U.S. effective tax rate at the corporate level.

AS: Total assets of controlled foreign corporations which are net after reduction of reported liabilities such as accumulated depreciation, amortization, and depletion, and by the reserve   for bad debts. The money amount is in millions of dollars.

ASIV: the inverse of AS, i.e 1/AS.

ROR: Rate of return on investment, which is a ratio of income before tax to total assets of controlled foreign corporations.

HROR: Home country's real rate of return on investment, which is the U.S. pretax rate of return of the nonfinancial corporate sectors.

GNPP: GNP per capita in thousands of dollars.

b: The estimated regression correlation coefficient of an independent variable.

T: Estimated t-statistic value.

( ): A number inside a parenthesis is a standard error of an estimated coefficient.

D : Country group variable. D=DEV is for the developed country group. D=LDC is for the developing country group.

MSE: Transformed regression mean square error.[17]

DF: Degree of the freedom.

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[17] The R-Square is not used here for testing goodness of fit. Instead, the MSE is used. Since during the transformation, the structure of the data has been changed, the intercept term in the transformed X matrix is not a column of one. The calculated R-Square does not make much sense under this circumstance.

i : i_{th} country.

t : Time period.

5.3.3 Econometric Testing Models and Statistical Results.

<u>Scenario 1</u>: Host country tax rate effect.

Only consider impacts of host countries taxes (TA) on attracting FDI.

Model Representation examples:

$$RE_{it} = b_0 + b_1 TA + b_2 ROR + b_3 GNPP + b_4 AS + e_{it}$$

$$\dots\dots\dots\dots\dots\dots\dots(5.3.1)$$

$$EQ_{it} = b_0 + b_1 TA + b_2 ROR + b_3 GNPP + b_4 AS + e_{it}$$

$$\dots\dots\dots\dots\dots\dots\dots(5.3.2)$$

The estimated coefficients and t statistics for models' (or regression equations') independent variables were summarized in the following table.

TABLE 5.4: STATISTICAL RESULTS
(UNDER SCENARIO 1)

Equation No.	5.3.1	5.3.2	5.3.3	5.3.3a D=DEV	5.3.3b D=LDC	5.3.4	5.3.4a D=DEV	5.3.4b D=LDC
Y								
$b_i(T)$	RE	EQ	RE	RE	RE	EQ	EQ	EQ
X								
b_0	-31.99 (-0.87)	-154.4 (-5.91)	159.5 (1.19)	50.44 (3.48)	-35.58 (-0.8)	-126.2 (-9.0)	-432.6 (-3.1)	-24.1 (-1.0)
TA	-493.64 (-5.36)	-30.66 (-0.46)	-567.6 (-2.2)	-499.5 (-16.9)	-291.3 (-3.32)	-52.36 (-1.0)	204.3 (0.93)	-111.2 (-1.78)
ROR	2036.6 (12.24)	1587.5 (6.85)	1294.9 (1.7)	5591.46 (28.22)	1746.4 (4.99)	1064.6 (10.1)	2242.7 (3.2)	15.94 (0.1)
GNPP	3.30 (1.75)	8.32 (3.63)	46.61 (7.29)	19.25 (7.58)	9.48 (1.08)	3.02 (1.93)	5.4 (1.43)	24.5 (4.09)
AS	0.019 (12.05)	-0.004 (-2.74)	N/A	N/A	N/A	N/A	N/A	N/A
ASIV	N/A	N/A	-121769 (-2.13)	-283320 (-13.7)	-21182 (-1.9)	22627 (2.0)	144166 (2.98)	33680 (3.43)
DF	127	127	127	67	55	127	67	55
MSE	0.232	0.256	0.243	0.51	0.498	0.243	0.454	0.60

X : Independent variable of a regression model.
Y : Dependent variable of a regression model.
T : T statistic between brackets.

Estimation of these models reveals that reinvested earnings (RE) do appear tax sensitive, while fresh funds (EQ) do not. In terms of impacts of host country tax rate (TA) and rate of return(ROR) on reinvested earnings and fresh funds, reinvested earnings are more sensitive to TA and ROR than fresh funds are,((5.3.1) to (5.3.4)). These findings are consistent with the previous theoretical analysis described in equations (3.11) and (3.14) (see Table 3.2).

By running regressions on both the developed and developing countries groups, it is found that the reinvested earnings of the developed country group are more tax sensitive than that of the developing country group, as shown by the regression estimates in equations (5.3.3a) and (5.3.3b).

Comparing the above four regression models, RE and EQ in (5.3.3) and (5.3.4) are more sensitive to ASIV than to AS in models (5.3.1) and (5.3.2). It appears that reinvested earnings (RE) and fresh funds investment (EQ) are not very sensitive to the assets level when assets are at the lower range, but become very sensitive when the assets level reaches a higher range or when investment has taken the root in the host country. It may also indicate that as investments mature and start self-generating, investors will maximize their investment out of retained earnings rather than fresh funds to fully capture the tax advantages and to make full use of the infrastructure and economics of scale established

at that location. However, the fresh funds (EQs) relationship with ASIV or the sign of ASIV correlation coefficient appears opposite to what was expected. It shows that the higher the assets level, the lower the fresh fund investment flow. Before coming to this conclusion, we need to double check the result to see whether ASIV is correlated with other independent variables or its sign is influenced by others -- i.e if ASIV is independent from other variables, the signs and the number of other variables' coefficients should not be changed significantly by dropping ASIV. The tested result is shown on the regression (5.3.5).

$$EQ = -125.58 -36.18TA + 1070.09ROR + 2.52GNPP$$

$$\dots\dots\dots\dots\dots\dots\dots\dots\dots(5.3.5)$$

(14.52) (44.47) (113.69) (1.426)

T = -8.65 -0.82 9.41 176

MSE = 0.248 DF = 128

It seems that ASIV is independent from other independent variables and it is negatively correlated with EQ. Is this because the higher level of assets level indicates higher barriers for new comers to earn upto the normal rate of return -- i.e., the higher AS is, the lower EQ flows into that location? This phenomenon will need further study, before a serious conclusion can be made.

Scenario 2: A country group relative tax rate effect.

Consider the impacts of both host country tax policy and host country group (host neighbor countries') tax level on attracting and competing for FDI. The country groups relative tax rate variable is defined as: DIF = TA - TM.

TABLE 5.5: STATISTICAL RESULTS (UNDER SCENARIO 2)

Equation No.	5.3.6	5.3.6a D=DEV	5.3.6b D=LDC	5.3.7	5.3.7a D=DEV	5.3.7b D=LDC
Y $b_i(T)$	RE	RE	RE	EQ	EQ	EQ
X						
b_0	-63.36 (-0.84)	-237.67 (-1481.2)	-158.65 (-7.49)	-127.95 (-5.30)	-271.09 (-3.57)	-53.98 (-1.95)
DIF	-725.94 (-2.61)	-745.92 (-455.82)	-375.30 (-11.59)	-149.04 (-2.21)	-95.99 (-0.51)	-77.86 (-1.70)
ROR	1250.47 (1.62)	5699.83 (836.02)	1823.87 (9.06)	962.25 (5.16)	2061.77 (3.29)	63.45 (-0.36)
GNPP	46.25 (7.98)	22.39 (267.60)	8.74 (1.70)	3.79 (1.83)	3.93 (1.18)	25.4 (4.28)
ASIV	-158081 (-1.69)	-263208 (-502.64)	-16385 (-2.58)	14280 (0.89)	123635 (2.92)	30522 (4.28)
DF	127	67	55	127	67	55
MSE	0.24	0.469	0.558	0.23	0.43	0.61

X : Independent variable of a regression model.
Y : Dependent variable of a regression model.
T : T statistic between brackets.

Reinvested earnings (RE) and fresh funds (EQ) are both sensitive to a tax competition indicator (DIF). Yet, the tax effect coefficient of EQ is very marginal, shown by regression models (5.3.7), (5.3.7a) and (5.3.7b). The estimations also show that RE is more sensitive to DIF than is EQ; and that the developed country group has larger correlation coefficients across all independent variables than the developing country group; and that the ASIV coefficients have opposite signs between regression models (5.3.6) and (5.3.7).

<u>Scenario 3</u>: A home-host country relative tax rate effect.

This model specification tests the impacts of both home and host countries' tax policies on attracting and repelling foreign investment. Testing the impacts of a capital export neutrality policy on the behaviors of reinvested earnings (RE) and fresh funds investment (EQ). The home-host country relative tax rate is defined as: DIFH = TA - TH.

