AN ANALYSIS OF CHINA'S TAXATION OF
FOREIGN DIRECT INVESTMENT

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I. INTRODUCTION

EVER since it embarked on its "open policy" in 1979, the People's Republic of China has been drawing increasing attention in the Western business world. Not only has China a gigantic market potential, but it has also ample opportunities for foreign investment with its enormous and largely untapped resources and its vast industrial potential. Foreigners would err were they to see China solely as an easily accessible market for their products. In pursuit of its national economic development plan, China urgently needs to acquire foreign direct investment together with advanced technology. Hence, an appropriate approach foreigners should follow in order to seize the opportunities would be to participate in a process of China's economic development by means of direct investment. Through this they may find satisfactory and mutually beneficial long-run opportunities.

Since 1979, China has made significant economic achievements. During the period from 1980 to 1987, the Chinese economy grew by 8.7 per cent per year, and it was expected to grow at 8.0 per cent in 1988. Foreign direct investment (hereafter referred to as FDI) in China increased rapidly; it amounted to U.S.$916 million in 1983, and increased to U.S.$2,273 million in 1987 [4]. In making decisions on investment in China, her taxation of income from FDI has an important bearing. Furthermore, in order to attract foreign investment, China provides various tax incentives. The tax regulations and the incentive system are complex, and not well understood, and in particular, it appears that no attempt has been made to answer one important question: What is the real tax burden on a marginal investment project undertaken in China by foreign investors? This question may best be addressed by measuring the effective marginal tax rate.

The concept of the effective marginal tax rate (hereafter, simply the effective tax rate) has been widely employed in analyzing domestic tax incentives and in comparing tax systems of advanced Western countries [14] [18] [7]. However, international comparisons of tax systems available in the literature are still in the domestic context; they are comparisons of domestic taxes on domestic investments financed by domestic financiers within each country. They do not provide useful

information for a domestic investor who contemplates foreign investment. What the investor needs is a comparison of taxes which are wedges between the before-tax rate of return on FDI and the after-tax rate of return to domestic savers who finance the foreign project. This involves a number of variables such as the exchange rate, foreign inflation rate, and foreign tax system. These variables are not considered in estimating tax incentives from a domestic perspective.

The objectives of this paper are therefore (a) to extend the concept of the effective tax rate to the taxation of income from FDI in developing countries, (b) to analyze China's taxation on income from FDI, and (c) to apply the concept of the effective tax rate in measuring the effective tax rates on FDI in China.

II. EFFECTIVE TAX RATES ON FOREIGN DIRECT INVESTMENT

In the international context, the tax wedge is by definition the difference between the before-tax (gross) real rate of return on a marginal FDI project and the after-tax real rate of return on domestic savings used in financing the project. The effective tax rate is then defined as the tax wedge divided by the before-tax real rate of return. The effective tax rate thus defined can be written as

$$t_e = \frac{\rho - s}{\rho},\tag{1}$$

where t_e, ρ, and s denote, respectively, the effective tax rate, the before-tax real rate of return on a marginal FDI project, and the after-tax real rate of return on domestic savings.

The total tax wedge can be separated into two components: the corporate tax wedge (including property taxes levied on companies), and the personal tax wedge. These measure the contribution of the corporate and personal tax systems to the total tax wedge. The corporate tax wedge is defined as the difference between the before-tax real rate of return on a marginal FDI project and the after-tax real cost of funds to the corporation. The personal tax wedge is then defined as the difference between the after-tax real cost of funds to the company and the after-tax real rate of return on domestic savings.

The effective tax rate on FDI differs from that on domestic investment. The effective tax rate on domestic investment is usually based on the assumption that the domestic investment is financed by domestic savers, and thus the investment and saving decisions are interdependent through the workings of the capital market. This assumption is justified by a strong positive correlation between domestic savings and investment rates.[1] It appears, however, that there is no systematic relationship between domestic savings and FDI particularly in developing countries such as China. Since developing countries are small actors in the world financial market, changes in investment behavior in one of these countries do not affect the rate of return on savings in the home country or in the world. This in effect

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[1] For the positive correlation between domestic savings and investments, see [13].

separates FDI decisions from domestic saving decisions.[2] The main implication of this separation is that for FDI decisions only foreign taxes are relevant, and personal taxes imposed on domestic savers do not affect FDI. Therefore, the effective tax rate on FDI is concerned only with the corporate tax wedge.

