Financing and Valuation of Intangible Assets

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Expert Consultative Group on Valuation of Intangible Assets
Definition of Intangibles

Economic definition:
- Non-physical assets

Accounting definition:
- Identifiable non-physical assets (IAS 38)

We follow the economic definition (some may not be on balance sheets)
Definition of Intangibles

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Accounting definition:
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Common types:
1. Technology-related assets (e.g., patents, databases, or software)
2. Artistic-related assets (e.g., copyrights of books, music, or film)
3. Marketing and customer-related assets (e.g., trademarks, brands, data)
4. Contractual rights (e.g., licenses, franchise rights, excavation rights)
5. Organizational capital (e.g., managerial principles, production processes)
Financing of Intangibles

Identifiable ↔ separable

Separable intangibles: can be transferred to others on a standalone basis
  - E.g., licenses, patents, software, some brands
  - Can be directly pledged as collateral for borrowing
  - Asset-based lending, securitization, sale-leaseback

Nonseparable intangibles: cannot exist independently from the company
  - E.g., organizational capital
  - Require debt against the business as a whole or equity financing
  - Cash flow-based lending, equity
Valuation of Intangibles

Nonseparable intangibles

Enterprise value calculations (e.g., discounted cash flows, multiples)

Separable intangibles

Market-based: ideal if possible, but data could be sparse

Cost-based: relationship between expenditures and resale value uncertain

Income-based: more common for intangibles than for physical assets

Four income-based methods:

With-and-without (WaW)

Excess earnings (EE)

Greenfield (G)

Relief from royalty (RfR)
Valuation of Intangibles

Nonseparable intangibles

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Four income-based methods:

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Visualizing Income-Based Valuation Methods

(iii): value of complementary assets + intangibles

(i): value of complementary assets at cost

(ii): value of rents from complementary assets (return > capital cost)

\( W^{(e)} \): economic value of intangibles; \( W^{(c)} = W^{(e)} + \text{rents from complementary assets} \)
Income-Based Valuation Methods

1. With-and-without value: $	ext{Value(intan+comp. assets)} - \text{Value(comp. assets)} = W(e)$. Ideal if possible to implement; conceptually right definition.

2. Excess earnings: $	ext{Value(intan+comp. assets)} - \text{Capital cost(comp. assets)} > W(e)$ if rents from comp. assets (return > capital cost).

3. Greenfield: same, replacing capital cost with rental cost.

4. Relief-from-royalty: $	ext{Value(licensing the intan)} < W(e)$ if licensee has bargaining power.
Income-Based Valuation Methods

1. **With-and-without**: \[ \text{Value(intan+comp. assets)} - \text{Value(comp. assets)} \]

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2. **Excess earnings**: \[ \text{Value(intan+comp. assets)} - \text{Capital cost(comp. assets)} \]

   \[ \succ W(e) \] if rents from comp. assets (return > capital cost)

3. **Relief-from-royalty**: \[ \text{Value(licensing the intan)} \]

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   \[ = W^{(e)} \]
   
   Ideal if possible to implement; conceptually right definition.
Income-Based Valuation Methods

1. With-and-without: Value(intangibles + competitive assets) − Value(competitive assets) = \( W^{(e)} \). Ideal if possible to implement; conceptually right definition.

2. Excess earnings: Value(intangibles + competitive assets) − Capital cost(competitive assets) > \( W^{(e)} \) if rents from competitive assets (return > capital cost).

Greenfield: same, replacing capital cost with rental cost.

Relief-from-royalty: Value(licensing the intangibles) < \( W^{(e)} \) if licensee has bargaining power.
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   - $> W^{(e)}$ if rents from comp. assets (return $> \text{capital cost}$)
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   - ▶ $< W^{(e)}$ if licensee has bargaining power
The Relationship Among Income-Based Valuation Methods

VALUE OF INTANGIBLE ASSET

EX-RENTS ECONOMIC VALUE $W^{(e)}$

NET PRESENT VALUE OF RENTS FROM COMPLEMENTARY ASSETS

CUM-RENTS ECONOMIC VALUE $W^{(c)}$

RELIEF-FROM-ROYALTY VALUE $W^{(RfR)}$

EXCESS EARNINGS AND GREENFIELD VALUES $W^{(EE)}$ AND $W^{(G)}$

WITH-AND-WITHOUT VALUE $W^{(WaW)}$
Risks and Discount Rates for Valuation

Common perception: intangibles are risky ⇒ should use high discount rate

In theory only systematic risk should affect discount rate

- Comovement between cash flows from intangible and market
- Not necessarily higher than the rest of the company

Idiosyncratic risk (e.g., obsolesce, infringement) could enter denominator if

- Cash flows for valuations measure situations without these risks happening
- Then probability of these events can be used in denominator
Risks and Discount Rates for Valuation

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\[
\frac{1}{r - g} \quad \rightarrow \quad \frac{1}{r + \lambda - g}
\]
Institutional Infrastructure

- **Ownership and rights:**
  - Separable intangibles: recognition and enforcement of liens on movable assets
  - Nonseparable intangibles: recognition of blanket liens, investor control rights

- **Bankruptcy:**
  - Restructuring useful for pledging cash flows for borrowing

- **Trading:**
  - Separable intangibles: secondary market trading is helpful
  - Nonseparable intangibles: markets for M&A, private equity may be helpful

