

# International Capital Budgeting

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International Finance

# 1. Adjusted Net Present Value

- ANPV used for:
  - capital budgeting when corporations make investment decisions and determine the valuations of international projects.
  - valuing a project done by a foreign subsidiary
- ANPV approach lends itself to international applications most easily.

# 1. An Overview of Adjusted Net Present Value

- Adjusted Net Present Value

- Adjusted Net Present Value is the sum of three things:

- $ANPV = NPV + NPVF + RO$

- Discounted cash flows of the all-equity firm

- The sum of all discounted expected future revenues minus the sum of current and discounted expected future costs and investments.

- Revenues and costs measured on an incremental, after-tax cash flows (same currency!) basis

- Discount rate must be appropriate for the currency of denomination of the cash flow (time premium + risk)

- Net present value of financial side effects (NPVF)

- Examples: costs of issuing securities; tax implications of financing; costs of financial distress (if applicable); subsidized financing from governments

- Value the real options (RO)

- The ability to adjust the scale of the project in response to future information

- For a movie, this would be a sequel

- Decision: accept only (+) ANPV projects (the one with the highest ANPV should be accepted)

# 1. An Overview of Adjusted Net Present Value

- Vincenzo Uno has a project with the cash flows:

Annual revenue	€1,000,000
Annual cost	<u>-€600,000</u>
Operating income	€400,000
Corporate tax (0.34 tax rate)	<u>-€136,000</u>
After-tax profits	€264,000

- If the discount rate for the project is 20%, the PV of these perpetual expected profits is:
  - $\frac{264,000}{1.20} + \frac{264,000}{1.20^2} + \frac{264,000}{1.20^3} + \dots = \frac{264,000}{0.20} = 1,320,000$
- If the initial investment needed is €1,350,000, the NPV of this project is therefore negative (-€30,000) and the project should be rejected.

## 2. Deriving the NPV of Free Cash Flow

- Incremental profits
  - Flows that result from the project alone
  - Export cannibalization
- Revenues
  - Forecasts depend on future economic environment
- Costs
  - Measures cost of goods sold
- Depreciation
  - Legal tax shield; subtracted out before taxes are calculated
- Capital expenses
  - Money spent on property, plant and equipment (PPE)
- Net working capital
  - Inventory and cash on hand to run business

## 2. Deriving Free Cash Flow

### Exhibit 15.1 Deriving free cash flow

Step 1. Subtract costs from revenues:

$$\text{Revenue} - \text{Costs} = \text{Earnings before interest and taxes (EBIT)}$$

Step 2. Subtract taxes on earnings:

$$\text{EBIT} - \text{Taxes on EBIT} = \text{Net operating profit less adjusted taxes (NOPLAT)}$$

Step 3. Add back non-cash costs:

$$\text{NOPLAT} + \text{Accounting depreciation} = \text{Gross cash flow (GFC)}$$

Step 4. Subtract investments made to increase future profitability:

$$\text{Gross cash flow} - \text{Change in net working capital } (\Delta\text{NWC}) - \text{Capital expenditures (CAPX)} = \text{Free cash flow (FCF)}$$

All flows to be denominated in the same currency, which involves forecasting exchange rates

## 2. Deriving the NPV of Free Cash Flow

- Earnings Before Interest and Taxes (EBIT)
  - Pretax operating income without debt
- Net Operating Profit Less Adjusted Taxes (NOPLAT)
  - Equals EBIT minus taxes paid
- Gross Cash Flow - NOPLAT plus depreciation
  - CAPX is capital expenditures (CEPEX)
    - Large in initial stages of project
    - Investment later when repairs become costly

## 2. Deriving the NPV of Free Cash Flow

- Discounting Free Cash Flows

- $NPV(t) = \sum_{k=0}^{\infty} \frac{E_t[FCF(t+k)]}{(1+r)^k}$

- $r$  = Discount rate and  $k$  = number of years beyond time  $t$

- Calculating the terminal value of a project

- In theory, the all-equity firm will “live” forever

- The growth rate of  $g$  should primarily reflect the expected rate of inflation in the currency of the forecasts

$$\text{Terminal value in year 10} = \frac{E_t[FCF(t+10)](1 + g)}{(r - g)}$$

After calculating the terminal value in year 10, we discount it to year 0 by dividing by  $(1 + r)^{10}$ :

$$\text{Terminal value in year 0} = \frac{\text{Terminal value in year 10}}{(1 + r)^{10}}$$