It is assumed that arbitrage takes place at the firm level such that the cost of debt and equity is the same and identical for all firms at the after-corporate-tax interest rate in the home country. This arbitrage assumption implies that the after-tax return to domestic savers will differ across financing sources, and that the before-tax rate of return on FDI projects will differ.[3] Under this assumption, the differences in the effective tax rate on FDI reflect those in the foreign corporate tax system and in the structure of FDI, rather than the differences in financial structure in the home country. It is further assumed that the source of funds of the firm is equity capital.[4] Then, the nominal and real costs of equity and the inflation rate are assumed to be related as $i = r + \pi$ where i, r, and π denote, respectively, the nominal rate of return, the real rate of return on equity capital (or after-corporate-tax interest rate), and the inflation rate. The effective tax rate on income from FDI can then be written as

$$t_e = \frac{\rho - (i - \pi)}{\rho}. \tag{2}$$

The before-tax real rate of return on investment, ρ, is the well-known user cost of capital less economic depreciation. In the context of FDI, the user cost of capital involves complex problems that are not shared in a domestic context. Since the foreign tax structure applies to monetary values denominated in foreign currency, cash flows are first measured in foreign currency, then converted into home currency at an appropriate exchange rate.[5]

Cash flows for the investor depend on the total amount of taxes and not on which government collects the taxes. Since there are tax treaties between two countries in most cases by which foreign taxes paid are credited against domestic taxes, the relevant tax rate, as far as the investor is concerned, is the higher of the home country and foreign rates. In reality, however, taxes are often reduced to the level below the higher rate through appropriate choices of transfer prices, royalty pay-

[2] The literature on FDI in developing countries do not in general include domestic savings as a determinant of FDI, indicating non-existence of correlation between FDI and domestic savings. For this, see [21]. The separation of the corporate and personal tax wedge will also be appropriate for a country in its domestic context if the country is small in the international capital market and capital moves freely across its border. For this, see [8].

[3] This arbitrage assumption is similar to the one adopted by Bradford and Fullerton [9].

[4] This assumption may be supported by a finding of a survey by the U.S. Department of Commerce which indicates that 60 per cent of FDI is financed by internally generated funds, and almost all the rest of funds is relied on intercompany credit. This survey is cited in [21]. This supports the assumption that the cost of finance is the same regardless of its source, because, if otherwise, only one of the sources would have been relied on.

[5] The rental receipts of capital can be seen either from the perspective of the investor's home country or from that of the foreign country where the project located. Adler [1] convincingly argues for the former which is adopted by the present study.

ments, and so on. These techniques can be used to move income from high-tax countries to low-tax countries, thereby reducing overall corporate taxes. In addition, the tax payments to the home country may be deferred by leaving remittable income abroad, as under the U.S. tax system. Since the emphasis of this study is on a measurement of China's tax burden on FDI, the tax rate for this study is assumed to be China's tax rate.

As a type of tax incentive for FDI, developing countries including China provide tax-holidays for a number of years. Depreciation for projects abroad may be allowed for corporate taxes of the home country as well as for foreign taxes. It is assumed, however, that depreciation for FDI is allowed only for foreign taxes. In addition to the corporate income tax there are in general multiple tiers of taxation of income from FDI in developing countries, of which property tax is an important one. Combining these special features involved in FDI, the cost of capital and the effective tax rate are developed as follows.

The acquisition cost and the rental price of capital are denoted as, respectively, q and c, both of which are denominated in foreign currency. The exchange rate, S_t, is measured by "the direct quote" which indicates the domestic currency price of one unit of foreign currency. It is assumed that the exchange rate of the domestic currency appreciates over time at rate m, so that at time t, $S_t = Se^{-mt}$. It is also assumed that the rental price increases over time by the foreign exponential rate, δ, thereby the rental price declining at the depreciation rate. Thus, at time t, the rental price before taxes converted into home currency equals $Sce^{-(m+\delta-p)t}$.

With regard to the foreign tax system, it is assumed that depreciation deductions for tax purposes are allowed on a historical cost basis by the straight line method. No investment tax credit is provided. Tax holidays are provided for the first n years, and finally the foreign corporate tax rate is denoted as u. Property taxes are levied by the local government on land and buildings but not on machinery. The property tax paid is deductible in computing the corporate income tax. Finally, since the source of funds is assumed to be equity capital yielding the after-tax market interest rate, that rate in the home country, i, measured in nominal terms, is the discount rate.

In equilibrium, then, the present value of nominal rental receipts from a unit of capital investment undertaken in a foreign country must be equal to the initial acquisition cost. This can be written as

$$Sq = \int_0^n Sce^{-gt}dt + \int_n^\infty (1-u)Sce^{-gt}dt + uSqZ - (1-u)SqK, \qquad (3)$$

where $g = m + \delta + i - p$, Z and K denote, respectively, the present value of tax-depreciations and property taxes of a unit of capital, and u denotes the corporate income tax rate. The first term on the right hand side of equation (3) shows the present value of before-tax rental receipts converted into home currency during the tax-holiday period, n. The second term shows the present value, as of year zero, of after-tax rental receipts during the post-tax-holiday period. The third term shows the present value of tax savings from depreciation deductions converted into home currency. The last term shows the present value of the property tax net of corporate tax savings.

