Chapter 21

Putting it all together: International Capital Budgeting
Overview

Domestic Capital Budgeting: a Review
Discounted cash flows and NPV
Adjusted NPV (ANPV)

i-Issue #1: how to handle non-equity features?

i-Issue #2: how to live with Xrisk?

i-Issue #3: How to incorporate Political Risk

i-Issue #4: Incremental cash flows

Checklist: review & some add-ons
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Discounted Cash Flows

♢ **We use cash flows, not Profits.** Differences:

▷ investments: cash flow v amortization
▷ provisions etc
▷ P/L records of IN, OUT on basis of date of sale, not actual date

How to handle this “Net Working Capital” issue? Three alternatives:
1. estimate NWC as a % of sales, subtract ΔNWC this/next yr
2. shift part of costs into preceding yr, part of revenue into next yr
3. use fractional discounting, recognizing shifts forward/backward

Example

Yr1: sales=180, costs 120. A/R cashed 30 days after sale, A/P paid +30 days before sale. So A/R=15, INV–A/P=10, ⇒ NWC=25

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Ex1: \[ PV = \frac{[180 - 120] - 25}{1.10} + \frac{25}{1.10^2} = 52.48 \]

Ex2: \[ PV = \frac{-10}{1.10^0} + \left(\frac{(180 - 15) - (120 - 10)}{1.10^1}\right) + \frac{15}{1.10^2} = 52.40 \]

Ex3: \[ PV = \frac{180}{1.10^{1+1/12}} - \frac{120}{1.10^{1-1/12}} = 52.38 \]
More on Discounted Cash Flows

◊ Comparing the NWC methods:

▷ Method 1 (NWC/Sales): assumes constant ratio of costs/sales

▷ Method 2 (shift ▶ and ◀):
  + can handle changing profit margin—e.g. learning effects, creaming
  + can handle many types of sales & costs, each having own lead/lag
  − complicates your spreadsheet

▷ Method 3 (build leading/lagging into discounting):
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  + simpler to implement: discount each line separately
  + allows further refinement with timing—e.g. investment might be in second half of yr, or sales are at middle of year (approx of continuous sales)
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DCF example: data

Five-year project by Chinese family-owned firm. All-equity financed.

1. **Land**: CNY 100. Cannot be depreciated. Expected liquidation value after five years: CNY 130.
2. **Plant and Equipment (P&E)**: CNY 350. Depreciated linearly over five years, zero scrap value.
3. **Set-up costs**: CNY 250 (training, initial advertising, free samples, etc.). Depreciated linearly over five years.
4. **Sales, operating costs**: overleaf
5. **Timing**:
   - Investment (CNY 700): 0.5
   - Sales: $n + 0.5$; A/R settled $n + 0.75$, A/P $n + 0.25$.
   - Overhead: $n + 0.5$.
   - Taxes: $n + 1$ (yr end)—$n = 7$ for final sale of land
   - Liquidation: 6.5.
DCF example: computations

<table>
<thead>
<tr>
<th></th>
<th>(a1)</th>
<th>(a2)</th>
<th>(b)</th>
<th>(c)</th>
<th>(d)</th>
<th>(e)</th>
<th>(f)</th>
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<tbody>
<tr>
<td></td>
<td>sales: goods</td>
<td>sale: land</td>
<td>variable costs</td>
<td>overhead</td>
<td>depreciation</td>
<td>txbl income</td>
<td>taxes</td>
</tr>
<tr>
<td>1</td>
<td>650</td>
<td>–</td>
<td>260</td>
<td>105</td>
<td>120</td>
<td>165</td>
<td>58</td>
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<tr>
<td>2</td>
<td>1000</td>
<td>–</td>
<td>400</td>
<td>110</td>
<td>120</td>
<td>370</td>
<td>130</td>
</tr>
<tr>
<td>3</td>
<td>1100</td>
<td>–</td>
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<td>120</td>
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<tr>
<td>6</td>
<td>–</td>
<td>130</td>
<td>–</td>
<td>–</td>
<td>–</td>
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</tr>
<tr>
<td>PV</td>
<td>1991</td>
<td>40</td>
<td>872</td>
<td>312</td>
<td>–</td>
<td>–</td>
<td>198</td>
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\[
NPV = \sum_{t=1}^{5} \frac{sales_t}{1.2^{t+0.75}} + \sum_{t=1}^{5} \frac{varblcosts_t}{1.2^{t+0.25}} + \sum_{t=1}^{5} \frac{overhead_t}{1.2^{t+0.5}} + \frac{land sale_t}{1.26.5} + \sum_{t=1}^{6} \frac{taxes_t}{1.2^{t+1}} - \frac{investment_t_0}{1.12^{0.5}}
\]