TABLE 5.6: STATISTICAL RESULTS (UNDER SCENARIO 3)

Equation No.	5.3.8	5.3.8a D=DEV	5.3.8b D=LDC	5.3.9	5.3.9a D=DEV	5.3.9b D=LDC
Y						
$b_i(T)$	RE	RE	RE	EQ	EQ	EQ
X						
b_0	-280.15 (-2.9)	-248.83 (-3.34)	-206.04 (-13.75)	-189.78 (-48.39)	-307.26 (-4.72)	8.44 (0.42)
DIFH	-1292.37 (-4.34)	-1239.89 (-.54)	-347.26 (-6.05)	-213.31 (-30.46)	-280.99 (-3.68)	107.27 (2.24)
ROR	1092.90 (1.72)	3360.21 (4.02)	1906.32 (12.68)	1030.77 (62.28)	2494.17 (5.16)	-167.36 (-1.58)
GNPP	56.50 (7.28)	29.72 (3.24)	8.68 (1.71)	5.04 (15.93)	3.18 (0.86)	16.67 (3.69)
ASIV	-66401 (-0.70)	-13161 (-1.23)	-14777 (-3.4)	41937 (19.22)	87474 (2.92)	2876.7 (0.28)
DF	127	67	55	127	67	55
MSE	0.249	0.45	0.54	0.246	0.42	0.58

X : Independent variable of a regression model.
Y : Dependent variable of a regression model.
T : T statistic between brackets.

Among the three tax effects scenarios, reinvested earnings (RE) are the most sensitive to

the tax difference between home and host country (DIFH), less sensitive to the host

country tax (TA) and the tax competition factor (DIF) respectively. The tax sensitivities of

fresh funds investment (EQ) in all three scenarios are significantly smaller by comparison

than the tax sensitivities of retained earnings. It also shows that the developed country

group is more tax sensitive than the developing country group.

The positive sign of DIFH's correlation coefficient in equation (5.3.9a) is opposite to what

was expected. At first glance, it does not make sense. Yet, why does it appear in the

developing country group but not in the developed country group? It may reveal a

phenomenon of favorable tax treatment to the returns from developing countries prior to

1976[18]. It also may show that in some cases investment was not repelled by a higher tax

developing country, and the tax liabilities resulting from that investment were consolidated

with returns from a lower tax country; or in other words, used as an excess tax credit to

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[18] In order to encourage investment to developing countries, special tax provisions were permitted for firms doing business in those countries prior to the passage of the Tax Reform Act of 1976, the time period which was partially covered by this research. There were several favorable tax provisions towards gains from investment in those lands, e.g., undistributed profits of controlled foreign corporations could be included in the gross income of U.S. corporations, while dividends, interest, and capital gains could be excluded for tax purposes. Hence high host country effective tax rates on a controlled foreign corporation might not have been high at all, when it was finally realized or paid by U.S. parent company.

cover other investment tax labilities on an overall basis[19] under existing U.S. tax law. As

it has been analyzed in the subsection of MNCs' tax behavior, an optimal solution for a

firm to maximize the advantages provided by a foreign tax credit policy is to balance its tax

liabilities position, i.e., let tax due at home equal tax due at host: $T_{cm} = T_{ch}$. Thus, in a

particular case we may see some deviation from the major trends. In general, it is safe to

say that a cumulative amount of foreign direct investment is negatively correlated with the

tax rate.

Finally, alternative models were used to test how robust the previous models were. The

new models were specified by replacing major independent variables, rate of return (ROR)

by the difference (DIFR) between ROR at host and ROR at home country, and tax rate

(TA) by the difference (DIFH) between tax rate at home and tax rate at host country. The

estimated coefficients were summarized in the following table. The difference in rate of

return (DIFR) is difined as: DIFR = ROR - HROR.

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[19] Until the passage of the Tax Reform Act of 1976, a MNC could compute its tax on either a "country-by-country" or "overall basis." The Tax Reform Act of 1976 repealed the country-by-country option and mandated the overall basis calculation.

TABLE 5.7: STATISTICAL RESULTS (ALTERNATIVE MODELS)

Equation No.	5.3.10	5.3.11	5.3.12	5.3.13
Y				
$b_i(T)$	RE	EQ	RE	EQ
X				
b_0	369.36	-40.44	-161.34	-72.19
	(4.11)	(-3.42)	(-2.30)	(-6.18)
TA	-772.26	-4.09	N/A	N/A
	(-2.57)	(-0.23)		
DIFH	N/A	N/A	-1371.60	-162.68
			(-5.11)	(-7.82)
ROR	N/A	N/A	N/A	N/A
DIFR	563.76	1079.0	-49.18	970.06
	(0.80)	(28.87)	(-0.07)	(20.71)
GNPP	42.71	0.29	54.00	1.24
	(7.50)	(0.43)	(8.47)	(1.24)
ASIV	-159040	44764.8	-28568	57377
	(-1.98)	(10.42)	(-1.59)	(10.06)
DF	127	127	127	127
MSE	0.26	0.26	0.25	0.255

X : Independent variable of a regression model.
Y : Dependent variable of a regression model.
T : T statistic between brackets.

In terms of tax effects, the results from these regression models are consistent with the results from models (5.3.1) to (5.3.4). They were found that fresh funds investment was driven more by the rate of return difference (DIFR) between host and home, while reinvested earnings were less so. Instead, reinvested earnings appear driven more by tax. The findings is anticipated from the theoretical analysis of Table 3.2.

5.3.4 Summary of Findings.

The stitistical results are summarized under the heading of each hypothesis developed in Chapter IV, Section 4.2.

H5: FDI is sensitive to the host country tax rate (TA).

H5a: FDI is sensitive to a country group relative tax rate

(DIF).

H5b: FDI is sensitive to a home-host country relative tax

rate (DIFH).

The tax related correlation coefficient (b_i) versus the t statistics of the three scenarios with 127 degree of freedom are be summarized as b_i/T in the following table.

Table 5.8: Comparison of Correlation Coefficients
of Tax Related Variables

b$_i$/T	TA	DIF	DIFH
RE	-567.57/-2.15	-725.49/-2.61	-1292.37/ -4.34
EQ	-52.36/-1.03	-149.04/-2.21	-231.31/-30.46

X : Independent variable of a regression model.
Y : Dependent variable of a regression model.

By studying tax sensitivities under three scenarios, a much clearer picture emerges of the tax impact on FDI, given the existence of the tax competition among a group of countries who are seeking the same foot-loose investment with similar economic and political conditions, and given the tax credit mechanism of capital exporting countries.

Under the three sets of models, the test results show that foreign direct investment outflows (FDI), i.e. the sum of reinvested earnings, equity and intercompany transfers, are sensitive across almost all three cases, except for the single instance in which tax (TA) hardly had any effect on fresh funds (EQ). FDI is most sensitive to DIFH and less so to TA and DIF. By decomposing FDI, it was found that RE are more tax sensitive than EQ. The hypothesis

was confirmed by these findings.

H6: The tax sensitivity of reinvested earnings is greater than that of fresh funds.

From above b_i/T table (Table 5.8), the hypothesis and previous theoretical analysis are both supported by the findings. Conclusion from data analysis appears that reinvested earnings (RE) are driven more by the tax difference between host and home countries (DIFH), while fresh funds investment is driven more by the rate of return difference (DIFR) between host and home countries.

If reinvested earnings are driven more by DIFH, given the fact that a high and increasing percentage of U.S. investment abroad is made of reinvested earnings, what is the implication for U.S. foreign investment policy which is supposed to be based on capital import and export neutrality? On the other side of the coin, from the capital receiving country point of view, it appears that by depending on a lower tax rate alone to attract fresh funds is not enough, because the fundamentals like economic infrastructures and political stability are the major factors affecting the rate of return on newly invested fresh funds (EQ). Once investment is there, how to keep it growing to further finance the host country's development is another policy question.

Fresh funds (EQ) are more profit driven. This makes sense because the initial investment searches for profitable opportunity first, rather than tax arbitrage. If the pie is big enough to adjust after tax return, fresh funds will go in despite a higher tax rate. However, once it is there and starts self generating, how to keep the investment attractive over all phases of the development will matter. If a developing country views FDI as a process rather than a single event in which RE is the consequence of EQ, the FDI tax policy should be followed accordingly.

H7: Tax sensitivity of FDI in a developed country group is higher than in a developing country group.

Table 5.9 again will summarize the results of each country group.