Explicit integration of equation (3) leads to a relationship among the rental rate of capital, c/q; the tax parameters, u and n; the discount rate, i; the foreign inflation rates, p; the rate of changes in the exchange rate, m; and the economic depreciation rate, δ, as shown by equation (4).

$$\frac{c}{q} = \frac{g}{1-ue^{-gn}}[1+uZ+(1-u)K].$$ (4)

As indicated above, $\rho = c/q - \delta$. Finally, the effective tax rate on FDI can be rewritten as

$$t_e = \frac{c/q - \delta - i + \pi}{c/q - \delta}.$$ (5)

This is the form used in measuring the effective tax rate on FDI undertaken in China. As the rental rate of capital and economic depreciation are different from asset to asset, the effective tax rate will differ by type of asset. However, the present study will limit the measurements of effective tax rates only to two broad categories of assets: machinery and buildings. It should be noted from equation (4) that the before-tax rate of return, ρ is in effect the required rate of return on the marginal asset, which is in turn determined by the tax parameters together with other economic variables. Therefore, a country with a higher effective tax rate requires a higher rate of return. As a result, the incentive to invest in that country declines accordingly.

III. CHINA'S TAXATION OF FOREIGN DIRECT INVESTMENT

China's modernization program and its open-door policy were initiated in 1979 with the proclamation of its first economic law, the Law on Sino-Foreign Joint Venture [15]. As late as 1978, China had virtually neither formal laws governing the way of operation of foreign entities in its territory nor foreign investment. Since 1979, China has promulgated more than 60 laws and regulations on foreign economic relations. In addition, there are many domestic economic laws containing factors relating to foreign countries. If this part is included, China has published over 160 laws and regulations concerning foreign economic relations [15]. The sheer number of these laws and regulations enacted during such a short period of time is obviously indicative of the complexities involved in business operation by foreign investors. What is worse is that the high level of sophistication exhibited by the central planner and drafters of the new legislation is often not matched by local functionaries who must interpret and implement that legislation. In China, individual provinces, Special Economic Zones, and open coastal cities have a significant extent of autonomy and discretion, and they compete each other in inducing foreign investment. Therefore, the interpretations of laws and regulations are likely to vary widely among different districts, and there are certainly many vexing problems and uncertainties in the area of tax legislation in China. Nontheless, it is sufficiently developed to warrant proper tax planning on the part of prospective foreign investors. The nature and extent of the taxes imposed on income from FDI depend on its mode and location of operation in China. There are three basic forms of

TABLE I

SOME CHARACTERISTICS OF CHINA-FOREIGN JOINT VENTURES

		1985	1986
1.	Total foreign share of investment (U.S.$ mill.)	633	403
2.	FDI by mode of operation (% of the total)		
	Equity joint venture	49.2 (34.7)	50.3
	Cooperative joint venture	49.7 (63.3)	49.7
	Wholly foreign-owned enterprise	1.1 (2.0)	0.7
3.	Proportion of investment in special economic zones and coastal cities	67.0	55.5
4.	Sources of foreign investment		
	Hong Kong, Macao (% of total)	65.3	51.1
	U.S.A. (% of total)	18.2	18.6
	Japan (% of total)	7.3	7.4
5.	Average duration (years)	12.7	13.3
6.	Proportion of projects with 10 year duration (%)	53.8	42.2
7.	Average foreign investment per project (U.S.$1,000)	1,391	887

Sources: [12, 1986 and 1987 editions].
Note: The figures in brackets are those for 1984.

investment in China by foreign enterprises: (1) an equity joint venture, (2) a co-operative (also known as contractual) joint venture, and (3) a wholly foreign-owned enterprise.

For the equity joint venture, foreign enterprises and Chinese economic organizations contribute equity to a new limited company. It is the company that becomes the taxpayer, rather than the Chinese and foreign partners individually. The investment by the foreign participant in an equity joint venture must not be less than 25 per cent of the total capital contribution, and the percentage generally ranges from 25 per cent to 50 per cent. The profit from the company is shared in proportion to the equity ratio. A joint venture (for both equity and cooperative) does not have perpetual existence. Its business license is granted for a term agreed to by the parties, usually ten to thirty years. Investment in an equity joint venture (not so for cooperative) cannot be repaid during the life of the venture.

The cooperative joint venture between a foreign party and Chinese economic organizations does not take the form of a limited liability company. The two participants remain completely separate in a corporate sense, have no equity share in the venture, divide proceeds strictly according to contract rather than on the basis of equity ratio, and pay income taxes separately. Under the cooperative joint venture contracts, the foreign partner usually contributes capital, technology, and equipment, and the Chinese partner contributes land, natural resources, labor, buildings, and so on. This structure makes the most of the advantages possessed by each partner, and is regarded as being much more flexible. Governed by contract and not by a legal code, it does not require articles of association and is not subject to legislative rules governing boards of directors. The wholly foreign-owned enter-

TABLE II
CHINA'S TAX STRUCTURE

	Joint Venture Tax (Equity Joint Venture)	Foreign Enterprise Tax (Cooperative Joint Ventures and Wholly Foreign Owned Enterprises)
1. Tax payer: (with establishment)	the company	each partner separately
2. Depreciation:	straight line method on the original cost less 10% thereof	the same as joint venture tax
3. Loss carryover:	5 years	the same as joint venture tax
4. Capital gains:	ordinary income	the same as joint venture tax
5. Tax rate:	a flat rate of 30%	a progressive scale from 20% to 40%
6. Local tax:	10% of the income tax	10% of taxable income
7. Withholding tax on repatriated profit:	10%	none

prise is a limited company with equity investment solely from foreign entities. It offers the investor the advantage of autonomy, but restrictions may be imposed on where it can be located.