### 3. Financial Side Effects

- The costs of issuing securities
  - Monetary fee
  - Underwriting discount:
    - The spread between what the firm receives from issuing securities and what the public pays for the securities
- Data on costs
  - Lee, Lockhead, Ritter and Zhao (1996)
    - The percentage cost decreases as the amount of money raised increases (i.e., there are economies of scale)
    - In their sample, the monetary fee  $\approx 3.69\%$  and the discount  $\approx 7.31\%$

### 3. Financial Side Effects

- Tax shields for certain securities
  - Interest tax shield - the value of the ability to deduct interest expense for tax purposes
    - $D - \frac{(1+r_D)D}{(1+r_D)} + \frac{\tau r_D D}{(1+r_D)}$
    - Interest tax shield =  $\frac{\tau r_D D}{(1+r_D)}$
    - $\tau$  – corporate income tax rate,  $\tau r_D$  - tax deduction,  $r_D$  - market interest rate as the discount rate,  $D$  - loan
  - For a perpetuity: this equation becomes  $\tau D$ 
    - With a corporate tax rate of 34%, the value of Vincenzo Uno’s tax shield for a €500,000 issue of debt calculated as perpetuity is:
      - $0.34 \times €500,000 = €170,000$

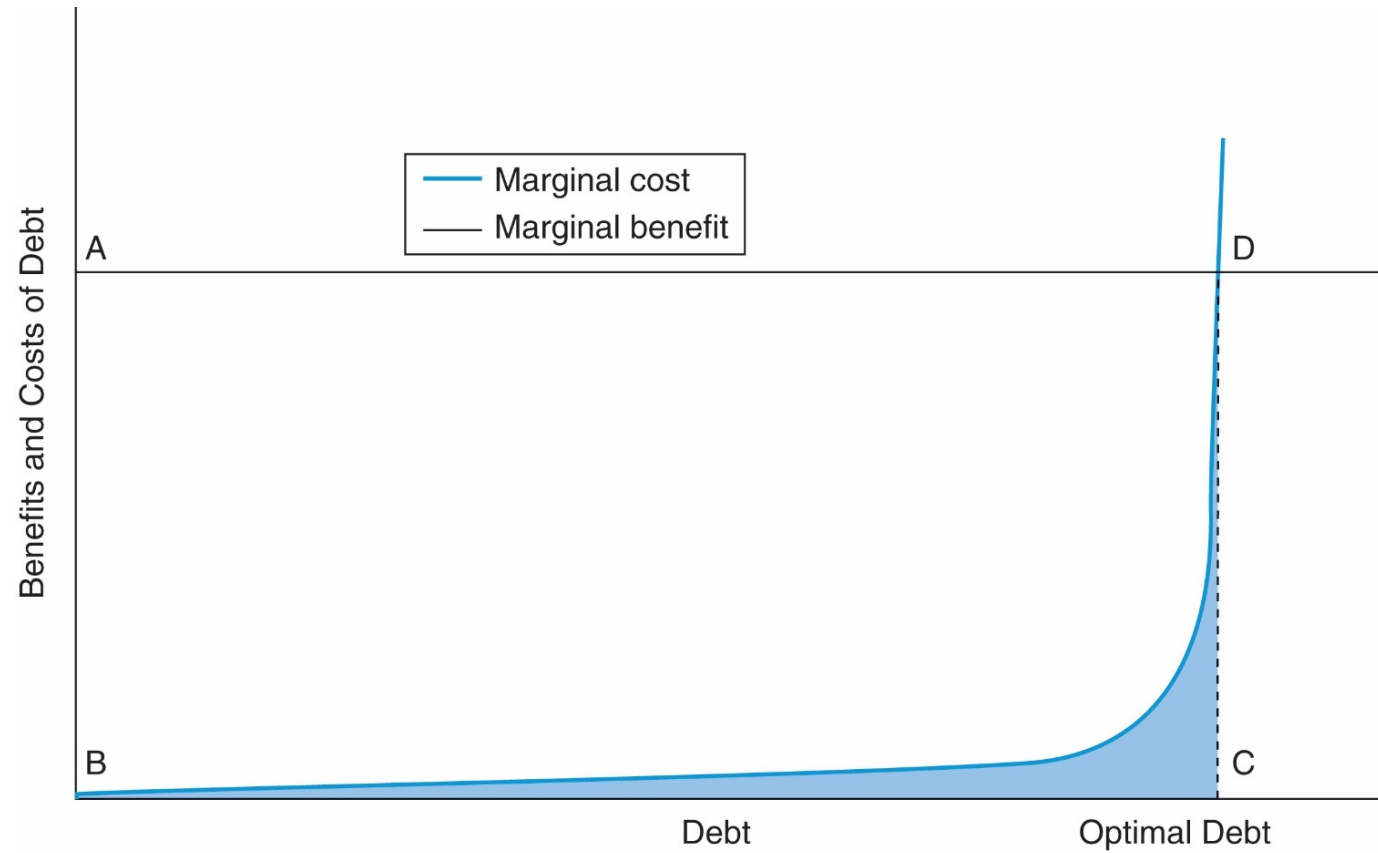
### 3. Financial Side Effects

- The proper discount rate
  - Rate should reflect the appropriate riskiness of the project's cash flows
- Costs of financial distress
  - If these costs did not exist, firms would be financed by debt only
    - Direct costs of financial distress (bankruptcy), e.g., legal consulting, and accounting fees  $\approx 3\%$
    - The indirect costs of financial distress
      - Loss of value due to the expectation of failure
      - Customers not wanting to buy because after-sales service is not guaranteed or creditors unwilling to extend more credit
      - Inability to attract high-quality, skilled labor
- The equilibrium amount of debt
  - Where the marginal benefit of the tax shield equals the marginal costs of financial distress

### 3. Benefits and Costs of Debt

How issuing debt adversely affects the ability of the firm to operate in world markets.

The rectangle ABCD is the total benefit of the debt. The shaded area under the marginal cost curve is the total cost of the debt.



# 3. Financial Side Effects

- Subsidized financing
  - Interest subsidies
    - Add value to the project