Table 5.9: Comparison of Correlation Coefficients of Tax
Related Variables by Country Group

Y	X b_i/T	TA	DIF	DIFH
RE:				
Developed	-499.50/-16.91	-745.92/-455.82	-1239.89/-5.4	
Developing	-291.30/ -3.32	-375.30/ -11.59	-347.26/-6.05	
EQ:				
Developed	204.32/0.93	-95.99/ -0.51	-280.99/-3.68	
Developing	-111.22/-1.78	-77.86/ -1.70	107.27/ 2.24	

According to both the tax trend and the tax sensitivity analyses, tax competition within the developed country group is convergent and is more intense than within the developing country group, the extent to which is determined by each country's adjustment of its investment flow (specifically RE) relative to the tax rate.

Tax competition within the developing country group is divergent. The overall tax sensitivities are low, although within the developing country group a slightly higher RE to DIF correlation coefficient seems to indicate competition for the retained earnings within the group countries. As Guisinger (1989) mentioned, the developing country group relies more on trade measures than on fiscal measures. It seems that without a comprehensive understanding of the substitution and complementary relationship between these trade and fiscal measures, to use tax wars is a more expensive and less effective measure for the developed country group. In other words, a developing country will attract less investment by reducing its tax rate the same amount as a developed country.

Perfect market structure tends to paralyze a nation's effort to set a higher tax rate and makes less rewarding to a firm's tax arbitrage activities. While in the less perfect market of the developing country group, tax arbitrage is rewarding and costly to the host government. One economic efficiency issue that may deserve some attention and further research here is whether tax disparity encourages MNCs to operate in a lower tax area. If

the answer is yes, is this opportunity also equally available to domestic firms? Should a

harmonized tax rate or free tax competition be recommended for developing nations?

H8: FDI is historically dependent.

Reinvested earnings are positively correlated with assets level shown by running regressor

AS, and extremely so when assets reach a higher level shown by running ASIV. The results

are summarized in Table 5.10.

Table 5.10: Comparison of Correlation Coefficients
of Assets Related Variables

b_i/T	AS	ASIV (1/AS)
RE	0.019/12.05	-121769/-2.13
EQ	-0.004/-2.74	22627/1127.1

These results confirm what Hartmam predicated (1984) --i.e., when firms are in the mature

phase of their investment path and marginal investment is made out of retained earnings,

the cost of funds is less than those for an immature firm's investment due to the tax treatment. Thus, the firm will maximize its investment out of retained earnings and net profit after tax to utilize fully the advantages provided by an established location. This explains from a point of view other than that of Arthur[20], why FDI is historically dependent.

It is interesting to ask why EQ is negatively correlated with assets level. Does a higher level of assets in an investment location indicate a barrier to entry or a signal of market saturation, thus deterring a new investment?

H9: Tax sensitivity of FDI varies across countries.

Because of the lack of sufficient data for each country, the research failed to detect a tax sensitivity pattern at this stage. Yet, this will leave room for further study.

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[20] In an industry location pattern paper, W. B. Arthur (1986) shows that industry will cluster in one dominant location due to both geographical attractiveness and accidental historical order of choice -- historical-dependence.

VI. CONCLUSION

6.1 Objective of the Research

This research started by asking following questions. With growing global economic integration, are national tax rate and policies converging or diverging? Are there signs of tax competition in which countries use their tax policies to aggressively solicit new foreign investment? Do tax differentials between countries and over time make a difference in detouring the direction of capital flows? Do tax policies have the same impact on reinvested earnings as on fresh fund investment? And in particular, why is a large percentage of U.S. investment made from reinvested earnings and how is this phenomenon related to tax policy?

Based on a broader framework, which combines the merits of three approaches (i.e., determinants of FDI, MNCs' tax behavior, and tax competition), this research examined MNCs' tax behavior to determine in an economically interdependent world how each country's tax policy interacts and how MNCs react to them. It also analyzed the different characteristics of the developed and developing markets in directing and attracting FDI. Enlightened by Hartman's (1984) study, this research also examined the different tax impacts on reinvested earnings and fresh funds investment theoretically and empirically.

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In particular, it further explored the questions of why reinvested earnings and fresh funds investment responded differently to foreign investment rates of return and tax rates of host countries, and why FDI is historically dependent upon previous level of investment.

6.2 Conclusions.

To answer the above questions, this research combined tax sensitivity study with the study of world tax trends and tax competition. The rationale was that it is almost impossible to progress with the tax study without some knowledge of the market. Unlike previous studies, this research examined world tax trends and tax competition patterns first. The FDI tax sensitivity study was subsequently conducted under three scenarios, by country group. Conclusions were drawn in six areas.

First, developed countries generally had higher effective tax rates and were more competitive in their tax policies, which tended to converge toward a group norm. Developing countries had lower average effective tax rates, less competition in their tax policies and tended toward divergent tax behavior--i.e. they tended to drift further apart from one another in terms of their tax policies.

Second, foreign direct investment (FDI), the sum of reinvested earnings (RE), equity and

intercompany transfers (EQ), was more sensitive to a country group relative tax rate (DIF), and a home-host country relative tax rate (DIFH) than to a host country tax rate (TA) in terms of correlation coefficients and statistical significance levels (See Table 5.8).

Third, these three tax sensitivity coefficients were much larger within the developed group and lower within the developing group. The larger tax sensitivity of the developed country group suggests that FDI levels adjusted faster within the developed country group than within the developing country group, given the same amount of change in the tax rate. It also indicated more intense competition within the developed country group (See Table 5.9).

Fourth, reinvested earnings were very sensitive to both host country tax rate (TA) and inter-country relative tax rates (DIF & DIFH), while fresh funds were only sensitive, and to a much lesser degree, to inter-country relative tax rates (See Table 5.8).

Fifth, reinvested earnings (RE) were most sensitive to the tax difference between host and home countries (DIFH), while fresh funds (EQ) were most sensitive to the rate of return difference between host and home countries (DIFR) (See equations 5.3.12 and 5.3.13).

Sixth, reinvested earnings were sensitive to the assets level (AS), especially when assets

reach the upper range (ASIV).

In summary, combining the results of both the tax trends and tax sensitivity analyses, it was found that tax competition within the developed country group was convergent and was more intense than within the developing country group, to the extent that each country adjusted its investment flow relative to the tax rate. This study also found that tax competition within the developing country group was divergent and overall tax sensitivities were low. Thus, "tax wars" would be more expensive and less effective in attracting FDI to the developing country group.   A given amount of tax reduction will attract less foreign direct investment to a developing country than to a developed country.

The research showed theoretically and empirically that reinvested earnings have higher tax sensitivities than fresh funds investment. This indicated a tax policy with deferral fundamentally violated the tax neutrality principle.

6.3 Policy Implications

This analysis indicated that developed and developing countries differ both in the formation of their tax policies and in the responsiveness of foreign direct investment to changes in tax rates. This is because that in the developed country group, tax policy was based on the

neutrality and equality principle, while in the developing country group these policies were based on the development principle (which was applied as either a protective device or revenue device). Furthermore, the developed countries market was more integrated and tended to bring tax levels to an equilibrium by quickly adjusting capital flows, while the developing countries markets were less integrated and less elastic. This suggests that the more efficient a market is, the less useful is government's attempt to set higher tax rates and the less useful are MNCs' tax arbitrage activities; on the other hand, the less efficient a market is, the less useful are government efforts to lower tax rates and the more beneficial are MNCs' tax arbitrage activities.

This analysis has also confirmed what other authors have found--i.e., foreign direct investment is sensitive to changes in tax rates. However, tax sensitivity is much greater in developed countries than in developing countries. This does not imply that developing countries do not use nor should not use tax policy as a means of attracting foreign investment. These findings only suggest that tax policy instruments are probably less efficient in developing countries. However, even though developed countries may find tax policies more efficient stimulators of foreign direct investment, tax competition is more intense. The efforts of a developed country to reduce its effective tax rate usually meets with rapid retaliation, leaving little or no relative gain.

These findings have implications for tax planning by multinational firms. Tax rates in developing countries are likely to be far more volatile than in developed countries. This suggests that multinational firms should develop alternative strategies for remitting funds that take into account sudden increases or decreases in both statutory and effective tax rates. Also, over the longer term, tax policies in high-income developing countries are likely to move toward those in developed countries.