In the past, the most popular form of FDI in China was the cooperative joint venture. Recently, however, its relative importance has been declining, while that of the equity joint venture has been increasing. As a result, during the 1984–86 period, the proportion of FDI in China, in terms of FDI amounts, for cooperative joint ventures decreased from 63.3 per cent to 49.7 per cent, while that for equity joint ventures increased from 34.7 per cent to 50.3 per cent (Table I). The wholly foreign-owned enterprises accounted for an insignificant portion. Another aspect of FDI in China is that the majority of them are located within four special economic zones or fourteen open coastal cities. Table I shows that FDI in those areas accounts for 67.0 per cent and 55.5 per cent of the total in 1985 and 1986 respectively. Finally, the average duration of FDI projects during the 1985–86 period was about thirteen years, and in particular FDI projects with ten years of duration accounted for about half the total investment.

The tax rules are significantly different for the equity joint venture, the cooperative joint venture, and the wholly foreign-owned enterprises as shown in Table II.[6] The equity joint venture is governed by the Joint Venture Income Tax and the remaining two are governed by the Foreign Enterprise Income Tax. The basic income tax rate for the equity joint venture is 30 per cent. A surtax of 10 per cent

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6 The structure of China's taxation of FDI draws on [6] [2] [10] [3] and information obtained through personal interviews with numerous tax officers at the central as well as provincial governments of China conducted by the author during the summer of 1987.

of the basic tax payable is levied by local authorities in the region in which the joint venture is located. If the foreign participant repatriates its share of profits, a 10 per cent withholding tax is also levied on the profit remitted. Thus, if the foreign participant remits all profits home, the overall tax rate becomes 39.7 per cent. Capital gains in China are treated as ordinary income and subject to tax in the same way as other income. An equity joint venture can depreciate its fixed assets on the straight line method, after deducting a 10 per cent residual value from the original value of the assets. A minimum useful life is stipulated for specified assets as follows:

(i)   buildings .... 20 years
(ii)   trains, ships, machines, equipment, and
       other apparatus for production purposes .... 10 years
(iii) electronic equipment and means of
       transport other than trains and ships .... 5 years

For other assets, the useful life has not been specified. For the present study, twenty years for buildings and ten years for machinery will be used.

As indicated in Table II, cooperative joint ventures are taxed according to a five-stage progressive system ranging from 20 to 40 per cent. In addition to the basic tax, a local income tax of 10 per cent is levied against the original taxable income of a cooperative joint venture. Thus, the real tax rate ranges from 30 per cent to 50 per cent. No withholding tax is payable on repatriated profits. Depreciation for cooperative joint ventures is identical to that stipulated for equity joint ventures. For any form of joint venture, the local real estate tax is levied on the owner of real estate or the user of the property on behalf of the owner. The tax is levied on the value or rent of land and building without distinguishing between them. It is typically computed at the rate of 1.2 per cent of a property's "residual value" or at 12 per cent of the rental income. The residual value is deemed to be the original cost less 30 per cent of the original cost.

Various forms of special incentives are then provided for FDI, depending on the mode and location of its operation as shown in Table III. Equity joint ventures scheduled to operate for a period of at least ten years can be exempted from income tax for their first two profit-making years, and can receive a 50 per cent tax reduction for each of the following three years. The tax holiday and reduction provisions are in practice virtually automatic. A profit-making year is defined as a year in which an equity joint venture earns a profit after its losses of up to five preceding years. If an equity joint venture engages in a low-profit operation such as farming or forestry, or participate in a project located in an economically underdeveloped (remote) area, it can receive a reduction in its tax rate ranging from 15 to 30 per cent for an additional period of ten years, following the expiration of the five-year tax reduction period. If profits after tax are reinvested, 40 per cent of taxes paid are refunded. Finally, local authorities have discretion to exempt local taxes.

If an equity joint venture is designated as an export enterprise, by exporting at least 70 per cent of its product or advanced technology enterprise, additional incentives are provided. First, the period of 50 per cent tax reduction following

TABLE III

CHINA'S TAX INCENTIVES

A. Tax Incentives (General)

		Joint Venture Tax	Foreign Enterprise Tax
1. Tax holidays and tax reduction (with at least 10 years of operation)	(a)	first 2 years of tax holiday and 50% reduction for next 3 years	(a) none in general; only for low-profit operations 1 year tax holiday and 50% reduction for next 2 years
	(b)	for low-profit operations 15–30% reduction for additional 10 years	(b) the same as joint venture tax
2. Export enterprise	(a)	2 years tax holiday plus 50% reduction for an indefinite period	(a) the same as joint venture tax
	(b)	no withholding tax	(b) none
3. Advanced technology enterprise	(a)	2 years tax holiday plus 50% reduction for next 6 years	(a) the same as joint venture tax
	(b)	no withholding tax	(b) none
4. Reinvestment of profits (for at least 5 years)	(a)	40% of taxes paid refunded in general	(a) the same as joint venture tax
	(b)	100% refund for export and advanced technology enterprise	(b) the same as joint venture tax
5. Local taxes	(a)	may be exempt	