    - Appropriate discount rate is the market's required rate of return on the debt since the firm is just as likely to default on a subsidized loan

## 4. Real Options

- Real-world example
  - Proctor & Gamble purchasing Brazilian company Phebo
    - Value in learning about how to operate in Brazil (thus enabling them to expand further)
- Abandonment options

# 5. Parent Versus Subsidiary Cash Flows

- ANPV of parent versus Subsidiary
  - Very different, so you must be clear which one you are valuing
  - Foreign exchange controls, royalty payments, licensing agreements, overhead management fees, and profits from intermediate goods sold to subsidiary can make a difference

## 5. Parent Versus Subsidiary Cash Flows

- A three-step approach to determining the value of a foreign subsidiary (i.e., from perspective of parent company)
  - NPV cash flow analysis on the foreign subsidiary as if it were independent of parent
  - Cash flow from parent's perspective
    - After-withholding-tax dividends project will yield to parent
    - After-tax value of royalty payments, licensing / management fees, sales of intermediate goods
    - Watch for cannibalization of exports
  - Adjust the value of the project for the NPV of financing side effects and possible growth options



## 6. The Case of International Wood Products

- IWPI is considering whether to acquire a Spanish manufacturing facility to serve its European market
  - Initial Investments (plant, equipment, inventory):
    - $€100M + €73M + €5.66M = €178.66M$  or  $\$250.12 M$
  - Forecasting total revenue
    - Only half of 44,000 units demanded will be produced in Spain the 1st year but all thereafter
    - Current price of furniture is  $\$3,430$  (or at  $S = € 1.40/\$ \rightarrow €2,450$ ) and will grow at expected inflation

## 6. Revenue Forecasts for IWPI-Spain

**Exhibit 15.3** Revenue forecasts for IWPI-Spain

	Years in the future									
	1	2	3	4	5	6	7	8	9	10
1. Real growth rates of unit sales	10%	11%	12%	10%	8%	6%	4%	3%	2%	1%
2. Unit sales	22,000	48,840	54,701	60,171	64,985	68,884	71,639	73,788	75,264	76,017
3. Euro inflation rates	3%	4%	3%	2%	2%	2%	2%	2%	2%	2%
4. Euro price per unit	2,524	2,624	2,703	2,757	2,812	2,869	2,926	2,985	3,044	3,105
5. Total euro revenue (1,000,000's) (Line 2) × (Line 4)	55.52	128.18	147.87	165.91	182.76	197.60	209.62	220.22	229.12	236.04

