Finance Basics

Dr. Amanda Thompson
Finance in one slide

What are the important questions an investor (or manager) would ask in this transaction?

- How much $ now?
- How much $ later?
- When is later?
- How certain is later?

Invest if...

$ Return > $ Invest + Risk Compensation
How much $ required now??

• Easiest to estimate because near term, tangible operational needs

• Driven by:
  – Type of innovation
  – Distance to next major milestone

• How to estimate:
  – Be as activity focused as you can, what specific people and resources do I need?
  – Can I estimate a relationship between a cost and a driver of cost to link my estimates to my activities?
Example

• Activity example: Online education company
  – Each possible student requires about a 15 minute (0.25 hr) chat with admission counselors
  – Counselors are on the phone about 50% of their 8 hr day.
  – 5% of students reached actually enroll

• How many students can one counselor recruit in a 5 day week?
  – On phone 50% x 40 hrs = 20 hrs per week
  – Recruit 5% of the (20 hrs per week/ 0.25 hr per student)
    = 5% x 80 students/wk = 4 students/wk per counselor

• How many admission counselors will you need if you target 100 new students per trimester (16 wks)?
  – 4 students/wk x (16 wk/tri) = 64 stud/counselor/tri
  – 100 student target / 64 = 1.5 counselors

• Salary = $40,000/yr what is the cost per enrollee just for recruitment?
  – (1.5 coun x $40,000)/(3 tri*100 students) ~ $208/enrollee
### Building a Model

**General Assumptions**

<table>
<thead>
<tr>
<th>Assumption</th>
<th>Working hrs/tri</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>640</td>
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</table>

### Assumptions

<table>
<thead>
<tr>
<th>Assumptions</th>
<th>Salary</th>
<th>Conversion</th>
<th>Time(hr)/prospective</th>
<th>% phone</th>
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<tbody>
<tr>
<td>Admission Counselor</td>
<td>$40,000</td>
<td>5%</td>
<td>0.25</td>
<td>50%</td>
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<tr>
<td>Student Tech support</td>
<td>...</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Professors</td>
<td></td>
<td></td>
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### Time

<table>
<thead>
<tr>
<th>Time</th>
<th>2017 T1</th>
<th>2017 T2</th>
<th>2017 T3</th>
<th>2018 T1</th>
</tr>
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<tbody>
<tr>
<td>Target enroll</td>
<td>100</td>
<td>110</td>
<td>125</td>
<td>140</td>
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<tr>
<td>Counselors</td>
<td>1.56</td>
<td>1.72</td>
<td>1.95</td>
<td>2.19</td>
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<td>Salary Cost</td>
<td>$20,833</td>
<td>$22,916</td>
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</table>

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![INNOVAR logo](https://example.com/innovar_logo.png)
Exercise

• Exercise: Think and share
  – Can you specify your major milestones?
  – What major activities will be required to reach them?
  – What are some activity ratios?
    • 1 student enrolled per 10 hours of counselor time
    • How many professor hours per student?
    • What % drop out?
  – Can you estimate the capital required to get to each milestone?
• For our example: Need now = $3M
What is the return later?

Invest

$3M Ask

Sell Company/IPO??

Time??
What is the return later?
Building your business model

Price > Costs = Profit!!!!

INVESTOR

CUSTOMER

GOV’T

INNOVAR
This is easy...right??

Revenue > Costs = Profit!!!!
This is easy...right??

Revenue > Costs = Profit!!!!

<table>
<thead>
<tr>
<th>100 units</th>
<th>April</th>
</tr>
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<tbody>
<tr>
<td>Sales</td>
<td>$1,000</td>
</tr>
<tr>
<td>Costs</td>
<td>$850</td>
</tr>
<tr>
<td>Equipment</td>
<td>$50</td>
</tr>
<tr>
<td>Profit before tax</td>
<td>$100</td>
</tr>
<tr>
<td>Tax</td>
<td>$25</td>
</tr>
<tr>
<td>Profit after tax</td>
<td>$75</td>
</tr>
</tbody>
</table>

- Materials SUPPLIERS
  - $6 materials for $10 sale

- Equipment SUPPLIERS
  - $600/machine lasts 12 months

- LABOR
  - $2.50 labor for $10 sale

- CUSTOMER
  - 100 units at $10 each

- GOV’T
  - 25%
Example: Manufacturing

- **Receive Materials**
  - Payables: 60 days
  - Inventory shelf: 90 days

- **Pay for Materials**

- **Sell Product**
  - Collection: 30 days

Funding Gap creates Cash Flow Problem!