In the case of reinvested earnings, which obviously violates the capital import and export neutrality principles, these national tax policies, which were based on these principles, need to be reevaluated. The differences in tax behaviors of reinvested earnings and fresh funds investment have important implications in conducting host and home country tax policy to direct and attract capital flows in general, and MNCs' investment decisions in particular.

Since there is an increase in economic interdependence within the developed nations, the market becomes a large scale economy. This makes it very difficult for each nation's government to pursue its own policy. The question of whether to search for an international tax harmonization, such as GATT, on trade and tariff or to search for a market solution so as to let each country be able to act on its own, needs to be addressed.

While this research has answered questions about worldwide tax trends, competition, and

the effectiveness of tax policy, it only begs the important question of what tax policy governments should follow. The research points to the need for tax harmonization among developed countries to avoid situations of cut-throat competition. Certainly, the timing seems appropriate for an extension of the GATT to include taxes. If foreign direct investment is truly a substitute for trade, then the GATT should be equally concerned with taxes on foreign direct investment as it is with tariffs on trade.

6.4 Areas for Further Research

This research found that there is a negative correlation between the fresh funds investment and the level of the assets. An explanation of this relationship provides a fruitful ground for further research into these fields, which is beyond the scope of the present research.

This research identified the tax sensitivity difference between developed and developing country groups. The methodology developed by this research may be useful in investigating the pattern of FDI tax sensitivity for each individual country, and regional country group, when the data becomes available. The relationship between effective tax rates and the host country rate of returns can be also explored in the future research.

The research has identified two theoretical groups of variables which are endogenous and

exogenous to a firm. The first specifies that the objective function of a firm is to minimize taxes and maximize the cash flow on an overall basis. The second set of variables may be applied to a government's utility function, which employs the firm's exogenous variables as endogenous variables, and can be formulated to determine an optimal tax rate under a government-business framework. This is similar to an agency theory framework.

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8.1 Calculated Effective Tax Rates by Countries

TABLE 8.1: Effective Tax Rates

OBS	COUNTRY	1968	1972	1974	1976	1980	1982
Developing country group:							
1	ARGENTINA	0.22	0.30	0.30	0.25	.	0.11
2	BRAZIL	0.28	0.21	0.20	0.20	0.31	0.30
3	EGUADOR	0.22	0.29	0.23	0.21	0.16	0.21
4	MEXICO	0.41	0.42	0.43	0.47	0.42	0.42
5	PANAMA	0.11	0.13	0.07	0.10	0.09	0.11
6	PERU	0.33	0.30	0.39	0.36	.	0.50
7	VENEZUELA	0.28	0.26	0.28	0.29	0.29	0.32
8	COSTARICA	0.15	0.16	.	0.31	.	0.47
9	ELSALVADOR	0.06	0.08	.	0.10	.	.
10	GUATEMALA	0.17	0.28	.	0.43	.	0.44
11	HONDURAS	0.22	0.27	.	0.25	.	0.39
12	DOMINICA	0.16	0.28	.	0.28	.	0.23
13	URUGUAY	0.16	0.21	.	0.21	.	0.28
14	BAHAMAS	0.10	0.41	0.35	0.12	0.11	0.23
15	BERMUDA	0.10	0.02	0.02	0.03	0.03	0.03
16	NETHERLANDS	0.05	0.15	0.19	0.09	0.14	0.16
17	SPAIN	0.36	0.28	0.26	0.37	0.21	0.27
18	PORTUGAL	0.32	0.23	.	0.22	.	0.36
19	TURKEY	0.39	0.37	.	0.30	.	0.44
20	GREECE	0.12	0.18	.	0.35	.	0.40
21	LIBERIA	0.06	0.03	0.05	0.03	0.03	0.04
22	NIGERIA	0.16	0.70	.	0.81	.	0.83
23	ZAIRE	.	0.44	.	0.25	.	0.39
24	KENYA	0.28	0.39	.	0.43	.	0.43
25	ZAMBIA	0.38	0.34	.	0.45	.	.
26	ALGERIA	0.32	0.53	.	0.04	.	.
27	EGYPT	0.96	0.38	.	0.29	.	.
28	ATHIOPIA	0.23	0.13	.	.	.	.
29	TANZANIA	0.47	0.46	.	0.39	.	.
30	UGANDA	0.36	0.50	.	0.42	.	.
31	GHANA	0.27	0.00	.	0.18	.	.
32	SAFRICA	0.35	0.40	0.29	0.34	0.28	0.39
33	H.K.	0.18	0.12	0.11	0.11	0.21	0.13
34	INDONESIA	0.49	0.08	0.14	0.23	0.22	0.46
35	PHILIPPINES	0.30	0.34	0.33	0.41	0.39	0.31
36	IRAN	0.11	0.25	.	0.34	.	.
37	IRAQ	0.44	0.45	.	.	.	.
38	ISRAEL	0.39	0.39	.	0.41	.	0.27
39	SAUDIARABIA	.	.	.	0.06	.	0.04
40	INDIA	0.57	0.67	..	0.57	.	0.56
41	MALAYSIA	0.12	0.26	.	0.28	.	0.20
42	PAKISTAN	0.51	0.14	.	0.46	.	.
43	SINGAPORE	0.26	0.08	.	0.19	.	0.18

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TABLE 8.1 (Continue)

OBS	COUNTRY	1968	1972	1974	1976	1980	1982
44	THAILAND	0.18	0.23	.	0.29	.	0.34
45	CHINA	.	0.12	.	.	.	0.10
46	SKOREA	0.00	0.11	.	.	.	0.26
47	TAIWAN	0.00	0.08	.	0.18	.	0.14
48	PUERTORICO	0.15	0.26	0.23	0.24	0.23	0.32

Developed country group:

OBS	COUNTRY	1968	1972	1974	1976	1980	1982
49	CANADA	0.39	0.35	0.38	0.37	0.36	0.32
50	AUSTRIA	0.54	0.33	0.38	0.35	0.36	0.42
51	BELGIUM	0.34	0.33	0.34	0.39	0.41	0.36
52	DENMARK	0.30	0.31	0.15	0.26	0.35	0.28
53	FRANCE	0.45	0.38	0.38	0.43	0.35	0.45
54	ITALY	0.42	0.40	0.29	0.35	0.30	0.34
55	NETHERLANDS	0.35	0.38	0.34	0.34	0.27	0.23
56	SWEDEN	0.40	0.35	0.31	0.42	0.31	0.45
57	SWITZERLAND	0.26	0.20	0.15	0.19	0.18	0.19
58	UK	0.38	0.32	0.33	0.39	0.28	0.34
59	W.GERMANY	0.41	0.39	0.33	0.33	0.40	0.42
60	FINLAND	0.73	0.40	.	0.47	.	0.47
61	NORWAY	0.50	0.33	.	0.37	.	0.39
62	IRELAND	0.13	0.10	.	0.10	.	0.04
63	JAPAN	0.42	0.39	0.44	0.45	0.44	0.51
64	AUSTRALIA	0.40	0.30	0.39	0.34	0.36	0.35
65	NEW ZEALAND	0.52	0.37	.	0.37	.	0.41

".": Missing data.
The effective tax rates are calculated from the IRS statistics.
Data source: Statistices of Income: U.S. Corporation and Their
Controlled Foreign Corporations by IRS (1968-1982)