B. Special Incentives for Any Foreign Enterprises Located in Special Economic Zones or in Economic and Technological Development Zones of Coastal Cities

1. Tax rate: a flat rate of 15%.
2. Tax holidays and tax reduction: two years and 50% reduction for next 3 years for investment in industry, transport, farming, forestry, and livestock breeding.
3. Withholding tax: none.
4. Reinvestment of profit: the same as the general incentives.
5. Export enterprise: a flat tax rate of 10% plus general incentives.
6. Advanced technology enterprise: a flat tax rate of 15% plus general incentives.
7. Local taxes: may be exempt.

the two-year tax holiday extends indefinitely for an export enterprise and to six years for an advanced technology enterprise. Second, no withholding tax is imposed on repatriated profit. Finally, for reinvested profits, taxes paid will be fully refunded.

Tax incentives for cooperative joint ventures are less generous than those for equity joint ventures. The two-year tax holiday and 50 per cent tax reduction are

not available in general for cooperative joint ventures. If, however, they are engaged in low-profit operations, one year of tax holiday and 50 per cent tax reduction for the next two years are provided. In addition, they may also have 15 per cent to 30 per cent tax reduction for additional ten years. Therefore, the tax advantage of the equity joint venture over the cooperative joint venture appear so substantial as to render the latter unattractive. This has not been the case, however, for two reasons. First, as mentioned earlier, the cooperative joint venture is regarded in many ways more flexible than the equity joint venture. Second, as shown in Table III, if FDI is located within one of the special economic zones or open coastal cities, or it is engaged in export or advanced technology enterprises, tax incentives are virtually the same.

For FDI located within a special economic zone or the economic and technological development zones of the fourteen coastal cities, a new set of tax incentives are provided equally for both equity and cooperative joint ventures. The basic tax rate becomes 15 per cent, and no withholding tax is imposed. In case FDI is undertaken in industry, transport, farming, forestry, and lifestock breeding, two-year tax holidays and 50 per cent tax reduction for the next three years are provided. If a joint venture is qualified as an export enterprise, the basic rate reduces further to 10 per cent together with other general incentives mentioned above. In most cases, the local surtax of 10 per cent is not levied.[7]

For the present study, effective tax rates will be measured for three different cases: (a) an equity joint venture which is scheduled to operate for more than ten years but eligible only for the incentive of two-year tax holiday and 50 per cent tax reduction for the next three years; (b) a cooperative joint venture scheduled to operate for more than ten years but not eligible for tax incentives; and (c) a joint venture located within a special economic zone or coastal city and qualified for an export enterprise. The tax parameters and their values are shown in Table IV. The cooperative joint venture is taxed on a progressive scale ranging from 30 per cent to 50 per cent depending on the level of taxable income. The statutory tax rate which is relevant for the effective tax rate is the additional tax on profits resulting from a dollar of marginal investment. In view of the relatively small size of FDI (Table I), the statutory rate of 40 per cent chosen for this study may well be an overestimate.

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[7] It should be noted that each of the special economic zones and open coastal cities is divided into the Special Development Zone (SDZ) and its old city limit, and in order to obtain the incentives of locating in these areas, an investment must be located within the SDZ. Where an investment is located in one of the old city areas, the same broad scope of concessions is not available. However, the 15 per cent overall tax rate is still available for an investment in the old city area regardless of the form of its operation if any one of the following conditions is met: (a) the project is technology-intensive, (b) the foreign investment exceeds U.S.$30 million, and (c) the investment is in an energy, communication, or port development project. However, even if the investment cannot qualify under one of the above for the 15 per cent overall tax rate, it may still receive a 20 per cent reduction of the tax otherwise applicable under the normal tax laws if it falls within a list of 16 different industries approved by the Ministry of Finance. For these industries, see [2]. Tax incentives regarding the old city areas are not explicitly dealt with by this study.

TABLE IV

VALUES OF TAX PARAMETERS

	Equity Joint Venture	Cooperative Joint Venture	Joint Venture with Full Incentives
Basic tax rate	0.300	0.400	0.100
Local taxes	0.030	0.100	0
Withholding tax	0.100	0	0
Total statutory tax rate	0.397	0.50	0.100
Tax holidays (years)	2	0	2
50% tax reduction (years)	3	0	indefinite
Depreciation rate			
Machinery	0.100	0.100	0.100
Buildings	0.050	0.050	0.050
Property tax rate	0.012	0.012	0.012

IV. ESTIMATES OF EFFECTIVE TAX RATES

In addition to those tax parameters examined in the preceding section, the values of the remaining variables entering into equations (4) and (5) are required in order to compute effective tax rates. First, the expected inflation rates for China and a home country are required. The United States will be regarded as the home country. Based on the current trends of inflation rates, the expected annual inflation rates for China and the United States are assumed to be, respectively, 5.0 per cent and 4.0 per cent, as shown in Table V.[8] Recently, the U.S. dollar has been appreciating against the Chinese currency (yuan). Based on this, it is assumed that the exchange rate, as the domestic currency price of one unit of foreign currency, is assumed to decrease by 1.0 per cent per year against China.[9]

Economic depreciation rates for fixed assets are not available for China. Hall [16] used a 10 per cent exponential rate for equipment and a 3 per cent exponential rate for structure.[10] In the absence of any other reliable sources, the present

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[8] For the period for 1982 to 1987, the consumer price indexes increased by 3.3 per cent, and 5.3 per cent, respectively, in the United States and China [19] [5].

