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FDI-An APV Treatment

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Foreign Direct Investment (FDI) involves cross border cash flows bringing a host of additional factors into the capital budgeting scenario that make it rather complicated case of investment evaluation. This requires a detailed and comprehensive scenario analysis for identifying the financial flows emerging out of such interactions. It, at the same time, necessitates the consideration of FDI as a special case of investment analysis and should not be subjected to a one-point treatment style of traditional discounted cash flow techniques. It calls for the development of an FDI investment evaluation approach that can take care of all the conventional as well non-conventional factors bearing upon such a project. The FDI evaluation model based on value additivity principle proposed in this article is considered to be better than conventional approaches in bringing out the component values and their treatment in the FDI analysis from a variety of aspects e.g. treatment of cash flows, the adjustment of additional risk factors and translation factors. The Adjusted Present Value approach on which the treatment of FDI is based in this article is considered to be more comprehensive and advantageous to the current approaches to the FDI evaluation.

1. Introduction

Foreign Direct Investment (FDI) is across-border acquisition of physical assets with final control of managerial operations being exerted from the parent company carrying out such overseas investments. It may be in the form of:

- Acquisition of overseas plant and equipment,
- Establishing overseas subsidiaries to carry out local production or service facilities
- Extension or restructuring of existing overseas facilities requiring parent company flows.

FDI involves cross border cash flows bringing a host of additional factors into the capital budgeting scenario that make it rather complicated case of investment evaluation. There can be numerous grounds that give rise to additional relevant financial variables, but at the same time it will not be out of place if it is said that such differences mostly emerge out of the following ma-

jor factors :

i . Conflicting or parallel international laws

ii . Form of financing entailing international projects and

iii . Cash flow restrictions

An investor investing internationally is subject to two sets of laws that are not necessarily in harmony with each other. A set of home-taxation laws comes before the investment is taken up subject to the laws of the country in which the investment is proposed. It is equally likely to get tax credit for withholding taxes paid overseas as is to be subject to double taxation. The set of accounting laws, the prudential regulations or the securities law in the host country are certainly going to affect an overseas investment a great way that make the parent and subsidiary relationship a complex web of financial and legal interactions. This requires a detailed and comprehensive scenario analysis for identifying the financial flows emerging out of such interactions. It is, however, not necessary that varying international laws render the international projects less profitable as still the international direct investment is sought with the purpose of increasing shareholder's wealth and its volume is increasing every day. But it at least necessitates the consideration of FDI as a special case of investment analysis and should not be subjected to a one-point treatment style of traditional discounted cash flow techniques.

Financing in the case of FDIs makes them a real different case as in most of the cases it would come as a part of the investment proposal. In most of foreign projects now a days the financing packages are connected with the investment proposal coming in the form of either a subsidized loan or the project loans with its own financing features. It is also equally possible that some projects require exceptionally high cost financing depending upon the risk inherent in the project. As Lessard (1981) observed that

> The available cash flows and their value to the firm often depend on the specific financing of the projects, not only because of concessional financing opportunities, but also because the costs or limits on cross-border transfers often depend on the nature of the financial transaction involved, e.g. interest or principal, fees, dividends, or payment for goods.

It necessarily means that optimal FDI evaluation requires the integration of financing and investment decisions, an obsession with the traditional evaluation techniques. The treatment of FDI analysis requires a model capable of taking care of both the investment as well as financing aspects of the project in consideration. It is also important that such a model should be able to incorporate the debt capacity carried by the FDI itself.

Cash flow restrictions on the other hand give rise to dilemma of ascertaining the project relevant cash flows. As such restrictions mean that not all the

cash flows generated by the subsidiary will necessarily be remitted to the parent company. Such restrictions come either in the form of mandatory foreign exchange remittance laws that prohibit overseas remittances beyond a certain limit or due to the scarcity of the foreign reserves with host countries. Whatever may be the case, it means that the parent investor will not be able to make use of all the flows produced by the overseas project. Whereas as per the standard notion, for the parent investor the only relevant cash flows are the flows that are remittable to the investor.