8.2 Calculated Effective Tax Rates by Countries and Industries

8.2.1 1974 Data Set

TABLE 8.2.1a: 1974 Effective Tax Rates by Five Industrial Sectors

COUNTRY	TOTAL	MFN.	MINING	SERVICE	FIN.	TRADE
ALL AREAS	0.32	0.33	0.15	0.35	0.33	0.39
CANADA	0.38	0.37	0.17	0.48	0.43	0.55
LATIN AMERICA TOTAL	0.24	0.25	0.08	0.32	0.21	0.38
ARGENTINA	0.30	0.30	.	.	0.11	0.22
BRAZIL	0.20	0.20	0.18	0.12	0.20	0.16
ECUADOR	0.23	0.24	.	.	0.20	.
MEXICO	0.43	0.43	0.45	0.31	0.36	0.46
PANAMA	0.07	0.07	0.04	0.41	0.14	0.14
PERU	0.39	0.33	0.35	.	.	0.55
VENEZUELA	0.28	0.27	0.35	.	0.18	0.28
OTHER W. HEMISPHERE	0.22	0.27	0.01	0.21	0.07	0.04
BAHAMAS	0.35	0.42	0.01	.	.	.
BERMUDA	0.02	0.03	0.00	.	0.00	0.00
NETHERLANDS.A	0.19	0.19	.	.	0.29	0.18
EUROPE TOTAL	0.30	0.30	0.29	0.28	0.34	0.34
AUSTRIA	0.38	0.39	.	0.29	0.33	0.40
BELGIUM	0.34	0.35	.	0.25	0.34	0.14
DENMARK	0.15	0.15	.	0.34	0.06	0.32
FRANCE	0.38	0.38	.	0.29	0.46	0.37
ITALY	0.29	0.29	.	0.30	0.32	0.32
LUXEMBOURG	0.08	0.08	.	.	0.26	.
NETHERLANDS	0.34	0.34	0.53	0.13	0.37	0.46
SPAIN	0.26	0.26	.	0.32	0.31	0.17
SWEDEN	0.31	0.32	.	0.06	0.11	.
SWITZERLAND	0.15	0.15	.	0.03	0.11	0.19
U.K.	0.33	0.32	0.31	0.37	0.49	0.45
WEST GERMANY	0.33	0.33	0.28	0.33	0.27	0.34
EAST EUROPEAN	0.22	0.22	.	.	.	.
AFRICA TOTAL	0.47	0.47	0.17	0.23	0.33	0.22
LIBERIA	0.05	0.06	0.00	.	0.31	.
SOUTH AFRICA	0.29	0.30	0.34	0.29	0.43	0.20
OPEC COUNTRIES	0.80	0.80	0.43	.	0.41	0.18
ASIA TOTAL	0.31	0.32	0.37	0.46	0.29	0.26
MIDDLE EAST	0.41	0.41	0.40	0.55	0.43	.
OPEC COUNTRIES	0.27	0.31	.	.	.	.
OTHER ASIA TOT.	0.31	0.32	0.27	0.38	0.26	.
H.K.	0.11	0.11	.	.	0.17	0.08
INDONESIA	0.14	0.24	.	.	.	.
JAPAN	0.44	0.43	.	0.62	.	.
PHILIPPINES	0.33	0.32	.	.	0.45	0.34
OCEANIA TOTAL	0.39	0.39	0.20	0.45	0.39	0.40
AUSTRALIA	0.39	0.40	0.20	0.45	0.39	0.39
PUERTO RICO	0.23	0.22	.	0.41	0.27	.

TABLE 8.2.1b: 1974 Effective Tax Rates by Seven
Sub-Manufacturing Sectors

COUNTRY	VEH.	ELEC.	MACH.	METAL	PETRO.	CHEM.	FOOD
ALL AREAS	0.36	0.32	0.39	0.26	0.28	0.33	0.35
CANADA	0.40	0.43	0.46	0.31	0.32	0.35	0.41
LATIN AMERICA TOTAL	0.28	0.33	0.27	0.25	0.14	0.25	0.25
ARGENTINA	0.32	0.22	0.29	0.23	0.22	0.35	0.24
BRAZIL	0.26	0.25	0.17	0.16	.	0.17	0.18
ECUADOR	.	.	0.22	.	0.24	0.26	0.46
MEXICO	0.32	0.41	0.45	0.44	0.38	0.44	0.43
PANAMA	0.02	0.36	0.10	0.11	0.04	0.10	0.08
PERU	.	0.34	0.40	0.32	0.36	0.29	0.28
VENEZUELA	0.39	0.36	0.38	0.17	0.07	0.29	0.30
OTHER W. HEMISPHERE	0.00	0.13	0.06	0.06	0.33	0.06	0.10
BAHAMAS	.	0.26	0.00	.	0.45	0.04	0.00
BERMUDA	.	0.11	0.03	.	0.02	0.04	0.01
NETHERLANDS.A	0.27	0.14	0.36	.	0.15	0.18	0.27
EUROPE TOTAL	0.31	0.32	0.38	0.32	0.16	0.33	0.38
AUSTRIA	0.38	0.33	0.40	.	0.33	0.47	0.39
BELGIUM	0.37	0.37	0.39	0.09	0.07	0.40	0.46
DENMARK	0.05	0.39	0.31	0.27	0.48	0.31	0.32
FRANCE	0.50	0.46	0.53	0.05	0.13	0.44	0.41
ITALY	0.40	0.33	0.16	0.51	0.15	0.41	0.44
LUXEMBOURG	.	.	0.38	.	0.01	0.18	.
NETHERLANDS	0.41	0.31	0.35	0.41	0.25	0.41	0.31
SPAIN	0.07	0.30	0.31	0.30	0.10	0.25	0.29
SWEDEN	0.43	0.36	0.46	0.45	0.01	0.37	0.33
SWITZERLAND	0.18	0.13	0.23	0.08	0.06	0.11	0.29
U.K.	0.44	0.43	0.37	0.37	0.13	0.48	0.44
WEST GERMANY	0.31	0.28	0.42	0.38	0.25	0.33	0.36
AFRICA TOTAL	0.30	0.26	0.39	0.12	0.54	0.37	0.28
LIBERIA	.	.	.	0.05	0.04	.	0.15
SOUTH AFRICA	0.34	0.19	0.39	0.33	0.18	0.41	0.33
OPEC COUNTRIES	.	0.41	0.35	.	0.81	0.31	.
ASIA TOTAL	0.40	0.18	0.44	0.25	0.15	0.48	0.33
MIDDLE EAST	.	0.37	0.31	.	0.43	0.39	.
OPEC COUNTRIES	.	.	0.22	.	.	0.34	.
OTHER ASIA	0.40	0.17	0.45	.	0.15	0.49	0.33
H.K.	.	0.23	0.40	0.14	0.01	0.14	0.01
INDONESIA	.	0.49	.	.	.	0.10	.
JAPAN	0.51	0.49	0.47	0.50	0.20	0.57	0.38
PHILIPPINES	0.36	0.32	0.20	0.35	0.09	0.35	0.38
OTHER	.	0.07	.	.	0.18	0.51	.
OCEANIA TOTAL	0.42	0.40	0.41	0.25	0.33	0.42	0.33
AUSTRALIA	0.43	0.40	0.41	0.25	0.38	0.42	0.33
OTHER	0.41	0.34	0.40	.	0.14	0.58	0.31
PUERTO RICO	0.10	0.34	0.23	0.23	0.07	0.27	0.16

8.2.2 1980 Data Set

TABLE 8.2.2a: 1980 Effective Tax Rates by Five Industrial Sectors

COUNTRY	SERVICE	MINING	FIN.	TRADE	MFN.
ALL AREA	0.30	0.21	0.26	0.24	0.31
CANADA	0.41	0.24	0.34	0.37	0.37
LATIN AMERICA	0.27	0.29	0.17	0.10	0.28
BRAZIL	0.42	0.33	0.25	0.17	0.31
ECUADOR	0.23	.	0.21	0.14	0.16
MEXICO	0.38	0.45	0.41	0.37	0.42
PANAMA	0.27	0.19	0.04	0.01	0.08
VENEZUELA	0.39	0.35	0.24	0.07	0.28
ALL OTHER	0.10	.	0.08	0.09	0.22
OTHER W.HEMISPHERE	0.02	0.17	0.15	0.05	0.06
BAHAMAS	.	.	0.11	0.07	0.11
BERMUDA	0.01	0.10	0.06	0.00	0.03
NETHERLANDS	0.06	0.33	0.16	0.08	0.15
EUROPE TOTAL	0.33	0.15	0.31	0.22	0.32
AUSTRIA	0.58	0.57	0.27	0.30	0.36
BELGIUM	0.39	0.89	0.40	0.51	0.41
DENMARK	0.41	0.33	0.19	0.22	0.36
FRANCE	0.42	0.46	0.39	0.56	0.35
ITALY	0.69	0.36	0.37	0.31	0.30
LUXEMBOURG	.	.	0.33	.	0.26
NETHERLANDS	0.15	0.17	0.49	0.39	0.27
SPAIN	0.32	0.36	0.39	0.17	0.21
SWEDEN	0.42	.	0.39	0.02	0.37
SWITZERLAND	0.22	0.15	0.11	0.13	0.20
U.K.	0.36	0.10	0.34	0.26	0.29
W.GERMANY	0.40	0.48	0.32	0.51	0.40
AFRICA TOTAL	.	0.19	0.29	0.22	0.28
LIBERIA	-0.29	.	0.18	0.02	0.05
S.AFRICA	0.38	0.32	0.34	0.29	0.27
OPEC	.	0.41	0.38	0.31	0.42
OTHER	0.58	.	0.40	0.42	0.42
ASIA TOTAL	0.29	0.23	0.22	0.37	0.33
OPEC				0.04	.
H.K.	0.08	0.17	0.13	0.11	0.24
INDONESIA	.	0.37	.	0.40	0.38
JAPAN	0.49	0.52	0.45	0.41	0.44
MIDDLE EAST	.	0.35	0.51	0.36	0.12
PHILIPPINES	0.45	.	0.09	0.96	0.36
OTHER	0.39	0.14	.	0.33	0.22
OCEANIA TOTAL	0.35	.	0.24	0.39	0.37
AUSTRALIA	0.37	.	0.23	0.39	0.37
OTHER	0.23	.	0.41	0.39	0.32
PUERTO RICO	.	.	.	.	0.23