[9] Since China embarked on its open-door policy, the Chinese currency has been gradually depreciating against the U.S. dollars. For instance, for the 1982–87 period, it depreciated by 14.1 per cent per year [5]. It appears that the trends of depreciation of the Chinese currency will maintain for a while. It should be noted that the change in the exchange rates assumed by this study is much lower than the recent actual changes. This is done so because the concept of the effective tax rate is based on a much longer perspective. Although the assumed exchange rate change and inflation rate are consistent with the purchasing power parity condition of the exchange rate, it appears to be difficult to endorse the condition particularly with the Chinese economies at the present time.

[10] It appears that the depreciation rates used by Hall [16] are based on Hulten and Wykoff [17] who estimated economic depreciation through the changes in market price with age observed in second-hand markets of used capital goods. In Canada, Kwon [20] found that corporations in Canada use a 15.2 per cent for machinery and 5.5 per cent for buildings

TABLE V

VALUES OF OTHER VARIABLES

Variable	Symbols	China	U.S.A.
Inflation rates	p & π	0.05	0.04
Changes in exchange rate (U.S.$/yuan)	m	−0.01	—
Discount rate			
Nominal rate	i	—	0.10
Real rate	r	—	0.06
Economic depreciation	δ		
Machinery		0.10	0.10
Buildings		0.03	0.03

study assumes that machinery depreciates at a constant exponential rate of 10 per cent, and buildings at 3 per cent, as shown in Table V.

It remains to specify the interest rate in the home country (the United States). Because of variation of the interest rate by the terms of debt, by firms, and even by type of asset, numerous studies simply select arbitrary interest rates.[11] Hall chose an assumed real after-corporate-tax interest rate of 4 per cent which is subscribed by the present study. This rate, however, may have to be adjusted. Hall used the above interest rate in computing effective tax rates which are in turn based on the required return on capital in the context of risk-free environment in the United States. However, it is likely that here is some risk associated with foreign investment which is not explicitly faced with domestic investment because of exchange rate changes and uncertain foreign political events. This additional risk may be taken into account through upward adjustment of the discount rate. In view of these, it is assumed for this study that the after-corporate-tax real interest rate is 6 per cent, and thus 10 per cent is used as the discount rate (Table V).

China does not provide investment tax credit. It levies property taxes on land and buildings, and machinery is exempt from such taxes. The property tax is 1.2 per cent of the property's residual value of buildings which is 70 per cent of the original value. It appears that the base of the property tax remains fixed at the residual value. Since the life of buildings is stipulated to be twenty years, it is assumed that the property tax base remains fixed for twenty years. The property tax is deductible for income tax purposes, and it is assumed that the property tax is not eligible for the two-year tax holiday, although it depends on regions. Thus, the present value of China's property tax on a dollar of building (K) net of income taxes is shown as

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as the depreciation rates for their bookings. Boadway, Bruce and Mintz [8] estimated depreciation rates of machinery and buildings in Canada, respectively, as 14.7 per cent and 4.1 per cent.

[11] Boadway, Bruce and Mintz [8] used estimated rates based on observed interest rates in Canada rather than assumed rates. The effective tax rate based on actual interest rates would of course be better applicable to the marginal investment projects than the effective tax rate based on arbitrarily selected rates. The issue is how accurately the interest rate would be estimated.

TABLE VI

PRESENT VALUES OF PROPERTY TAXES NET OF INCOME TAXES AND
TAX SAVINGS FROM TAX DEPRECIATION

	Equity Joint Venture	Cooperative Joint Venture	Joint Venture with Full Incentives
Present value of property tax $((1-u)K)$	0.048	0.034	0.063
Present value of tax saving from depreciation (uZ)			
Machinery	0.121	0.273	0.018
Buildings	0.097	0.182	0.014

$$(1-u)K = \int_0^{20} w(1-u)(0.7)e^{-ft}dt = \frac{w(1-u)(0.7)(1-e^{-f20})}{f}, \qquad (6)$$

where $f = m + i$, and w denotes the property tax rate. It should be noted that the tax rate (u) changes over time when the tax holiday and tax reduction take place. The present values of the property tax, net of corporate tax savings, on a dollar of building in China are estimated to be 0.048, 0.034, and 0.063, respectively, for the equity and cooperative joint ventures, and the venture with the full incentives (Table VI).