Another valuation problem with the cross-national investments is the valuation of cash flows whereby parent and FDI flows are denominated in different currencies. This is a situation that the domestic investors usually do not have to care about. But this is not very difficult a situation to deal with as many standard techniques have been developed to deal with the translation problem. However, what is important is the additional translation risk that is associated with such investments involving foreign currencies as the exchange rates keep on changing. Summarizing, it can be said that FDI is vulnerable to additional imposing factors like

- Translation risk resulting in exchange losses/or even gains
- Political risk resulting in expropriations
- Foreign economy risk like inflation, balance of payment problems etc.
- Remittance problems due to restricted remittances or remittance taxes
- Foreign country laws.

All above comes in addition to the factors relevant for an all-domestic investment.

It calls for the development of an FDI investment evaluation approach that can take care of all the conventional as well non-conventional factors bearing upon such a project. The FDI evaluation model based on value additivity principle proposed in the coming lines is considered to be better than conventional approaches.

2. Background

A *typical* FDI evaluation problem would involve following steps:

i. Identification of project cash flows
ii. Separation of cash flows remittable to the parent investor
iii. Translation of flows to the parent company currency
iv. Evaluation of the flows based upon some acceptance criterion reflecting the relevant cost of financing
v. Implementation of the project proposal
vi. Continual revaluation of the project for desirable restructuring, extension or rollback etc.

A foreign investment project, however, needs extensive and careful study of the factors like;

- Estimation of relevant flows
- Distinction between project and parent flows
- Consideration of foreign tax regulations
- Consideration of contractual nature of any of the relevant flows
- Premiums for political risk, economic risk and exchange risks
- Estimation and evaluation of the knock-out or spill-over effects
- Project financing and financial implications thereof
- Distinction between the parent and subsidiary risks
- Calculation of a number of project relevant discount rates

The traditional discounting techniques trying to make all or most of these factors subject to a single discounting denominator are certainly prone to either under-valuing or over-valuing the components; as a single factor cannot easily accommodate all this without being biased towards one factor or the other. Also, the special nature of financing of most of the international investments makes the use of WACC (weighted average cost of capital) based discounting techniques irrelevant as these projects carry their own debt capacities and hence need be not confused with the overall firm's debt capacity.

As all of these factors contribute their own negative or positive values towards the overall project value, so any valuation model based upon the *value additivity principle* will prove more suitable for dealing with such valuation problems. Haley & Schall (1979) explained that value additivity principle applies without exception to most investment valuation situations as long as investor can engage into arbitrage. Thus any restrictions or taxes on cross border transfers to the parent would be reflected in the income stream components, but will not affect the ability to combine or divide these remittable funds, net of corporate tax streams for valuation.

APV (adjusted present value) method of investment valuation is based upon the value additivity principle and is capable of accommodating as many valuation components as desirable. The value additivity basis and the flexibility of the APV method make it a strong candidate for dealing with the overseas investment evaluation problems. The APV with its value additivity principle will be able to combine the entire component values evaluated separately due to the flexibility afforded by the method. In this way the components will be valued pro-rata by the discount factors reflecting each individual component's risk and return characteristics separately making the evaluation more relevant and reliable. As Stewart C. Myers (1996) observed:

> Major international investments often have so many financing side effects that it's foolhardy to try to reduce the project analysis to one stream of cash flows and one adjusted discount rate.

Again Lessard (1981) commented as :

The APV approach provides a generalized framework capable of incorporating most of the special financial considerations that arise in evaluating foreign projects. Its attractiveness vis-á-vis traditional approaches, which attempt to force all these factors into a single term, rests only in part on its conceptual superiority. Much of its attraction lies in its transparency and simplicity of use in certain situations.

In the upcoming section an APV approach to the FDI valuation will be explained with its own style of dealing with the valuation components.

