

Financing and Valuation of Intangible Assets

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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)

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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

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- 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

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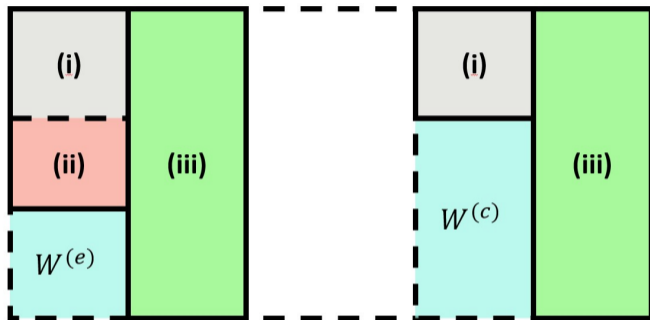
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Four income-based methods:

- With-and-without (WaW)
- Excess earnings (EE)
- Greenfield (G)
- Relief from royalty (RfR)

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 ; $W^{(c)} = W^{(e)} + \text{rents from complementary assets}$

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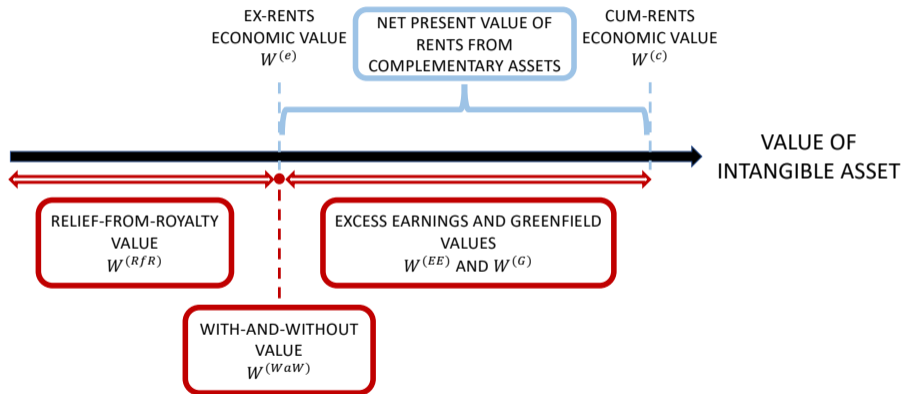
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 - ▶ $< W^{(e)}$ if licensee has bargaining power

The Relationship Among Income-Based Valuation Methods



Risks and Discount Rates for Valuation

Common perception: intangibles are risky \Rightarrow 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

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$$\frac{1}{r - g} \rightarrow \frac{1}{r + \lambda - g}$$

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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Example: Sorenson Communications (14-10454)

(\$ in 000's)	Notes	Unaudited	Estimated Asset		Estimated	
		Balances	Recovery %		Recovery \$	
		Jan. 31, 2014	Low	High	Low	High
Cash & Cash Equivalents	A	\$ 94,596	100%	100%	\$ 94,596	\$ 94,596
Accounts Receivable	B	138,727	75%	100%	104,046	138,727
Prepaid and Other Current Assets	C	8,351	5%	10%	418	835
Property, Plant and Equipment, net	D	72,584	6%	12%	4,389	8,779
Goodwill, net	E	214,900	0%	0%	-	-
Intangible Assets	F	98,765	17%	50%	16,348	49,043
Other Assets, Miscellaneous	G	16,901	0%	3%	-	550
Income from Wind-Down Operations	H	-	-	-	-	30,276
Total Assets and Gross Proceeds		\$ 644,824	34%	50%	\$ 219,796	\$ 322,805

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)

Industry-Level Liquidation Recovery Rates by Asset Category

	mean	sd	p25	p50	p75
Receivable	60.70	15.96	53.32	62.55	72.36
Inventory	45.40	16.73	32.26	44.49	55.16
PPE	35.00	13.11	26.09	34.14	43.91
Book intangible	24.83	32.58	2.14	17.58	31.46
Non-goodwill book intangible	32.03	39.63	4.50	22.94	42.44