TABLE 8.2.2b: 1980 Effective Tax Rates by Seven Sub-Manufacturing

Sectors

COUNTRY	FOOD	CHEM.	PETRO	MATEL	MACH.	ELEC.	VEH.
ALL AREAS	0.32	0.32	0.31	0.27	0.33	0.29	0.29
CANADA	0.39	0.41	0.42	0.28	0.43	0.29	0.39
LATIN AMERICA	0.35	0.30	0.19	0.24	0.26	0.34	0.29
BRAZIL	0.35	0.34	0.35	0.25	0.25	0.34	0.33
ECUADOR	0.15	0.13	0.22	.	0.07	.	.
MEXICO	0.45	0.43	0.38	0.39	0.41	0.43	0.44
PANAMA	0.12	0.12	0.04	0.08	0.16	0.09	.
VENEZUELA	0.28	0.24	0.28	0.30	0.41	0.25	0.35
ALL OTHER	0.31	0.26	0.29	.	0.17	0.30	0.21
OTHER W. HEMIS.	0.08	0.08	0.05	0.03	0.12	0.07	0.14
BAHAMAS	.	0.08	0.14	0.00	.	.	.
BERMUDA	0.04	0.05	0.02	0.03	0.01	0.04	0.05
NETHERLANDS.A	0.19	0.14	0.05	0.03	0.30	0.21	0.29
EUROPE TOTAL	0.30	0.30	0.32	0.29	0.32	0.31	0.29
AUSTRIA	0.51	0.30	0.18	.	0.57	0.30	0.33
BELGIUM	0.40	0.40	0.42	0.20	0.34	0.43	0.21
DENMARK	0.40	0.35	0.19	0.38	0.42	0.36	0.73
FRANCE	0.43	0.44	0.25	0.36	0.37	0.38	0.28
ITALY	0.36	0.30	0.20	0.30	0.35	0.31	0.40
LUXEMBOURG	.	0.24	0.18	.	0.40	0.34	.
NETHERLANDS	0.26	0.32	0.21	0.28	0.31	0.25	0.26
SPAIN	0.24	0.21	0.25	0.16	0.23	0.37	0.15
SWEDEN	0.63	0.28	0.09	0.19	0.52	0.28	0.60
SWITZERLAND	0.23	0.18	0.18	0.09	0.23	0.13	0.21
U.K.	0.26	0.28	0.27	0.31	0.29	0.39	0.32
WEST GERMANY	0.33	0.38	0.47	0.32	0.34	0.33	0.31
AFRICA TOTAL	0.20	0.36	0.26	0.22	0.35	0.20	0.09
LIBERIA	.	.	0.05	0.03	-0.01	0.03	.
SOUTH AFRICA	0.32	0.34	0.18	0.30	0.35	0.32	0.08
OPEC COUNTRIES	.	0.43	0.44	.	0.37	0.27	.
OTHER	.	.	.	.	0.36	0.50	0.50
ASIA TOTAL	0.35	0.41	0.31	0.38	0.39	0.16	0.25
OPEC COUNTRIES	.	0.05	0.02	.	.	0.00	.
H.K.	0.03	0.16	0.09	0.12	0.25	0.11	0.15
INDONESIA	.	0.28	.	0.02	0.47	0.43	.
JAPAN	0.42	0.51	0.40	0.51	0.44	0.46	0.37
MIDDLE EAST	.	0.21	0.20	.	0.07	0.14	.
PHILIPPINES	0.40	0.38	0.34	0.01	0.39	0.14	0.89
OTHER	.	0.41	0.23	0.39	0.27	0.09	0.11
OCEANIA TOTAL	0.37	0.40	0.37	0.31	0.39	0.38	0.35
AUSTRALIA	0.38	0.39	0.41	0.31	0.39	0.38	0.34
OTHER	0.23	0.46	0.27	0.46	0.42	0.45	0.46
PUERTO RICO	0.25	.	0.17	.	0.36	.	0.24

8.3 Data Set for Tax Sensitivity Analysis

TABLE 8.3a: Tax Sensitivity Analysis Date Set

OBS	COUNTRY	TA	YEAR	TM	HTA	HROR	ROR
1	ARGENTI	0.22	68	0.41	0.470	0.130	0.10702
2	ARGENTI	0.30	72	0.33	0.456	0.108	0.05861
3	ARGENTI	0.30	74	0.32	0.559	0.080	0.06793
4	ARGENTI	0.25	76	0.35	0.471	0.095	0.15282
5	ARGENTI	0.16	80	0.34	0.473	0.070	0.07271
6	ARGENTI	0.11	82	0.35	0.329	0.067	0.08390
7	AUSTRA	0.40	68	0.41	0.470	0.130	0.08247
8	AUSTRA	0.30	72	0.33	0.456	0.108	0.09840
9	AUSTRA	0.39	74	0.32	0.559	0.080	0.07954
10	AUSTRA	0.34	76	0.35	0.471	0.095	0.09035
11	AUSTRA	0.36	80	0.34	0.473	0.070	0.08831
12	AUSTRA	0.35	82	0.35	0.329	0.067	0.06173
13	BELGIU	0.34	68	0.41	0.470	0.130	0.07572
14	BELGIU	0.33	72	0.33	0.456	0.108	0.06109
15	BELGIU	0.34	74	0.32	0.559	0.080	0.07597
16	BELGIU	0.39	76	0.35	0.471	0.095	0.07544
17	BELGIU	0.41	80	0.34	0.473	0.070	0.10511
18	BELGIU	0.36	82	0.35	0.329	0.067	0.07005
19	BRAZI	0.28	68	0.26	0.470	0.130	0.10333
20	BRAZI	0.21	72	0.27	0.456	0.108	0.10250
21	BRAZI	0.20	74	0.23	0.559	0.080	0.09106
22	BRAZI	0.20	76	0.30	0.471	0.095	0.09522
23	BRAZI	0.31	80	0.21	0.473	0.070	0.08373
24	BRAZI	0.30	82	0.30	0.329	0.067	0.11444
25	CANAD	0.39	68	0.41	0.470	0.130	0.08339
26	CANAD	0.35	72	0.33	0.456	0.108	0.09363
27	CANAD	0.38	74	0.32	0.559	0.080	0.11532
28	CANAD	0.37	76	0.35	0.471	0.095	0.09926
29	CANAD	0.36	80	0.34	0.473	0.070	0.09955
30	CANAD	0.32	82	0.35	0.329	0.067	0.07325
31	DENMAR	0.30	68	0.41	0.470	0.130	0.03788
32	DENMAR	0.31	72	0.33	0.456	0.108	0.06532
33	DENMAR	0.15	74	0.32	0.559	0.080	0.11749
34	DENMAR	0.26	76	0.35	0.471	0.095	0.07277
35	DENMAR	0.35	80	0.34	0.473	0.070	0.08431
36	DENMAR	0.28	82	0.35	0.329	0.067	0.10547
37	FRANCE	0.45	68	0.41	0.470	0.130	0.07393
38	FRANCE	0.38	72	0.33	0.456	0.108	0.09989
39	FRANCE	0.38	74	0.32	0.559	0.080	0.08486
40	FRANCE	0.43	76	0.35	0.471	0.095	0.07498
41	FRANCE	0.35	80	0.34	0.473	0.070	0.11365
42	FRANCE	0.45	82	0.35	0.329	0.067	0.07489
43	INDIA	0.57	68	0.41	0.470	0.130	0.14781
44	INDIA	0.67	72	0.33	0.456	0.108	0.15099
45	INDIA	0.62	74	0.32	0.559	0.080	0.16977
46	INDIA	0.57	76	0.35	0.471	0.095	0.20722
47	INDIA	0.56	80	0.34	0.473	0.070	0.15397
48	INDIA	0.56	82	0.35	0.329	0.067	0.13641
49	ITALY	0.42	68	0.41	0.470	0.130	0.04596
50	ITALY	0.40	72	0.33	0.456	0.108	0.07665