3. FDI : An APV Approach

The APV treatment of an overseas investment starts with its elaborate treatment of the project cash flows followed by dealing with the issue of outlining the boundaries between the parent and project flows. The treatment of the relevant discount rates, consideration of various risks involved and the valuation of components comes after it.

3.1. *FDI Incremental Cash Flows*

The cash flows in case of FDI arise in a number of ways. An international investment will carry its own cash flows and at the same time will be affecting the existing flows of the firm in a number of ways. This is however very important that all the flows to be accounted for such a case should be recognized on incremental basis. It can be put in a simple way, as the difference between the pre-investment and post-investment flows should be regarded as the incremental flows relevant for the project evaluation purpose. However, as our APV approach is based upon the unbundling idea, so we need to look into all the components of cash flow for an organization engaging in FDI activity.
Mainly the cash flow for a project would be

- *Plant & Assets' Acquisition* Costs

Plant and assets acquisition cost would be quite easy to ascertain in case these are purchased from external sources ; however a careful estimate would be needed if the plant and assets have been supplied by the investor's internal sources. If these are acquired internally, then the opportunity cost of putting the assets to the project use should be taken into account. It should be estimated that what would have been the value of these assets if they were not put to the project use instead of charging book value of the assets to the project. If the project has been funded from the funds accumulated with subsidiary, then it would be checked that what would have been if the funds were remitted to the parent instead of being reinvested. It is very much likely that the funds remitted would have been subject to withholding taxes that can be saved simply by reinvesting the funs locally. It would result into decreasing the in-

vestment outlays.

- *Start up costs*

Start up costs would be the costs incurred in connection with putting the project into operations capable of producing and delivering goods or the services.

- *Operational flows*

Operational flows need be sub-divided into contractual and non-contractual flows. This classification is more important in case of FDIs as quite a good percentage of the flows are likely to be denominated contractually. Advanced contracts for supply of labor and material are usually possible in FDI case whereby the host countries usually provide incentives in these forms so as to attract foreign investment. Such contractual flows significantly decrease the risk of the project flows and hence need be discounted separately from the ordinary non-contractual flows. The contractual type operating flows will be contracted revenue, contracted operating costs and the depreciation tax shields. In addition to these flows, FDIs carry additional contractual operating flows like royalties, management fees and commissions etc.

The operating flows in case of an FDI are affected in a number of other ways as well. It is possible that assumption of a foreign project results into sales and consequently profits erosion from an existing project or the product ; a phenomenon called as *cannibalization.* It is then very important that incremental effect of sales or profit erosion must be attributed to the additional project responsible for it.

Contrary to the revenue erosion situation mentioned above, it is also possible that incremental project results into additional business or the revenues for the firm taking up the project. It may be in situation whereby the proposed project is likely to use up existing production as raw material or is going to effect economies in production or marketing of the existing business. So, in such a case the incremental revenue or the cost reduction should be attributed towards the proposed project and taken into account for the evaluation purpose.

Another issue that is not specific to FDIs only but is a common phenomenon in such cases is of transfer pricing for the intra company traded goods or services. It will be quite possible to show a project as overly or less profitable by charging it higher or lesser transfer prices than the market prices respectively for the internally traded goods or services and hence have wrong valuation. Internal trade should be priced at the market prices or the cost saving should be used as measure in the absence of market prices.

- *Financial flows*

An international investment project valuation will be incomplete without the mention and the treatment for the way it is financed. It is common that in-

ternational projects carry their own financing plans. This means that usually these projects carry their own debt capacities. Also, the FDIs usually carry financial subsidies like low cost loans provided by host countries, which needs be taken into account while calculating the value of such subsidies.

Again if project is financed by the parent company loans, then value of any interest tax shield should also be taken into account. However, if the project adds to the firm's overall debt capacity allowing the firm to borrow more funds then earlier, then value of any tax shields on this debt should be attributed to the proposed project.