Recovery Value of Identifiable Intangibles

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

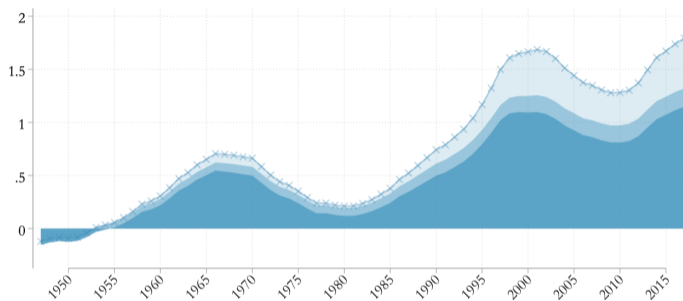
- Intangibles have no physical presence
 - ▶ Lower transportation cost. Easier to relocate.
- Maybe U.S. has better institutional infrastructure?

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

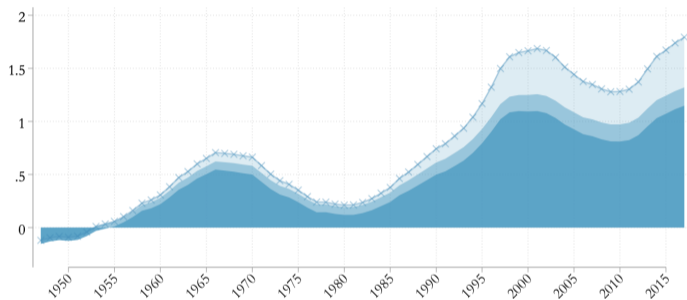
Estimates from aggregated data on U.S. nonfinancial firms (Crouzet and Eberly, 2023)



- Crossed line: enterprise value/replacement cost of physical assets
... NOT a measure of the (relative) value of intangible assets!

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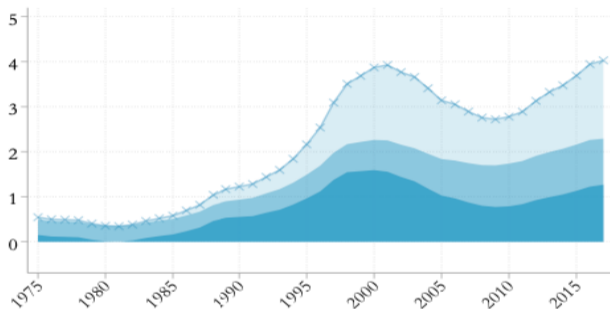
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- Crossed line: enterprise value/replacement cost of physical assets
- Dark blue: rents from physical assets (~65% of total)
- Medium/light blue: R&D assets (rep. cost + rents) (~35% of total)

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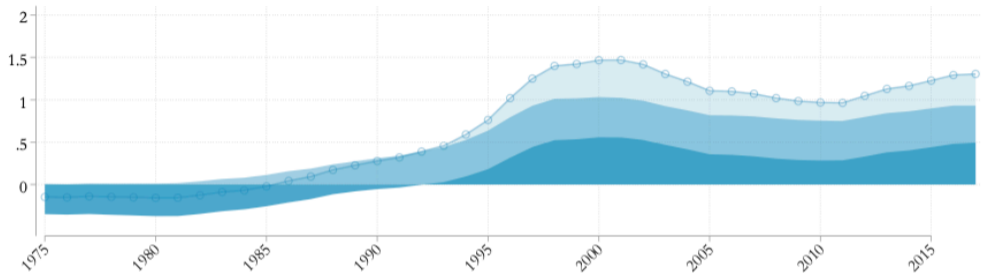
Estimates for the **healthcare** sector (Crouzet and Eberly, 2023)



- 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
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