## 6. The Case of International Wood Products

- Forecasting NWC, capital expenditures, and depreciation
  - Change in NWC:
    - $\Delta NWC = NWC_t - NWC_{t-1}$
  - CAPX: economic depreciation requires 3% replacement
    - CAPX will be  $(0.03 \times 0.58) + (0.10 \times 0.42) = 5.94\%$  of initial CAPX for 1st year, or €10.28M
    - $CAPX_{t+k} = CAPX_{t+k-1} \times (1 + \pi_{t+k}, \text{€})$
  - Depreciation: straight-line
    - $Depreciation_{t+k} = Depreciation_{t+k-1} + 0.0594 \times CAPX_{t+k-1}$

## 6. Forecasts of Additions to Net Working Capital and Capital Expenditures for IWPI-Spain

**Exhibit 15.4** Forecasts of additions to net working capital and capital expenditures for IWPI-Spain

	Years in the future										
	0	1	2	3	4	5	6	7	8	9	10
1. Total revenue (Exhibit 15.3 Line 5)		55.52	128.18	147.87	165.91	182.76	197.60	209.62	220.22	229.12	236.04
2. Stock of NWC (year 0 given, then 10.5% of Line 1)	5.66	5.83	13.46	15.53	17.42	19.19	20.75	22.01	23.12	24.06	24.78
3. Addition to NWC ( Line 2 year i – Line 2 year (i-1))		0.17	7.63	2.07	1.89	1.77	1.56	1.26	1.11	0.93	0.73
4. Capital expenditures	173.00	10.58	11.01	11.34	11.56	11.80	12.03	12.27	12.52	12.77	13.02
5. Depreciation		10.28	10.90	11.56	12.23	12.92	13.62	14.33	15.06	15.81	16.57

# 6. Cost Forecasts for IWPI-Spain

**Exhibit 15.5** Cost forecasts for IWPI-Spain

	Years in the future									
	1	2	3	4	5	6	7	8	9	10
1. Variable cost per unit	702	730	752	767	782	798	814	830	847	864
a. Labor										
b. Materials sourced in Europe	665	692	712	727	741	756	771	786	802	818
c. Parts purchased from IWPI-US	407	423	436	445	454	463	472	481	491	501
2. Total variable cost (Lines 1.a + 1.b + 1.c) × (Exh. 15.3 Line 2)	39.03	90.11	103.95	116.63	128.48	138.91	147.36	154.81	161.07	165.93
3. Royalty fees @ 5% of total revenue (0.05 × Exh. 15.3 Line 5)	2.78	6.41	7.39	8.30	9.14	9.88	10.48	11.01	11.46	11.80
4. Overhead allocation @ 2% of total revenue (0.02 × Exh. 15.3 Line 5)	1.11	2.56	2.96	3.32	3.66	3.95	4.19	4.40	4.58	4.72
5. Overhead expenses	1.59	1.65	1.70	1.74	1.77	1.81	1.84	1.88	1.92	1.96
6. Depreciation (Exhibit 15.4 Line 5)	10.28	10.90	11.56	12.23	12.92	13.62	14.33	15.06	15.81	16.57
7. Total cost (Lines 2 + 3 + 4 + 5 + 6)	54.78	111.64	127.56	142.21	155.96	168.17	178.21	187.17	194.83	200.98

## 6. The Case of International Wood Products

- Forecasting total costs
  - Royalty Fees – paid by subsidiary to parent
  - Overhead allocation – paid to parent for help with accounting and management
  - Variable costs and overhead expenses – increase at € rate of inflation
  - US costs are included here based on PPP



## 6. Forecasts of After-Tax Profit for IWPI-Spain

**Exhibit 15.6** Forecasts of after-tax profit for IWPI-Spain

	Years in the future									
	1	2	3	4	5	6	7	8	9	10
1. Total revenue (Exhibit 15.3 Line 5)	55.52	128.18	147.87	165.91	182.76	197.60	209.62	220.22	229.12	236.04
2. Total cost (Exhibit 15.5 Line 7)	54.78	111.64	127.56	142.21	155.96	168.17	178.21	187.17	194.83	200.98
3. Earnings before tax (EBIT) (Line 1 - Line 2)	0.74	16.54	20.30	23.69	26.80	29.43	31.41	33.05	34.29	35.06
4. Corporate income tax @ 35% (0.35 × Line 3)	0.26	5.79	7.11	8.29	9.38	10.30	10.99	11.57	12.00	12.27
5. Earnings after tax (NOPLAT) (Line 3 - Line 4)	0.48	10.75	13.20	15.40	17.42	19.13	20.41	21.48	22.29	22.79