TABLE 8.3a (CONTINUE)

OBS	COUNTRY	TA	YEAR	TM	HTA	HROR	ROR
51	ITALY	0.29	74	0.32	0.559	0.080	0.04590
52	ITALY	0.35	76	0.35	0.471	0.095	0.05382
53	ITALY	0.30	80	0.34	0.473	0.070	0.10985
54	ITALY	0.34	82	0.35	0.329	0.067	0.07588
55	JAPAN	0.42	68	0.41	0.470	0.130	0.14279
56	JAPAN	0.39	72	0.33	0.456	0.108	0.17804
57	JAPAN	0.43	74	0.32	0.559	0.080	0.14616
58	JAPAN	0.45	76	0.35	0.471	0.095	0.16829
59	JAPAN	0.44	80	0.34	0.473	0.070	0.15831
60	JAPAN	0.51	82	0.35	0.329	0.067	0.10820
61	LIBER	0.06	68	0.41	0.470	0.130	0.08962
62	LIBER	0.03	72	0.33	0.456	0.108	0.08201
63	LIBER	0.05	74	0.32	0.559	0.080	0.09028
64	LIBER	0.03	76	0.35	0.471	0.095	0.03883
65	LIBER	0.03	80	0.34	0.473	0.070	0.05627
66	LIBER	0.04	82	0.35	0.329	0.067	0.04685
67	MEXIC	0.41	68	0.41	0.470	0.130	0.11001
68	MEXIC	0.42	72	0.33	0.456	0.108	0.10691
69	MEXIC	0.43	74	0.32	0.559	0.080	0.14823
70	MEXIC	0.47	76	0.35	0.471	0.095	0.14565
71	MEXIC	0.42	80	0.34	0.473	0.070	0.19864
72	MEXIC	0.42	82	0.35	0.329	0.067	0.08814
73	NETHER	0.35	68	0.41	0.470	0.130	0.07578
74	NETHER	0.38	72	0.33	0.456	0.108	0.09293
75	NETHER	0.34	74	0.32	0.559	0.080	0.13997
76	NETHER	0.34	76	0.35	0.471	0.095	0.09163
77	NETHER	0.27	80	0.34	0.473	0.070	0.12144
78	NETHER	0.23	82	0.35	0.329	0.067	0.07334
79	PANAM	0.11	68	0.41	0.470	0.130	0.10102
80	PANAM	0.13	72	0.33	0.456	0.108	0.09390
81	PANAM	0.07	74	0.32	0.559	0.080	0.12428
82	PANAM	0.10	76	0.35	0.471	0.095	0.11053
83	PANAM	0.09	80	0.34	0.473	0.070	0.10767
84	PANAM	0.11	82	0.35	0.329	0.067	0.10643
85	PHILI	0.30	68	0.41	0.470	0.130	0.10920
86	PHILI	0.34	72	0.33	0.456	0.108	0.07708
87	PHILI	0.33	74	0.32	0.559	0.080	0.12282
88	PHILI	0.41	76	0.35	0.471	0.095	0.12623
89	PHILI	0.39	80	0.34	0.473	0.070	0.12412
90	PHILI	0.31	82	0.35	0.329	0.067	0.09671
91	SAFRI	0.35	68	0.41	0.470	0.130	0.13531
92	SAFRI	0.40	72	0.33	0.456	0.108	0.09649
93	SAFRI	0.29	74	0.32	0.559	0.080	0.14660
94	SAFRI	0.34	76	0.35	0.471	0.095	0.12955
95	SAFRI	0.28	80	0.34	0.473	0.070	0.18979
96	SAFRI	0.39	82	0.35	0.329	0.067	0.11695
97	SPAIN	0.36	68	0.41	0.470	0.130	0.05017

TABLE 8.3a (CONTINUE)

OBS	COUNTRY	TA	YEAR	TM	HTA	HROR	ROR
98	SPAIN	0.28	72	0.33	0.456	0.108	0.12931
99	SPAIN	0.26	74	0.32	0.559	0.080	0.13658
100	SPAIN	0.37	76	0.35	0.471	0.095	0.07056
101	SPAIN	0.21	80	0.34	0.473	0.070	0.08226
102	SPAIN	0.27	82	0.35	0.329	0.067	0.06826
103	SWEDEN	0.40	68	0.41	0.470	0.130	0.06214
104	SWEDEN	0.35	72	0.33	0.456	0.108	0.08688
105	SWEDEN	0.31	74	0.32	0.559	0.080	0.14590
106	SWEDEN	0.42	76	0.35	0.471	0.095	0.11590
107	SWEDEN	0.31	80	0.34	0.473	0.070	0.10025
108	SWEDEN	0.45	82	0.35	0.329	0.067	0.08380
109	SWIZER	0.17	68	0.41	0.470	0.130	0.08800
110	SWIZER	0.20	72	0.33	0.456	0.108	0.10006
111	SWIZER	0.15	74	0.32	0.559	0.080	0.14666
112	SWIZER	0.19	76	0.35	0.471	0.095	0.12589
113	SWIZER	0.18	80	0.34	0.473	0.070	0.12730
114	SWIZER	0.19	82	0.35	0.329	0.067	0.09889
115	UK	0.38	68	0.41	0.470	0.130	0.09491
116	UK	0.32	72	0.33	0.456	0.108	0.12844
117	UK	0.33	74	0.32	0.559	0.080	0.07960
118	UK	0.39	76	0.35	0.471	0.095	0.06642
119	UK	0.28	80	0.34	0.473	0.070	0.12567
120	UK	0.34	82	0.35	0.329	0.067	0.11214
121	VENEZ	0.28	68	0.41	0.470	0.130	0.10288
122	VENEZ	0.26	72	0.33	0.456	0.108	0.12293
123	VENEZ	0.28	74	0.32	0.559	0.080	0.09497
124	VENEZ	0.29	76	0.35	0.471	0.095	0.12342
125	VENEZ	0.29	80	0.34	0.473	0.070	0.11736
126	VENEZ	0.32	82	0.35	0.329	0.067	0.11806
127	WGERMAN	0.41	68	0.41	0.470	0.130	0.13648
128	WGERMAN	0.39	72	0.33	0.456	0.108	0.13031
129	WGERMAN	0.33	74	0.32	0.559	0.080	0.10248
130	WGERMAN	0.33	76	0.35	0.471	0.095	0.12710
131	WGERMAN	0.40	80	0.34	0.473	0.070	0.12463
132	WGERMAN	0.42	82	0.35	0.329	0.067	0.07773