- *Terminal value of the project*

Shapiro (1996) advises three approaches to calculate a project's terminal or the end period value. One is to assume that the investment will be liquidated after the end of the planning horizon and to use this value. The second approach is to estimate the market value of the project assuming that it is the present value of remaining cash flows. The third approach is to calculate a breakeven terminal value at which the project is just acceptable to the parent and then use that as benchmark against which to judge the likelihood of the present value of future cash flows exceeding that value.

- *The Additional Risk Factors*

An FDI carries several additional risk factors like translation risk, political risk and economic risk. Here two approaches may be applied to deal with these risks, one, is to adjust the cash flows for these risks and the other is to adjust the discount rate to be used for the evaluation purpose. Although the statistical measures of adjusting the cash flows can be helpful in certain cases, however, in this paper the APV model will incorporate these risks by adjusting the relevant discount rates for this purpose. Lessard (1979) also recommended the upward adjustment of the discount rates in order to incorporate the risks involved.

3.2. *The Foreign Currency Translation & Inflation*

An FDI evaluation problem necessarily involves translating the project cash flows from one currency into another currency, as project flows should be comparable with today's home currency flows. Below are given two 3-step methods to deal with translation and inflation exposure of the FDIs cash flows.

	Step I	Step II	Step III
Method 1	Estimate nominal foreign currency future flows	Convert to home currency at forecast exchange rates	Discount at home currency nominal discount rates
Method 2	Estimate nominal foreign currency future flows	Calculate present value using foreign currency nominal discount rates	Convert to home currency using spot exchange rate

In addition to these methods, following two 4-step approaches can also be applied to deal with the translation and the inflation problem.

	Step I	Step II	Step III	Step IV
Method 3	Estimate nominal foreign currency future flows	Reduce to real term flows in foreign currency by discounting at foreign inflation rate	Calculate foreign currency present value in real terms using real term discount rate	Convert to home currency present value using spot exchange rate
Method 4	Estimate nominal foreign currency future flows	Calculate real term flows by discounting at foreign country inflation rate	Convert to home currency using spot rate	Calculate present value using real term discount rates

Buckley (1992) has however proved the equality of all the four approaches as all of these give similar end values subject to the condition that purchasing power parity and Fisher Effect hold throughout the project period.

Shapiro (1983) also observed that:

> In order to assess the effect of exchange rate changes on expected cash flows, it is first necessary to remove the effect of offsetting changes in inflation and exchange rates. Over the long run, purchasing power parity (or the "law of one price") is a reasonably good approximation of economic reality; and thus, these changes tend to be almost completely offsetting.

Lessard (1979) suggested the ways to deal with translation and inflation problem separately for contractual and non-contractual flows. For non-contractual flows he suggested that constant term cash flows CF (constant)

should be discounted at all equity real discount (K_{EUL} or ρ_{real}) and multiplied by the current spot rate (S_0) expressed in equation form as:

$$V = S_O \sum_{t=i}^{T} \frac{\overline{CF}(constant)^t}{(1+\rho_{REAL})}$$

For contractual flows, however, it is recommended to discount the nominal cash flows at the nominal relevant discount rate ($\rho_{NOMINAL}$) and then convert to the home currency using spot exchange rate as:

$$V = S_O \sum_{t=i}^{T} \frac{\overline{CF}(current)^t}{(1+\rho_{NOMINAL})}$$

So, as long as purchasing power parity and Fisher Effect are going to hold, which in case of major currencies is more likely to hold. There is little evidence for major currencies subject to market forces that deviations from these key relationships are persistent or that they can be estimated precisely.

Lessard (1979) observed again,

> The basis for a simpler, yet more transparent approach is provided by the set of equilibrium relationships between interest rates, rates of inflation, and changes in exchange rates that (tend to) hold in efficient markets-purchasing power parity and the (domestic and international) Fisher effect. Even when these relationships do not hold precisely, they serve to highlight the impact on cash flows of the interactions between inflation and exchange rates and to provide insights regarding the valuation of these flows.