\[
= 1991 - 872 - 312 + 40 - 198 - 661 = -13
\]
Total incremental cash flows

- **“Project” point of view:** looks at business unit only—e.g. a WOS;
  - may overlook some benefits: profits that are made in parent or sister(s)
    - on deliveries to project or
    - on re-sales of project’s output
  - may overlook some costs: profits that disappeared in parent or sister(s) if this project replaces earlier business elsewhere

**Example**

Parent delivers components worth one-fourth of the project’s variable costs. Marginal profit margin 50%. PV of these cash flows is CNY 71m.

- NPV of the cash flows realized by the new business unit: $-13m$
- PV of the linked cash flows generated by the supplying unit: $71m$

Total (in CNY): $58m$
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- **Stage 1** is what we just did, in the example:
  - assume full equity financing; no issuing costs etc
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  - focus on inherent economic value

- **Stage-2 Adjustments (1):**
  - subsidies: need to know economic NPV
  - issue costs etc

- **Stage-2 Adjustments (2):** ¿add tax subsidy on corporate borrowing?

**Example**

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<td>100</td>
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<tr>
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<tr>
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</tr>
<tr>
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<td>(-) 30</td>
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<tr>
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<td>div 42, int 40, tot 82</td>
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- **Finite life?** For a project, we calculate the additional borrowing capacity, which is finite-lived not perpetual.

- **Unused shields?** At least occasionally, interest paid is above EBIT, so the gain is postponed or perhaps even lost.

- **Personal taxation:** often reverse discrimination, reducing or even annihilating the total gain—depends on the country;

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E.g. UK uses a credit system, which fully undoes the corporate tax effect:

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- **Bondholders capture at least part of the subsidy (if any)**

**Example:** costs of the Equity Hotel and the Bond Hotel

Assume that both hotels break even at price 100, and that, at this price, both hotels are needed to meet demand.

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<tbody>
<tr>
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Why drown WACC in a shipload of salt?

◊ **Often mis-understood:** “E” in formula should be the mkt value of equity, nor an accounting number—which might create a circularity problem

▷ use pre-specified long-run-target D/E: find GPV, *then* determine how much you must borrow

▷ or start from accounting D/E and iterate — too difficult for the average MBA

◊ **WACC assumes, hilariously,**

▷ perpetuities

▷ all shields fully used

▷ no reverse discrimination at personal level

▷ all of the subsidy goes to shareholders

⇒ the gain is vastly overstated, and is inextricably mixed up with the economic value into one grand number
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Adjusted NPV (ANPV)

i-Issue #1: how to handle non-equity features?

i-Issue #2: how to live with Xrisk?

i-Issue #3: How to incorporate Political Risk

i-Issue #4: Incremental cash flows

Checklist: review & some add-ons
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Domestic CapBudg: Review

*i*-Issue #1: what about non-equity features?

- **Big dose of tax planning**
  - need to chose legal form (branch/PE v WOS)
  - need to identify optimal remittance policy—reading all tax treaties in the whole world

Recommendation: 3-step procedure

- **Step 1:** Value as if done in a foreign branch
  - no tax games possible
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  - we do know the tax situation of parent and sisters
  - no issue as to which side gets what part of the gain

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  - subsidies, issue costs, ...
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Some How’s and Why’s in 3-Step NPV

◊ The branch stage avoids many pitfalls
  ▶ Pitfall#1: confusing costs and left-pocket/right-pocket payments
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◊ Do Step 2 (if you do it) as a MM-type tax correction

Example

Total tax on WOS profits/Div’s is 40%, total tax on royalties 30%. So effect of a \( p \) percent royalty is \( PV(Sales) \times p \times (0.40 - 0.30) \), calculated at a rate below that used for total cash flow.
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More How’s and Why’s in 3-Step NPV

✧ **Step 3**

▷ **Who should borrow?**

Look at *all* taxes, not just parent and WOS’ corptax

▷ **In what currency?**

- exposure management might be one consideration, taxes another
- in tax calculations, don’t forget PV’ed taxes on capital gain
  ⇒ if loans are in free markets, start from the idea that PV’s are equal for risk-free part, barring tax-discrimination effects; then just calculate PV of tax gains (and risk spreads, if inconsistent and not swappable)
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i-Issue #2: how to live with Xrisk?