TABLE 8.3b: Tax Sensitivity Analysis Date Set

OBS	COUNTRY	ASSETS	RE	EQ	YEAR	GNPP	INCOME BEFORE TAX
1	ARGENTI	1443.00	35	-7	68	1.060	154.43
2	ARGENTI	2124.15	13	12	72	1.230	124.50
3	ARGENTI	2617.82	-8	25	74	1.900	177.83
4	ARGENTI	2408.96	184	-158	76	1.550	368.14
5	ARGENTI	3800.76	470	115	80	2.390	276.35
6	ARGENTI	4602.56	222	-6	82	2.520	386.14
7	AUSTRA	4396.99	118	44	68	2.300	362.63
8	AUSTRA	7206.76	184	23	72	2.980	709.13
9	AUSTRA	8875.45	282	-109	74	4.760	705.99
10	AUSTRA	11343.76	293	-203	76	6.100	1024.93
11	AUSTRA	20418.04	438	-34	80	9.820	1803.11
12	AUSTRA	22318.92	-144	72	82	11.140	1377.83
13	BELGIU	1870.77	26	34	68	2.010	141.66
14	BELGIU	5387.45	158	-24	72	3.210	329.09
15	BELGIU	7221.51	111	138	74	5.210	548.64
16	BELGIU	9077.43	107	75	76	6.780	684.79
17	BELGIU	14316.65	329	60	80	12.180	1504.89
18	BELGIU	12061.46	54	-311	82	10.760	844.85
19	BRAZI	2143.20	73	7	68	0.270	221.47
20	BRAZI	4208.72	224	-31	72	0.530	431.40
21	BRAZI	7561.25	304	158	74	0.909	688.51
22	BRAZI	11771.61	497	-168	76	1.140	1120.94
23	BRAZI	18714.99	347	-56	80	2.050	1566.97
24	BRAZI	20131.86	568	214	82	10.760	2303.88
25	CANAD	27463.53	762	-168	68	2.650	2290.13
26	CANAD	40014.99	1367	-987	72	4.440	3746.68
27	CANAD	47951.80	2202	-1573	74	6.080	5529.93
28	CANAD	58129.31	2459	-2357	76	7.510	5770.19
29	CANAD	90043.61	3490	370	80	10.130	8963.46
30	CANAD	91099.93	812	-2124	82	11.320	6672.79
31	DENMAR	560.80	-6	-57	68	2.310	21.24
32	DENMAR	856.39	-2	23	72	3.670	55.94
33	DENMAR	1368.81	62	53	74	5.820	160.83
34	DENMAR	1694.97	71	-38	76	7.450	123.35
35	DENMAR	1985.51	50	94	80	12.950	167.40
36	DENMAR	1900.36	78	-140	82	12.470	200.43
37	FRANCE	5014.07	20	-41	68	2.460	370.68
38	FRANCE	9778.77	252	-96	72	3.620	976.85
39	FRANCE	14754.38	202	184	74	5.190	1252.12
40	FRANCE	16887.95	227	-403	76	6.550	1266.32
41	FRANCE	5390.43	970	344	80	11.730	2885.64
42	FRANCE	23335.94	-490	-74	82	11.680	1747.70
43	INDIA	238.36	7	70	68	0.110	35.23
44	INDIA	310.66	8	-11	72	0.110	46.91
45	INDIA	326.51	15	-22	74	0.130	55.43
46	INDIA	296.41	15	-13	76	0.150	61.42
47	INDIA	365.79	22	28	80	0.240	56.32
48	INDIA	447.44	17	14	82	0.260	61.03
49	ITALY	5059.78	2	-30	68	1.400	232.57
50	ITALY	6891.50	68	-25	72	1.960	528.21
51	ITALY	1010.14	217	133	74	2.770	505.36

TABLE 8.3b (CONTINUE)

OBS	COUNTRY	ASSETS	RE	EQ	YEAR	GNPP	INCOME BEFORE TAX
52	ITALY	11859.65	79	97	76	3.050	638.33
53	ITALY	19695.83	781	234	80	6.480	2163.62
54	ITALY	17437.21	143	-134	82	6.840	1323.17
55	JAPAN	1005.20	103	-26	68	1.430	143.53
56	JAPAN	2421.97	171	29	72	2.320	431.20
57	APAN	3137.95	159	305	74	3.88	458.65
58	JAPAN	4105.46	219	6	76	4.91	690.90
59	JAPAN	10214.97	246	-221	80	9.89	1617.14
60	JAPAN	10378.09	264	-305	82	10.08	1122.89
61	LIBER	1622.10	7	-18	68	0.20	145.37
62	LIBER	4467.02	4	6	72	0.25	366.33
63	LIBER	6368.74	20	12	74	0.33	574.97
64	LIBER	8332.23	20	-26	76	0.45	323.57
65	LIBER	8855.73	12	-36	80	0.53	498.35
66	LIBER	9178.71	35	-21	82	0.49	430.07
67	MEXIC	2094.90	63	-8	68	0.58	230.46
68	MEXIC	3096.51	99	-48	72	0.75	331.04
69	MEXIC	3427.68	245	-45	74	1.00	508.09
70	MEXIC	3563.62	-142	69	76	1.09	519.04
71	MEXIC	8520.74	900	520	80	2.09	1692.60
72	MEXIC	7504.08	-1520	301	82	2.27	661.44
73	NETHER	2320.88	4	118	68	1.76	175.87
74	NETHER	5164.38	203	-124	72	2.84	479.92
75	NETHER	6988.13	379	102	74	4.88	978.13
76	NETHER	8918.98	245	-104	76	6.20	817.25
77	NETHER	14721.59	505	495	80	11.47	1787.74
78	NETHER	18394.43	-177	-137	82	10.93	1349.00
79	PANAM	2417.82	47	28	68	0.66	244.24
80	PANAM	4052.02	83	-170	72	0.88	380.48
81	PANAM	6076.05	135	-270	74	1.01	755.10
82	PANAM	9287.01	116	-187	76	1.31	1026.50
83	PANAM	13952.46	259	34	80	1.73	1502.32
84	PANAM	18560.99	207	280	82	2.12	1975.52
85	PHILI	749.44	12	9	68	0.21	81.84
86	PHILI	864.38	-8	21	72	0.22	66.62
87	PHILI	1104.88	45	-15	74	0.31	135.71
88	PHILI	1093.12	33	21	76	0.41	137.99
89	PHILI	2194.75	59	-71	80	0.69	272.42
90	PHILI	1991.54	62	51	82	0.82	192.60
91	SAFRI	1260.31	26	-21	68	0.71	170.53
92	SAFRI	1674.33	36	-12	72	0.85	161.55
93	SAFRI	2727.87	136	17	74	1.20	399.92
94	SAFRI	3130.65	73	-64	76	1.34	405.57
95	SAFRI	5141.00	430	-16	80	2.30	975.72
96	SAFRI	5211.78	-36	-14	82	2.67	609.53
97	SPAIN	1284.99	2	109	68	0.82	64.47
98	SPAIN	1790.50	62	4	72	1.21	231.54

TABLE 8.3b (CONTINUE)

OBS	COUNTRY	ASSETS	RE	EQ	YEAR	GNPP	INCOME BEFORE TAX
99	SPAIN	2754.15	150	76	74	1.96	376.17
100	SPAIN	4668.46	59	92	76	2.92	329.40
101	SPAIN	7064.12	92	-48	80	5.40	581.10
102	SPAIN	8344.32	-283	232	82	5.43	569.62
103	SWEDEN	1010.89	-11	95	68	2.92	62.81
104	SWEDEN	1677.27	29	-21	72	4.48	145.73
105	SWEDEN	2303.49	95	-30	74	6.72	336.09
106	SWEDEN	2985.36	18	3	76	8.67	346.00
107	SWEDEN	3964.94	149	-25	80	13.59	397.50
108	SWEDEN	3046.28	-91	114	82	14.04	255.29
109	SWIZER	3308.06	102	-91	68	2.70	291.10
110	SWIZER	5596.94	146	-257	72	3.94	560.03
111	SWIZER	7045.78	380	-14	74	6.65	1033.30
112	SWIZER	8618.40	480	-386	76	8.88	1084.97
113	SWIZER	17175.64	1286	-247	80	16.44	2186.52
114	SWIZER	18110.93	1012	-310	82	17.01	1790.91
115	UK	12180.34	208	167	68	1.89	1156.06
116	UK	20350.11	490	-510	72	2.60	2613.73
117	UK	27518.79	528	-164	74	3.36	2190.51
118	UK	33443.35	311	1091	76	4.02	2221.46
119	UK	75916.89	2452	2129	80	7.92	9540.78
120	UK	83330.07	305	815	82	9.66	9344.47
121	VENEZ	1382.36	56	-80	68	1.00	142.22
122	VENEZ	1879.24	58	-123	72	1.26	231.01
123	VENEZ	2611.92	88	-455	74	1.71	248.05
124	VENEZ	2877.99	121	-616	76	2.57	355.19
125	VENEZ	4588.31	58	13	80	3.63	538.50
126	VENEZ	5292.61	227	-129	82	4.14	624.86
127	WGERMAN	7256.80	49	187	68	2.19	990.44
128	WGERMAN	13301.64	381	277	72	3.39	1733.31
129	WGERMAN	20322.84	306	-236	74	5.89	2082.73
130	WGERMAN	29397.02	1271	-843	76	7.38	3736.48
131	WGERMAN	46131.11	571	1072	80	13.59	5749.51
132	WGERMAN	45908.93	228	-151	82	12.46	3568.51

VITA

Xiaohong He was born in Beijing, China, on May 15, 1953, the daughter of Chohbao Li and Dongchang He. She completed her work at the Qinghau University's Affiliated Middle School, Beijing, China, in 1969. Later, she entered Jilin Industrial University, Changchuan, China, in 1973, where she graduated with a degree of Bachelor of Science, in mechanical engineering in 1977. During the following eight years she was employed as an engineer and a researcher in China's National Academy of Mechanization Sciences. In May, 1985, she entered the Graduate School of the University of Texas at Dallas, where she received her M.A. and M.S. degrees. In 1981, she married Ping Su. They have one son, Xiaowei Billy Su, born in 1982.