3.3. Discount Rate for FDI

From the discussion until now, it should be evident that APV approach to FDI evaluation calls for more than a single discount factor to calculate the values of the components of the project flows. Also, out of the two approaches i.e. adjusting cash flows or adjusting discount rates for considering additional risk factors, the APV approach that follows is based upon adjusting the discount factors upwards for allowing any risk premiums needed. It will piece out the investment project flows into various components, evaluate the components pro-rata and then will sum up the values to reach the final overall value.

4. The Model

Before presenting the APV based FDI model in integrated form, the break -up of the APV's FDI model component by component follows.

4.1 *Value of Capital Outlays*

The capital outlays as defined earlier will be taken only on incremental basis and in constant purchasing power terms. These flows will then be converted to home currency using spot rate of exchange. The discount factor used

for discounting these flows will be an all equity discount rate adjusted for any risk involved. In equation form it can be presented as:

$$PV_1 = e_0 \sum_{i=1}^{n} \frac{CO_i}{(1+K_{EUL})^i}$$

Here CO stands for the capital outlays incremental to the project and e_0 the spot exchange rate for the currency. K_{EUL} refers to the all equity cost of capital adjusted upwards for any additional risks associated with project's location in foreign country instead of the home country.

Most important risk to be considered for the capital outlays should be the risk of expropriation. The expropriation risk will usually come through political instability and the economic deterioration in the host country. Such a situation can be dealt with by, first, estimating the period until when the political and economic situation is not likely to vary drastically and then adjusting the discount rate so as to allow the payback within the safe period. However, in cases when political and economic conditions are not predictable at all, such a rate adjustment may not be very easy to accomplish with. Then a complete statistical analysis of the likely, most likely and unlikely set of expected cash flows should be conducted in addition to or in place of adjusting the discount rate. However, care must be taken that such all-out approach should not end into overly pessimistic view of the proposed project flows to render otherwise beneficial project as un-viable or vice versa.

4.2. *Non-contractual Operating Flows*

As discussed in earlier section, only the remittable operating cash flows that are of non-contractual nature should be taken into account to be discounted at an all equity rate of discount for project evaluation purpose. These flows should be ascertained in constant purchasing power terms and multiplied by the spot exchange rate to convert into home currency. In equation form it can be presented as:

$$PV_2 = e_0 \sum_{i=1}^{n} \frac{CF_i(1-t)}{(1+K_{EUL})^i}$$

Here CF stands for the non-contractual operating flows incremental to the project and e_0 for the spot exchange rate for the currency. K_{EUL} refers to the all equity cost of capital adjusted upwards for any additional risks associated with project's operations in foreign country instead of the home country.

4.3. *Contractual Operating Flows*

Contractual operating flows will be the flows that are not subject to opera-

tional variability like ordinary non-contractual flows rather are fixed in their nature. These may be contracted revenues by way of a stipulation into the investment contract or the cost that are subject to changes. Depreciation tax shield is one important source of contractual operating flows although these are somehow dependent upon the ability of the firm to make use of these flows. The after tax contractual cash flows (CCF) would be represented in current terms and discounted at nominal risk free rate adjusted for any overseas risk premiums required and then converted to home currency at spot exchange rate. It can be represented as:

$$PV_3 = e_0 \sum_{i=1}^{n} \frac{CCF_i(1-t)}{(1+K_d^*)^i}$$

Treatment of depreciation tax shield is also very much similar to the treatment of contractual operating flows presented here, as depreciation tax flows are also contractual in nature. However, it is advisable to provide a little additional premium for the possibility of firm not being able to make use of these tax shields in addition to the risk premiums added for the overseas risk factors mentioned earlier. In equation form it would be :

$$PV_4 = e_0 \sum_{i=1}^{n} \frac{DTS_i}{(1+K_d^*)^i}$$

4.4. *Business Design Flows*

In addition to the operating flows mentioned above, a business firm might be able to defer or eliminate certain cost due to its business design and the ability to manipulate intra business activities in a desirable way. It can be possible when a firm can shift some of its revenues or costs to other sections or to the affiliated concerns so as to avoid taxes or to effect operational economies. Growth opportunities or the ability to reinvest otherwise taxable remittances are just two but very important areas where most of multinational firms are able to add significant values to the projects assumed.