## 6. Net Present Value of Project Free Cash Flows for IWPI-Spain

**Exhibit 15.7** Net present value of project free cash flows for IWPI-Spain

	Years in the future										
	0	1	2	3	4	5	6	7	8	9	10
1. Earnings after tax (NOPLAT) (Exhibit 15.6 Line 5)		0.48	10.75	13.20	15.40	17.42	19.13	20.41	21.48	22.29	22.79
2. Depreciation (Exhibit 15.4 Line 5)		10.28	10.90	11.56	12.23	12.92	13.62	14.33	15.06	15.81	16.57
3. Change in NWC (Exhibit 15.4 Line 3)	5.66	0.17	7.63	2.07	1.89	1.77	1.56	1.26	1.11	0.93	0.73
4. Capital expenditures(CAPX) (Exhibit 15.4 Line 4)	173.00	10.58	11.01	11.34	11.56	11.80	12.03	12.27	12.52	12.77	13.02
5. Free cash flow (FCF) (Lines 1 + 2 - 3 - 4)	-178.66	0.00	3.02	11.35	14.17	16.77	19.16	21.21	22.91	24.39	25.60
6. Discount factors (@ 11.1% per annum)	1.00	0.90	0.81	0.73	0.66	0.59	0.53	0.48	0.43	0.39	0.35
7. Present value of FCF (Lines 5 × 6)	-178.66	0.00	2.45	8.28	9.30	9.91	10.19	10.15	9.87	9.46	8.94
8. Terminal value	100.17										
9. NPV of the project (sum of Line 7 + Line 8)	0.05										



## 6. The Case of International Wood Products

- Discount rate:
  - $r_f + (\beta \times r_m)$
  - $r_f - 4.5\%$  (interest rate on German government bonds)
    - 1.2 (beta)
    - 5.5% (equity risk premium) -  $r_m$
  - *Discount factor* for year  $k$  in the future is  $= 1/(1 + 0.111)^k$

## 6. The Case of International Wood Products

- Terminal value
  - Discounted present value of all expected future free cash flows in years 11 and beyond
    - Calculate the terminal value in the last year of the project as a growing perpetuity:
      - $[(€25.6M) \times (1 + 0.02)] / (0.111 - 0.02) = €286.95M$
      - €25.6M – **free cash flow in year 10** is taken to be a perpetuity that is growing at the long-run euro rate of inflation of 2%
    - Discount terminal value from the terminal year to year 0:
      - $€286.95M / (1 + 0.111)^{10} = €100.17M$

## 6. The Case of International Wood Products

- The parent company's perspective

- Forecasting the dividends received by IWPI-US
  - IWPI-Spain will pay all of its **FCF to parent (dividend)**
  - The parent will have to pay a 10% withholding tax to the Spanish government but they will get a tax credit from the U.S. government
- This additional profit substantially enhances the parent's value of the project

Exhibit 15.8 Dividends received by IWPI-US

	Years in the future									
	1	2	3	4	5	6	7	8	9	10
1. Dividend paid to IWPI-US (Exhibit 15.7 Line 5)	0.00	3.02	11.35	14.17	16.77	19.16	21.21	22.91	24.39	25.60
2. Spanish withholding taxes @ 10% (0.10 × Line 1)	0.00	0.30	1.14	1.42	1.68	1.92	2.12	2.29	2.44	2.56
3. After-tax dividend rec'd by IWPI-US (Line 1 – Line 2)	0.00	2.72	10.22	12.76	15.09	17.24	19.09	20.62	21.95	23.04

## 6. Calculation of Foreign Tax Credit for IWPI-US

**Exhibit 15.9** Calculation of foreign tax credit for IWPI-US

	Years in the future									
	1	2	3	4	5	6	7	8	9	10
1. Net income to IWPI-Spain (Exhibit 15.6 Line 5)	0.48	10.75	13.20	15.40	17.42	19.13	20.41	21.48	22.29	22.79
2. Dividend paid by IWPI-Spain (Exhibit 15.8 Line 1)	0.00	3.02	11.35	14.17	16.77	19.16	21.21	22.91	24.39	25.60
3. Income tax paid by IWPI-Spain (Exhibit 15.6 Line 4)	0.26	5.79	7.11	8.29	9.38	10.30	10.99	11.57	12.00	12.27
4. Deemed-paid credit to IWPI-US for income taxes paid by IWPI-Spain (Line 2/Line 1 × Line 3)	0.00	1.63	6.11	7.63	9.03	10.32	11.42	12.34	13.13	13.79
5. Withholding tax paid (Exhibit 15.8 Line 2)	0.00	0.30	1.14	1.42	1.68	1.92	2.12	2.29	2.44	2.56
6. Total foreign tax credit (Line 4 + Line 5)	0.00	1.93	7.25	9.05	10.71	12.22	13.11	13.86	14.44	14.83