- **Measurement:**
  - Separable intangibles: useful to measure cash flows that they generate
  - Nonseparable intangibles: important to measure cash flows from operations
Deep Dive Discussion
Limitations in Data Availability

- Intangibles are often unique. How to generalize from past transactions?
- Difficult to benchmark resale value based on past investment expenditures.
- Intangibles like customer data might be proprietary.
- Other challenges?
Recovery Value of Identifiable Intangibles

Data from U.S. Chapter 11 filings (Kermani and Ma, 2023)

- Hand collect **liquidation recovery rates** across asset types & industries
  - From liquidation analysis in Ch 11 filings. **Liquidation value/book value (cost).**
  - Liquidation: Ch 7—cease operations and sell off individual assets.
  - Using court documents from 2000 (start of electronic filings) to 2018.
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  - Using court documents from 2000 (start of electronic filings) to 2018.

Example: Sorenson Communications (14-10454)

<table>
<thead>
<tr>
<th>($ in 000's)</th>
<th>Notes</th>
<th>Jan. 31, 2014</th>
<th>Estimated Asset Recovery %</th>
<th>Estimated Recovery $</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Cash &amp; Cash Equivalents</td>
<td>A</td>
<td>$ 94,596</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Accounts Receivable</td>
<td>B</td>
<td>138,727</td>
<td>75%</td>
<td>100%</td>
</tr>
<tr>
<td>Prepaid and Other Current Assets</td>
<td>C</td>
<td>8,351</td>
<td>5%</td>
<td>10%</td>
</tr>
<tr>
<td>Property, Plant and Equipment, net</td>
<td>D</td>
<td>72,584</td>
<td>6%</td>
<td>12%</td>
</tr>
<tr>
<td>Goodwill, net</td>
<td>E</td>
<td>214,900</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td><strong>Intangible Assets</strong></td>
<td>F</td>
<td>98,765</td>
<td>17%</td>
<td>50%</td>
</tr>
<tr>
<td>Other Assets, Miscellaneous</td>
<td>G</td>
<td>16,901</td>
<td>0%</td>
<td>3%</td>
</tr>
<tr>
<td>Income from Wind-Down Operations</td>
<td>H</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total Assets and Gross Proceeds</strong></td>
<td></td>
<td>$ 644,824</td>
<td>34%</td>
<td>50%</td>
</tr>
</tbody>
</table>
Recovery Value of Identifiable Intangibles

Data from U.S. Chapter 11 filings (Kermani and Ma, 2023)

Average liquidation recovery rate by asset category and industry (2-digit SIC)

<table>
<thead>
<tr>
<th>Asset Category</th>
<th>mean</th>
<th>sd</th>
<th>p25</th>
<th>p50</th>
<th>p75</th>
</tr>
</thead>
<tbody>
<tr>
<td>Receivable</td>
<td>60.70</td>
<td>15.96</td>
<td>53.32</td>
<td>62.55</td>
<td>72.36</td>
</tr>
<tr>
<td>Inventory</td>
<td>45.40</td>
<td>16.73</td>
<td>32.26</td>
<td>44.49</td>
<td>55.16</td>
</tr>
<tr>
<td>PPE</td>
<td>35.00</td>
<td>13.11</td>
<td>26.09</td>
<td>34.14</td>
<td>43.91</td>
</tr>
<tr>
<td>Book intangible</td>
<td>24.83</td>
<td>32.58</td>
<td>2.14</td>
<td>17.58</td>
<td>31.46</td>
</tr>
<tr>
<td>Non-goodwill book intangible</td>
<td>32.03</td>
<td>39.63</td>
<td>4.50</td>
<td>22.94</td>
<td>42.44</td>
</tr>
</tbody>
</table>
Recovery Value of Identifiable Intangibles

Liquidation value of identifiable intangibles not much lower than that of PPE

- Intangibles have no physical presence
  - Lower transportation cost. Easier to relocate.
- Maybe U.S. has better institutional infrastructure?

Identifiable intangibles estimated to be < 50% of total intangibles

- Based on capitalizing R&D and a portion of SG&A (Peters and Taylor, 2017)
- Pledging non-identifiable intangibles for borrowing can be challenging
Contribution of Intangibles to Firm Value
Estimates from aggregated data on U.S. nonfinancial firms (Crouzet and Eberly, 2023)

- Crossed line: enterprise value/replacement cost of physical assets
  ... NOT a measure of the (relative) value of intangible assets!
Contribution of Intangibles to Firm Value
Estimates from aggregated data on U.S. nonfinancial firms (Crouzet and Eberly, 2023)

- Crossed line: enterprise value/replacement cost of physical assets
- Dark blue: rents from physical assets (∼65% of total)
- Medium/light blue: R&D assets (rep. cost + rents) (∼35% of total)
Contribution of Intangibles to Firm Value
Estimates for the healthcare sector (Crouzet and Eberly, 2023)

- Crossed line: enterprise value/replacement cost of physical assets
- Dark blue: rents from physical assets (∼35% of total)
- Medium/light blue: R&D + nonseparable intangibles (∼65% of total)
Contribution of Intangibles to Firm Value

Estimates for all firms including nonseparable intangibles (Crouzet and Eberly, 2023)

- Circled line: enterprise value/replacement cost of physical assets
- Dark blue: rents from physical assets (∼35% of total)
- Medium/light blue: R&D + nonseparable intangibles (∼65% of total)