Value of growth opportunities can be calculated by way of estimating some opportunity benefit possible to be availed as long as the growth opportunity is not exercised. Example may be of the growth opportunity to capture affiliated or auxiliary markets when a major investment project is assumed ; but such a growth opportunity is not availed immediately rather is franchised for a certain period. So in such a case it can be very easy to ascertain the value of growth opportunities, as the opportunity benefit available can be a good benchmark for the value of the opportunity. However, in the absence of benchmark figure for such growth opportunities, valuing the opportunity as an option is also suggested. As this discussion is beyond the scope of this thesis, ref-

erence for such models can be had from the works of Fischer (1973), Avinash (1995) and Luehrman (1997).

However, using the discounting approach for APV, opportunities can be valued as:

$$PV_5 = e_0 \sum_{i=0}^{n} \frac{GOF_i}{(1+K_{EUL}^{*})^i}$$

Here GOF_I is the growth opportunity flows in constant purchasing power terms and K_{EUL}^{*} is the all equity cost of capital adjusted for risk associated with such flows. However, if these flows are contractually denominated, then K_d^{*} should rather be used.

Similarly the business design flows (BDF) can also be valued as follows:

$$PV_6 = e_0 \sum_{i=1}^{n} \frac{BDF_i}{(1+K_{EUL}^{*})^i}$$

4.5. *The Interest Tax Shield*

Another important value component is the interest tax shield. The interest tax savings calculated in current terms should be discounted at risk free nominal rate (K_d) and then converted to home currency using spot exchange rate. In equation form it would be:

$$PV_6 = e_0 \sum_{i=1}^{n} \frac{ITS_i}{(1+K_d)^i}$$

4.6. *Financial Subsidies & Penalties*

Financial subsidies are very much likely to arise in case of overseas investments very often these investments entail preferential treatment in the form of subsidized loans or the financial kickbacks. Such subsidies need to be evaluated properly for project evaluation purpose so as to take care of all financial side effects of a project's financing. For this the difference between interest at normal market rate and at the subsidized rates should be discounted at the firm's normal risk free rate of borrowing adjusted for any overseas risk premiums needed. Finally this discounted value should be converted to the home currency using spot exchange rate. It can be presented as:

$$PV_7 = e_0 \sum_{i=1}^{n} \frac{D_i(K_d - K_{ds})}{(1+K_d)^i}$$

In case of financial penalties arising in the form of costly financing due to nature of the project into consideration, the numerator value would be a negative value and will be capable of being adjusted into the overall APV analysis.

4.7. *The Valuation Components Brought Together*

Adding up the valuation components we get,

$$\text{APV}\ (FID) = \text{PV}_1 + \text{PV}_2 + \text{PV}_3 + \text{PV}_4 + \text{PV}_5 + \text{PV}_6 + \text{PV}_7$$

Here PV_1, $\text{PV}_2 \cdots \text{PV}_7$ stand for the valuation components as defined earlier in this section.

Alternatively it would be:

$$APV(FDI) = e_0 \left[\sum_{i=1}^{n} \frac{CO_i}{(1+K_{EUL})^i} + \sum_{i=1}^{n} \frac{CF_i(1-t)}{(1+K_{EUL})^i} + \sum_{i=1}^{n} \frac{CCF_i(1-t)}{(1+K_d{}^*)^i} + \sum_{i=1}^{n} \frac{DTS_i}{(1+K_d{}^*)^i} + \sum_{i=1}^{n} \frac{BDF_i}{(1+K_{EUL}{}^*)^i} + \sum_{i=1}^{n} \frac{ITS_i}{(1+K_d)^i} + \sum_{i=1}^{n} \frac{D_i(K_d - K_{ds})}{(1+K_d{}^*)^i} \right]$$

However, it is stressed again here that different investment projects can have differing number of component values depending upon the nature and complexity of the project. Below is given an example to explain that how the FDI - APV model presented above will be applied in practical situations.