## 6. The Case of International Wood Products

- If the ratio of the dividend paid by IWPI-Spain to the after-tax income of the subsidiary is  $< 1$  (i.e., if they don't send everything home), only a fraction of the income tax paid is allowed as a credit
  - e.g., Year 1:

$$\frac{\text{Dividend of €3.02 million}}{\text{Net income of €10.75 million}} \times \text{Spanish tax of €5.79 million} = \text{Credit of €1.63 million}$$

- The US government realizes that only a fraction of the income earned was paid to the parent

## 6. The Case of International Wood Products

- Grossed-up dividend:
  - **After-tax dividend + tax credit**
- Potential U.S. tax on dividend:
  - Hence, for U.S. tax purposes, the grossed-up dividend is €2.72 million + €1.93 million = € 4.65 million
  - $0.34 \times €4.65M = €1.58M$
  - If this is less than the tax credit (1.93 in this case):
    - US taxes = 0

## 6. Calculation of U.S. Tax Liability of IWPI-US

**Exhibit 15.10** Calculation of US tax liability of IWPI-US

	Years in the future									
	1	2	3	4	5	6	7	8	9	10
1. Grossed-up foreign dividend received (Exhibit 15.8 Line 3 + Exhibit 15.9 Line 6)	0.00	4.64	17.46	21.81	25.80	29.46	32.21	34.48	36.39	37.88
2. Tentative US tax liability @ 34% (0.34 × Line 1)	0.00	1.58	5.94	7.41	8.77	10.02	10.95	11.72	12.37	12.88
3. Available foreign tax credit (Exhibit 15.9 Line 6)	0.00	1.93	7.25	9.05	10.71	12.22	13.11	13.86	14.44	14.83
4. Net US tax owed (Line 2 – Line 3, if Line 2 > Line 3)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5. Excess foreign tax credit (Line 3 – Line 2, if Line 2 < Line 3)	0.00	0.35	1.31	1.64	1.94	2.20	2.16	2.13	2.07	1.95



# 6. Net Present Value of After-Tax Dividends for IWPI-US

**Exhibit 15.11** Net present value of after-tax dividends for IWPI-US

	Years in the future										
	0	1	2	3	4	5	6	7	8	9	10
1. After-tax value of dividends to IWPI-US (Exhibit 15.8 Line 3 – Exhibit 15.10 Line 4)		0.00	2.72	10.22	12.76	15.09	17.24	19.09	20.62	21.95	23.04
2. Discount factors (@ 11.1% per annum)	1.00	0.90	0.81	0.73	0.66	0.59	0.53	0.48	0.43	0.39	0.35
3. Present value of after-tax dividends (Line 1 × Line 2)		0.00	2.20	7.45	8.37	8.92	9.17	9.14	8.88	8.51	8.04
4. Terminal value of dividends	90.15										
5. NPV of after-tax dividends (Sum of Line 3 + Line 4)	160.84										

$$€90.15 \text{ million} = \frac{€23.04 \text{ million} \times 1.02}{(0.111 - 0.02) \times (1.111)^{10}}$$



## 6. The Case of International Wood Products

- Terminal value of dividends calculated in same way as other terminal value
- PV of after-tax dividends is less than the cost of the project
  - $€160.84M < €178.66M$
- However, there are other sources of value
  - Royalty fees
  - Overhead allocation fees
  - After-tax profits of intermediate goods