In China, depreciation for tax purposes is based on the straight line method, with a deduction of the residual value which is 10 per cent of the original value. Therefore, the present value of tax savings from depreciation deductions (uZ) can be written as

$$uZ = \int_0^L \frac{0.9ue^{-ft}dt}{L} = \frac{0.9u(1-e^{-fL})}{Lf}, \qquad (7)$$

where L is the useful life of an asset. It should be noted that a company must take depreciation during the tax holiday period, because the tax holiday takes place during the profit making years after depreciation. Hence, the tax rate in equation (7) becomes zero during the tax holiday period, and it also changes over time during the tax reduction period. Estimates of the present values of tax savings from depreciation deductions (uZ) are shown in Table VI.

Now that all the required parameters and their values are specified, calculations of effective tax rates are straightforward. Table VII shows estimated effective tax rates for an equity joint venture with two-year tax holidays and 50 per cent tax reduction for the next three years, a cooperative joint venture, and a joint venture located in a special economic zone or in a coastal city and qualified as an export enterprise. For machinery, they are, respectively, 31.3 per cent, 54.8 per cent, and 4.8 per cent, and they are 30.7 per cent, 48.8 per cent and 4.2 per cent for buildings exclusive of the property tax. Although tax savings from depreciation of machinery are higher than those of buildings, the effective tax rates for machinery are higher than those for buildings particularly for the cooperative joint venture. This is so

TABLE VII

Estimates of Effective Tax Rates for Three
Different Cases

(%)

	Equity Joint Venture	Cooperative Joint Venture	Joint Venture with Full Incentives
Machinery	31.3	54.8	4.8
Buildings (without property tax)	30.7	48.8	4.2
Buildings (with property tax)	34.7	51.3	12.4
Weighted average (without property tax)	3.1	52.8	4.6

because the relative extent of economic depreciation as compared to tax deprecia-
tion is higher for machinery than for buildings. As indicated by equation (3),
economic depreciation decreases annual rental receipts over time. This raises the
rental rate of capital (c/q), thereby increasing the effective tax rate. So does the
tax rate. As a result, the relatively high economic depreciation of machinery raises
its effective tax rate particularly for the cooperative joint venture which is subject
to the highest tax rate.

The capital structure in China is not available. It is assumed that the capital
stock component of machinery is about twice as high as that of buildings.[12] Based
on this, weighted average effective tax rates excluding the property tax are estimated
to be 31.1 per cent, 52.8 per cent, and 4.6 per cent, respectively, for the equity
joint venture, the cooperative joint venture, and the joint venture with full incentives.
The estimated effective tax rate for the cooperative joint venture is close to its
statutory tax rate. This indicates that tax incentives are in the form of tax exemp-
tion or reduction (or tax rates) and not in the form of generous tax depreciation.
For the equity joint venture, the two-year tax holiday and 50 per cent tax reduction
significantly decrease its effective tax rate to 31.1 per cent. To take advantage of
this incentive, the joint venture must have at least ten years of contract duration.
This may explain why almost all of joint ventures have contract durations of ten
years or more (Table I). Certainly, tax incentives for a joint venture located in a
special economic zone or in a coastal city and qualified as an export enterprise are
quite generous. This may explain why more than half of FDI are located within
those areas (Table I).[13]

[12] For the overall manufacturing industry in Canada, machinery accounts for 51 per cent of
corporate capital stock, while buildings 26 per cent, so that the weight for machinery is
about twice as high as that for buildings [11]. In Korea, according to the composition of
gross capital formation, the proportion of investment in machinery has continuously been
about as high as that in non-residential buildings [19]. This may indicate that capital stock
component of machinery is also about twice as high as that for buildings in Korea.

[13] It should be noted that the above concept of effective tax rate and the estimates thereof
are based on an assumption of the perfect loss offset system under taxation. In practice,
however, tax systems including the Chinese system fall short of such an ideal system. Since
various influences of imperfect loss offsetting work in opposite directions, it is difficult to
say a priori whether or not imperfect loss offsetting raises or reduces effective tax rates.
For this, see [7].

TABLE VIII

SENSITIVITY OF EFFECTIVE TAX RATES TO ALTERNATIVE ASSUMPTIONS

(%)

	Equity Joint Venture	Cooperative Joint Venture	Venture with Full Incentives
A. Increase in the inflation rates			
Machinery	34.2	57.9	5.2
Buildings (no property tax)	35.1	51.1	4.6
Weighed average	44.5	55.6	5.0
B. Change in the exchange rate			
Machinery	45.6	64.6	28.0
Buildings (no property tax)	46.2	61.2	27.9
Weighted average	45.8	63.5	28.0

As indicated in Table VII, the property tax has substantial effects on the effective tax rate. It is interesting to note that the extents of increases in the effective tax rates due to the property tax are not all the same for the three cases. This indicates that the effective tax rate depends nonlinearly on the variables involved.