5. FDI-APV: An Illustration

Tokai Mizu Kabushikigaisha, a large Japanese multinational firm in beverages business with several overseas subsidiaries, is considering setting up its production and marketing facilities in Hawaii as another step towards its objective of across Pacific expansion. The proposed project will be initiated by acquiring plant and equipment of a local beverage business venture running into financial problems due to domestic reasons. The take-over would cost Tokai Mizu an estimated $ 500000 to be paid in US dollars at the time of takeover. In addition to this an estimated $ 250000 would be needed to remodel and upgrade the plant to the Tokai Mizu's standard. The project carries only 40% debt capacity meaning $ 300000 ($ 750000×40%) and rest would be supplied by the company's own funds. Hawaiian Investment Promotion Agency arranges subsidized loans for the first time investors in Hawaii, so Tokai Mizu will be able to get a loan of $ 300000 at 5% instead of the market rate of 9% for similar risk companies. Start up and production scheduling will not take much time and the plant will start production without any significant delay. Tokai Mizu will get confirmed orders for its Hawaiian plant from the selling company's customers worth $ 350000 for each of the first two years which are expected to grow by 20% for the third and fourth years as per conservative estimates. However, in the fifth year Tokai Mizu estimates a terminal value of the rest of the project life's cash flows to be $ 560000 as per its policy to restrict any projects cash flows estimates only up-to five years. Total operating costs are es-

timated to be 30% of the sales revenues. Plant assets will be depreciated at the rate of 20% on straight-line basis and the marginal tax rate for Tokai Mizu's Hawaiian project would be 35%. Tokai Mizu adjusts it foreign risk free rate upward by 10% to discount depreciation tax shield. Although the expropriation risk is negligible, however Tokai Mizu has policy of increasing its required rate of return on equity by 20% and on non-equity funds by 25%, which are 14% and 9% respectively for the company. Also as dollar-yen exchange rate is prone to frequent changes, Tokai Mizu would hedge it cross-border flows. As hedging costs are incurred, Tokai Mizu plans to incorporate this additional cost by moving up its cost of capital by another 5% of the home country cost of capital. Purchasing power parity is assumed to hold and spot exchange rate for yen to dollar is 100 Yen= 1 Dollar. The proposed project carries future growth option for the company as it can establish its own retail outlets expected to be a big success. However company's funds position as well as cautious approach towards eastward expansion does not permit to avail this growth option right now ; but company will be able to franchise this option to a local chain of retail outlets for an estimated lump-sum of $ 290000 in the 3rd year. Also, the company will be able to save withholding taxes on the accumulated funds of $ 300000 with its subsidiary in New Jersey, an east-coastal US city, at the rate of 25% otherwise taxable if remitted back to Tokai Mizu. Advise Tokai Mizu whether to invest or not. Tokai Mizu has asked for a piece-by-piece analysis of the evaluation problem.

Solution:

The Project Outlays

The project would cost $ 750000 in total. However part of the equity i.e. $ 300000 would be provided by shifting funds from New Jersey subsidiary resulting into a saving in withholding taxes of $ 75000 ($ 300000×25%). It will decrease the project outlays effectively by $ 75000 to $ 675000 as net outlays.

The Discount Factors

The company's cost of all equity capital is 14%. To cover for overseas political & economic risk, the company increases this required rate by 20% and another 5% is given to compensate hedging costs incurred in connection with covering the exchange risk. So the company's all equity cost of capital for the project would be:

All equity cost of capital at home	14%
20% increase for political and economic risk coverage	2.8%
5% increase to provide for hedging costs	0.7%

Total Hawaiian project all equity cost of capital	17.5%

Again Tokai Mizu requires similar adjustments for risk-free cost of capital for overseas projects. It will be:

Risk free rate	9%
25% adjustment for political and economic risk	2.25%
5% adjustment for hedging costs	0.45%
Total risk free cost of capital	11.7%