## 6. Net Present Value of After-Tax Royalty and Overhead Allocation Fees Received by IWPI-US

**Exhibit 15.12** Net present value of after-tax royalty and overhead allocation fees received by IWPI-US

	Years in the future										
	0	1	2	3	4	5	6	7	8	9	10
1. Royalty fee @ 5% of total revenue (Exhibit 15.5 Line 3)		2.78	6.41	7.39	8.30	9.14	9.88	10.48	11.01	11.46	11.80
2. Spanish withholding tax @ 10% (0.10 × Line 1)		0.28	0.64	0.74	0.83	0.91	0.99	1.05	1.10	1.15	1.18
3. Overhead fee @ 2% of total revenue (Exhibit 15.5 Line 4)		1.11	2.56	2.96	3.32	3.66	3.95	4.19	4.40	4.58	4.72
4. Spanish withholding taxes @ 14% (0.14 × Line 3)		0.16	0.36	0.41	0.46	0.51	0.55	0.59	0.62	0.64	0.66
5. After-tax fees received by IWPI-US (Line 1 - Line 2 + Line 3 - Line 4)		3.45	7.97	9.20	10.32	11.37	12.29	13.04	13.70	14.25	14.68
6. Tentative US tax liability @ 34% (0.34 × Line 1 + Line 3)		1.32	3.05	3.52	3.95	4.35	4.70	4.99	5.24	5.45	5.62
7. Excess foreign tax credit from dividends (Exhibit 15.10 Line 5)		0.00	0.35	1.31	1.64	1.94	2.20	2.16	2.13	2.07	1.95
8. Net US tax owed (Line 6 - Line 2 - Line 4 - Line 7)		0.89	1.70	1.06	1.02	0.99	0.96	1.19	1.39	1.60	1.82
9. After-tax value of fees to IWPI-US (Line 5 - Line 8)		2.57	6.27	8.14	9.30	10.33	11.33	11.85	12.31	12.65	12.86
10. Discount factors (@ 11.1% per annum)		0.90	0.81	0.73	0.66	0.59	0.53	0.48	0.43	0.39	0.35
11. Present value of after-tax fees (Line 8 × Line 9)		2.31	5.08	5.94	6.10	6.13	6.02	5.67	5.30	4.91	4.49
12. Terminal value of fees	50.31										
13. NPV of after-tax fees (Sum of Line 11 + Line 12)	102.26										

## 6. Net Present Value of After-tax Profit on Intermediate Goods Sold by IWPI-US to IWPI-Spain

**Exhibit 15.13** Net present value of after-tax profit on intermediate goods sold by IWPI-US to IWPI-Spain

	0	1	2	3	4	5	6	7	8	9	10
1. Unit sales (Exhibit 15.3 Line 2)		22,000	48,840	54,701	60,171	64,985	68,884	71,639	73,788	75,264	76,017
2. Per-unit price of exported parts (Exhibit 15.5 Line 1.c)		407	423	436	445	454	463	472	481	491	501
3. Export revenue of IWPI-US (Line 1 × Line 2)		8.95	20.67	23.85	26.76	29.48	31.87	33.81	35.52	36.95	38.07
4. Before-tax profit @ 16% margin (0.16 × Line 3)		1.43	3.31	3.82	4.28	4.72	5.10	5.41	5.68	5.91	6.09
5. US corporate tax @ 34% (0.34 × Line 4)		0.49	1.12	1.30	1.46	1.60	1.73	1.84	1.93	2.01	2.07
6. After-tax profit (line 4 – Line 5)		0.95	2.18	2.52	2.83	3.11	3.37	3.57	3.75	3.90	4.02
7. Discount factors (@ 11.1% per annum)		0.90	0.81	0.73	0.66	0.59	0.53	0.48	0.43	0.39	0.35
8. Present value of after-tax profits (Line 6 × Line 7)		0.85	1.77	1.84	1.85	1.84	1.79	1.71	1.62	1.51	1.40
9. Terminal value of profits	15.73										
10. NPV of after-tax profits (Sum of Line 8 + Line 9)	31.91										

# 6. The Case of International Wood Products

- Valuing the financial side effects
  - Subsidized loan by Spanish Government (€30M; 10 yrs; int. rate = 3%)
    - Interest tax shields:  $0.35 \times (0.03 \times \text{€}30M) = \text{€}0.315M$