1. *Effects of the inflation rate*

The effective tax rate depends on the present values of depreciation allowances, tax exemptions, and property taxes, which depend nonlinearly on the discount rate (the real interest rate plus the inflation rate) and the exchange rate. For this reason, there is no such number as the effective tax rate; different estimates will be obtained with different discount and exchange rates. It is thus necessary to investigate the sensitivity of the effective tax rate to different values of these rates. The present study will limit the analysis to the effects of inflation and exchange rates in the absence of the property tax.

Inflation is an important determinant of the effective tax rate because income from FDI in China is not indexed for its inflation-induced component. However, the inflation effect on the effective tax rate cannot be determined a priori. In a domestic context, it affects the real values of depreciation allowances, tax exemption, property taxes, and the discount rate. In the international context, the inflation effect is further ambiguous because inflation may affect the exchange rate which in turn affects the effective tax rate. Therefore, in order to understand the inflation effect, an experiment is carried out by increasing the inflation rates of the two countries by 3 percentage points each, maintaining the real interest rate, and thereby increasing the nominal discount rate to 13 per cent. The exchange rate is kept unchanged in order to isolate out the inflation effect alone.

The results are shown in Table VIII.A. For both machinery and buildings the effective tax rates increase substantially. This is attributable to decreases in the present value of tax depreciations because depreciations are based on the historical cost. The decreases in the present value of tax depreciation resulting from an increase in the discount rate (inflation rate) will be higher for assets of longer life. Thus, the effective tax rates for buildings increased more than those for machinery.

2. *Effects of exchange rates*

There are four separate effects of the exchange rate that operate in the model of this study. First, in case the domestic currency (U.S. dollar) appreciates against the foreign (Chinese) currency, for example, the present value of property taxes, as converted into domestic currency, will decrease, thereby decreasing the effective tax rate. Second, appreciation of the domestic currency will also decrease the present value of depreciation allowances, and this will increase the effective tax rate. Third, tax benefits arising from tax exemptions during the tax holiday period will decrease, thereby increasing the effective tax rate. Fourth, as indicated by equation (3), appreciation of the domestic currency will decrease annual rental receipts over time. Hence, the rental rate of capital will increase, and this will increase the effective tax rate. Therefore, it is impossible to determine a priori the net effect of the exchange rate. In the absence of the property tax, of course, the effective tax rate will increase. In order to measure the sensitivity of the effective tax rate to changes in the exchange rate, an experiment was carried out with annual appreciation of the home currency (U.S. dollar) against the Chinese currency by 3 per cent, maintaining the inflation rates of the two countries at their original rates. The inflation rates are kept unchanged in order to isolate out the effect of exchange rate changes alone.

The results of the sensitivity analysis are shown in Table VIII.B. Appreciation of domestic currency raised the effective tax rates for both machinery and buildings in China substantially. The weighted average tax rates increased from 31.1 per cent to 45.8 per cent for the equity joint venture, from 52.8 per cent to 63.5 per cent for the cooperative joint venture, and from 4.6 per cent to 28.0 per cent for the joint venture located in a special economic zone or in a coastal city and qualified as an export enterprise. Large magnitudes of changes in the effective tax rates resulting from exchange rate changes indicate that the effective tax rates are highly sensitive to the exchange rate.

V. SUMMARY AND CONCLUSION

An attempt has been made to analyze China's taxation of income from FDI and measure its effective tax burden on the marginal FDI project. For this purpose, the concept of the effective tax rate was extended to the international context, and taking into account the typical structure of taxation of income from FDI in developing countries including China, a model has been developed for the effective tax rate on FDI.

Some salient characteristics of China-foreign joint ventures were presented, and China's tax system on income from FDI was analyzed in a systematic form. The nature and extent of the tax on FDI depends on the form of joint venture associated with FDI and on its location in China. There are in essence three different tax rules for three different forms of FDI, and special incentives are provided for FDI located in special areas and qualified as special industries. The typical form of tax incentive is a low tax rate together with tax holidays.

Effective tax rates were then estimated for machinery and buildings of three different operations: (a) an equity joint venture qualified for the two-year tax holiday and 50 per cent tax reduction for the next three years; (b) a cooperative joint venture not eligible for any tax incentives; and (c) a joint venture of any form located in a special economic zone or in an economic and technological development zone of the coastal cities, qualified as an export enterprise, and thus eligible for the two-year tax holiday together with 5.0 per cent overall tax rate thereafter. Weighted average effective tax rates of the above three cases exclusive of the property tax were, respectively, 31.1 per cent, 52.8 per cent, and 4.6 per cent. This indicates that effective tax burden on new FDI is remarkably different depending on the mode and location of FDI. It appears that foreign investments in China have attempted to take advantage of tax concessions by selecting their modes and locations of operations required for tax incentives. The property tax has also an important bearing on the effective tax rates.

A sensitivity analysis of the effective tax rate was undertaken with different values for inflation and exchange rates. It was found that the effective tax rates are quite sensitive to inflation and particularly to the exchange rate. Depreciation of the foreign currency increases the effective tax rate, indicating the importance of the exchange rate in estimating the effective tax rate on FDI. If the recent trend of the exchange rate of the Chinese currencies continues, and it depreciates by the recent extents, the effective tax rate on FDI in China will increase substantially.

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