The Operating Flows

Out of the operating flows, the confirmed orders in advance mean contractual flows for the firm and hence should be discounted separately from the non-contractual operating flows. The sales revenue for the first two years is \$350000. The operating costs would amount to \$105000 (30% × \$350000) for the first two years. So, after tax contractual operating flows per year for the two years would be:

$$(\$350000 - \$105000)\ (1 - 0.35) = \$245000 \times 0.65 = \$159250.$$

Now the present value of these contractual operating flows would be calculated at adjusted risk-free rate of return of 11.7% as:

$$PV_2 = \$159250 \times 1.6967 = \$270205$$

Non-contractual operating flows would be the revenues for third and fourth year and the terminal value of flows in the fifth year. As the revenues for the third and fourth year are expected to grow by 20% per year so the flows can be calculated as:

3rd year flows :	
Revenues (\$350000×120%)	\$420000
Operating Costs (30% × \$420000)	126000
Before tax flows	\$294000
Tax @ 35%	102900
After tax flows	\$191100
4th year flows:	
Revenues (\$420000×120%)	\$504000
Operating costs (\$504000×30%)	151200
Before tax flows	\$352800

Tax @ 35%	123480
After tax flows	$ 229320

Now the present value of non-contractual flows can be calculated at an all -equity-adjusted cost of capital 17.5% as :

PV of 3 rd year:	$ 191100×0.6164=	$ 117800
PV of 4 th year:	$ 229320×0.5246=	120307
PV of Terminal Value	$ 560000×0.4465=	250034
Present value of non-contractual operating flows (PV_3)		$ 488141

Also, the value of depreciation tax shield can be calculated as:

Depreciation tax shield = Annual Depreciation × tax rate

= $ 750000×0.20×0.35

= $ 52500

The foreign risk free rate of 11.7% calculated above will be adjusted by another 10% to reflect risk associated with the subsidiary's inability to make use of depreciation tax shields. So the relevant discount rate for the discounting the depreciation tax shields becomes 11.7%×1.10=12.87%

Now the present value of depreciation tax shields for the five years will be:

PV_4= $ 52500×3.5284= $ 185242

Value of Growth Option

As the company will be able to franchise its growth option of setting up retail outlets producing a lump-sum amount of $ 290000 in the third year, so the value of this growth option at the rate of 11.7% will be:

PV_5= $ 290000×0.7175= $ 208084

Value of Interest Tax Shield

For the Hawaiian project $ 300000 in the form of loan will be provided at the rate of 5%. So the interest tax shield annually would amount to :

Interest × Tax rate= $ 300000× 5 %×35%= $ 5250

Present value at the risk free rate would be:

PV_6= $ 5250×3.6317= $ 19067

Value of Subsidized Loan

As the project will be financed at subsidized rate of 5% instead of the normal lending rate of 9%, so the project carries the value of subsidized loan that can be calculated as:

The subsidy = \$300000 (9% − 5%) = \$300000 × 4% = \$12000 per year.
Present value of subsidies at the risk free rate would be:

PV_7 = \$12000 × 3.6317 = \$43580

The Project APV

Summing up the components of the project valuation and converting to home currency at spot exchange rate of 100 Yen= 1 Dollar, the APV for the project can be calculated as:

APV = 100 [− \$675000 + \$270205 + \$488141 + \$185242 + \$208084
+ \$19067 + \$43580] = 100 [− \$675000 + \$1214319]
= Yen 53931900

As the project carries a large positive APV, Tokai Mizu can go ahead with the project.

6. Concluding Remarks.

The FDI evaluation model based on value additivity principle proposed in this article is considered to be better than conventional approaches in bringing out the component values and their treatment in the FDI analysis from variety of aspect e.g. treatment of cash flows, the adjustment of additional risk factors and translation factors. The Adjusted Present Value approach on which the treatment of FDI is based in this article is considered to be more comprehensive and advantageous to the current approaches to the FDI evaluation.

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