- CAPM v i-CAPM?
  - Is host a segmented market? immaterial!
  - Is this a domestic or a foreign investment? immaterial!
  - Is home a segmented market?
    - if yes: CAPM
    - if no: InCAPM, with “world” defined as market’s total portfolio

- When do we use what currency?
  - home and host integrated? use either HC or FC
  - home and host not integrated: use HC (home)

- Estimated risks and returns
  - Market: use long-term, lowish estimates
  - beta: use your priors too, or even exclusively
    - capital goods v consumer goods; operating leverage; growth opportunities
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Example

- Chinese project was family-owned; CC 20%: no diversification by owners, rate is not even market-based
- UK owner: – shareholders diversify internationally
  - international beta low, say 0.25
  - Chinese investors leave no CNY-prints on world stock mkt
  - So we set CC (in GBP) at 4% + 0.25 × 5% = 5.25%
  - expected appreciation of CNY by 2%

\[
P V = \frac{CF^* \times 1.02^t}{1.0525^t} = \frac{CF^*}{\left(\frac{1.0525}{1.02}\right)^t}
\]

Implied cost is 1.0525/1.02-1= 3.18% not 20%.
How to Deal with Political Risks?

- **Which risks?** Mainly:
  - transfer risk
  - expropriation risk

- **Transfer risk Management:**
  - not all flows are equally exposed. A tentative pecking order:
    1. noncontractual cap export
    2. large dividends
    3. debt amortisation
    4. dividends
    5. intragroup interest, royalties
    6. interest to a major bank
    7. regular interest, royalty
    8. Mgt fees, techn assist
    9. payments for imports

  - Proactive measures
    - set up intra-Cy trade (⇒ transfer pricing, leads & lags)
    - set up technical assistance, mgt. contract; license contract
    - disguise intra-group loans into bank loans (Bk2Bk) or Eurobonds
    - WB as a co-lender
    - enlist Gt or IFC as a shareholder

  - Reactive management
    - use transfer pricing; leading and lagging
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◊ **Accounting for Transfer Risk in NPV**

▷ **jack up the CoCa**, seat-of-the-pants style?
  
  Note: yield spread on internal v Eurobonds underestimates the required premium

▷ **deduct** $\Pr_r \times E_r$ (damage $T_i$ | blocked $T_i$) ??

▷ **deduct** cost of insurance, if a competitive mkt exists

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<thead>
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<tbody>
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   - project typically implemented in a separate legal entity, so you start from that Cy’s projected P&L
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♢ **Things to be kept in mind**
   - former export sales lost by related Cies
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   - taxes paid by recipients of intra-group remittances: consider net effect in Step 2
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Note: using current-price CFs and a "real" CoCa implies one single inflation number.
Checklist: review & some add-ons

◊ Terminal Value
  ▶ use book value? simple, and probably conservative.
  ▶ estimate going-concern value, using relevant mkt multiples
  ▶ compute the break-even liquidation value, then decide.

◊ Sensitivity analysis
  ▶ operational inputs; also beta, price of risk, Xrate forecasts...

◊ Don’t forget common-sense economics
  ▶ NPV>0 requires a unique comp advantage—what’s ours? and how long will it last?
  ▶ Think of mkt creaming; learning effects

◊ NPV isn’t everything
  ▶ shaky inputs
  ▶ risk of biased inputs ⇒ enlist a “devil’s advocate”
  ▶ how value very speculative “real options” created by project
  ▶ non-quantifiable aspects
Putting it all Together: International Capital Budgeting

P. Sercu, *International Finance: Theory into Practice*

Domestic CapBudg: Review

*i*-Issue #1: non-equity features?
*i*-Issue #2: Xrisk?
*i*-Issue #3: Political Risk
*i*-issue #4: Incremental cash flows

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