Exhibit 15.14 Net present value of interest tax shields

	Years in the future											
	0	1	2	3	4	5	6	7	8	9	10	
1. Tax rate × interest paid		0.315	0.315	0.315	0.315	0.315	0.315	0.315	0.315	0.315	0.315	0.315
2. Discount factors (@ 6.00% per annum)		0.94	0.89	0.84	0.79	0.75	0.70	0.67	0.63	0.59	0.56	
3. Present value of interest tax shields (Line 1 × Line 2)		0.30	0.28	0.26	0.25	0.24	0.22	0.21	0.20	0.19	0.18	
4. Terminal value of tax shields	8.97											
5. NPV of interest tax shields (Sum of Line 3)	11.29											

$$\begin{aligned} \text{Terminal value of interest tax shield} &= \frac{0.35 \times 0.06 \times \text{€}30 \text{ million} \times (1.02)}{(0.06 - 0.02) \times (1.06^{10})} \\ &= \text{€}8.97 \text{ million} \end{aligned}$$

## 6. The Case of International Wood Products

- Valuing the financial side effects
  - Subsidized loan by Spanish Government (€30M; 10 yrs; int. rate = 3%)
    - Interest subsidies:  $(0.06 \times €30M) - €0.9M = €0.9M$

**Exhibit 15.15** Net present value of interest subsidy

	Years in the future											
	0	1	2	3	4	5	6	7	8	9	10	
1. Interest subsidy		0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
2. Discount factors (@ 6.00% per annum)		0.94	0.89	0.84	0.79	0.75	0.70	0.67	0.63	0.59	0.56	
3. Present value of interest sub- sidy (Line 1 × Line 2)		0.85	0.80	0.76	0.71	0.67	0.63	0.60	0.56	0.53	0.50	
4. NPV of interest subsidy (Sum of Line 3)	6.62											

## 6. The Case of International Wood Products

Initial costs	– €178.66M
Dividends	+ €160.84M
Royalties	+ €102.26M
Exports	+ €31.91M
Interest tax shield	+ €11.29M
Interest subsidy	+ €6.62M
ANPV of IWPI-Spain	€134.26M > 0 (or \$187.97M @ €1.40/\$)
Decision	Accept



## 6. Net Present Value of After-Tax Profit on Lost Export Sales by IWPI-US

**Exhibit 15.16** Net present value of after-tax profit on lost export sales by IWPI-US

	Years in the future										
	0	1	2	3	4	5	6	7	8	9	10
1. Unit export sales		18,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000
2. Price per unit (Exhibit 15.3 Line 4)		2,524	2,624	2,703	2,757	2,812	2,869	2,926	2,985	3,044	3,105
3. Export revenue (Line 1 × Line 2)		45.42	104.98	108.13	110.29	112.50	114.75	117.04	119.38	121.77	124.20
4. Before-tax profit @ 16% margin (0.16 × Line 3)		7.27	16.80	17.30	17.65	18.00	18.36	18.73	19.10	19.48	19.87
5. US corporate tax @ 34% (0.34 × Line 4)		2.47	5.71	5.88	6.00	6.12	6.24	6.37	6.49	6.62	6.76
6. After-tax profit (Line 4 – Line 5)		4.80	11.09	11.42	11.65	11.88	12.12	12.36	12.61	12.86	13.12
7. Discount factors (@ 11.1% per annum)		0.90	0.81	0.73	0.66	0.59	0.53	0.48	0.43	0.39	0.35
8. Present value of after-tax profits (Line 6 × Line 7)		4.32	8.98	8.33	7.64	7.02	6.44	5.92	5.43	4.99	4.58
9. Terminal value of profits	51.31										
10. NPV of after-tax profits (Sum of Line 8 + Line 9)	114.95										

## 6. The Case of International Wood Products

- Cannibalization of export sales
  - Lost sales in first year are:
    - $(40,000 - 22,000) = 18,000$  (produced in Spanish facility)
  - ANPV falls because of this
    - $(€134.26M - €114.95M) = €19.31M$
    - However, as it is still positive it does not change the decision to accept the project



# Questions:

- Can an investment project of a foreign subsidiary that has a positive net present value when evaluated as a stand-alone firm ever be rejected by the parent corporation? Assume that the parent accepts all projects with positive adjusted net present values.
- How do licensing agreements, royalties, and overhead allocation fees affect the value of a foreign project?
- What is meant by the net present value of the financial side effects of a project?
- What is an interest tax shield? How do you calculate its value?
- What are growth options? Provide an example of one in an international context.
- What is the difference between EBIT and NOPLAT?
- What is meant by the cannibalization of an export market?
- What is the terminal value of a project? How is it calculated?
- Why is it sometimes assumed that CAPX equals depreciation in the later stages of a project? How does expected inflation affect this assumption?