INNOVAR
## Profit v. Cash Flow

<table>
<thead>
<tr>
<th>Sales</th>
<th>January</th>
<th>February</th>
<th>March</th>
<th>April</th>
</tr>
</thead>
<tbody>
<tr>
<td>Costs</td>
<td></td>
<td></td>
<td>$850</td>
<td></td>
</tr>
<tr>
<td>Equipment</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Profit before tax</td>
<td>$1,000</td>
<td></td>
<td>$100</td>
<td></td>
</tr>
<tr>
<td>Tax</td>
<td>$25</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Profit after tax</td>
<td></td>
<td></td>
<td></td>
<td>$75</td>
</tr>
</tbody>
</table>

### Materials Received
- January: $850

### Cash In
- Cash Out for Costs: $850
- Cash Out for Equipment: $600

### Cash Flow
- January: -$600
- February: $0
- March: -$850
- April: $0

### Timeline
- **Pay for Materials**
  - Raw
  - WIP
  - Finished
- **Collection**: 30 days
- **Inventory shelf**: 90 days
- **Payables**: 60 days

---

**Receive Payments**
# Profit v. Cash Flow

## Table

<table>
<thead>
<tr>
<th></th>
<th>January</th>
<th>February</th>
<th>March</th>
<th>April</th>
<th>May</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>$1,000</td>
<td>$1,000</td>
<td>$1,000</td>
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<tr>
<td>Costs</td>
<td>$850</td>
<td>$850</td>
<td>$850</td>
<td>$850</td>
<td></td>
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<tr>
<td>Equipment</td>
<td>$50</td>
<td>$50</td>
<td>$50</td>
<td>$50</td>
<td></td>
</tr>
<tr>
<td>Profit before tax</td>
<td>$100</td>
<td>$100</td>
<td>$100</td>
<td>$100</td>
<td>$75</td>
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<tr>
<td>Tax</td>
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<tr>
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<tr>
<td>Materials Received</td>
<td>$850</td>
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</tr>
<tr>
<td>Cash In</td>
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<td>$1,000</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Cash Out for Costs</td>
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<td></td>
<td></td>
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<tr>
<td>Cash Out for Equipment</td>
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<tr>
<td>Cash Flow</td>
<td>-$600</td>
<td>0</td>
<td>-$850</td>
<td>0</td>
<td>$1,000</td>
</tr>
</tbody>
</table>

## Diagram

- **Pay for Materials**: Raw, WIP, Finished
  - Inventory shelf: 90 days
  - Payables: 60 days

- **Receive Payments**: Collection: 30 days

**INNOVAR**
## Profit v. Cash Flow

<table>
<thead>
<tr>
<th></th>
<th>January</th>
<th>February</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>August</th>
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</thead>
<tbody>
<tr>
<td><strong>Sales</strong></td>
<td>$1,000</td>
<td>$1,000</td>
<td>$1,000</td>
<td>$1,000</td>
<td>$1,000</td>
<td>$1,000</td>
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<tr>
<td><strong>Costs</strong></td>
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<td>$850</td>
<td>$850</td>
<td>$850</td>
<td>$850</td>
<td>$850</td>
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<tr>
<td><strong>Equipment</strong></td>
<td>$50</td>
<td>$50</td>
<td>$50</td>
<td>$50</td>
<td>$50</td>
<td>$50</td>
<td>$50</td>
<td>$50</td>
</tr>
<tr>
<td><strong>Profit before tax</strong></td>
<td>$100</td>
<td>$100</td>
<td>$100</td>
<td>$100</td>
<td>$100</td>
<td>$100</td>
<td>$100</td>
<td>$100</td>
</tr>
<tr>
<td><strong>Profit after tax</strong></td>
<td><strong>$75</strong></td>
<td><strong>$75</strong></td>
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<td><strong>$75</strong></td>
<td><strong>$75</strong></td>
<td><strong>$75</strong></td>
<td><strong>$75</strong></td>
<td><strong>$75</strong></td>
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<tr>
<td><strong>Materials Received</strong></td>
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<td>$850</td>
<td>$850</td>
<td>$850</td>
<td>$850</td>
<td>$850</td>
<td>$850</td>
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<tr>
<td><strong>Cash In</strong></td>
<td></td>
<td></td>
<td></td>
<td>$1,000</td>
<td>$1,000</td>
<td>$1,000</td>
<td>$1,000</td>
<td>$1,000</td>
</tr>
<tr>
<td><strong>Cash Out for Costs</strong></td>
<td>$850</td>
<td>$850</td>
<td>$850</td>
<td>$850</td>
<td>$850</td>
<td>$850</td>
<td>$850</td>
<td>$850</td>
</tr>
<tr>
<td><strong>Cash Out for Equipment</strong></td>
<td>$600</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cash Flow</strong></td>
<td><strong>-600</strong></td>
<td><strong>0</strong></td>
<td><strong>-850</strong></td>
<td><strong>-850</strong></td>
<td><strong>150</strong></td>
<td><strong>150</strong></td>
<td><strong>150</strong></td>
<td><strong>150</strong></td>
</tr>
</tbody>
</table>

**But what if sales grow by 20%?**

### Payments and Collections Timeline

- **Receive Materials**
- **Pay for Materials**
- **Sell Product**
- **Receive Payments**
- **Inventory shelf:** 90 days
- **Collection:** 30 days
- **Payables:** 60 days
**Profit v. Cash Flow**

<table>
<thead>
<tr>
<th></th>
<th>January</th>
<th>February</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>August</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sales</strong></td>
<td>20%</td>
<td></td>
<td></td>
<td>$1,000</td>
<td>$1,200</td>
<td>$1,440</td>
<td>$1,728</td>
<td>$2,074</td>
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<tr>
<td><strong>Costs</strong></td>
<td>85%</td>
<td></td>
<td></td>
<td>$850</td>
<td>$1,020</td>
<td>$1,224</td>
<td>$1,469</td>
<td>$1,763</td>
</tr>
<tr>
<td><strong>Equipment</strong></td>
<td>$600</td>
<td></td>
<td></td>
<td>$50</td>
<td>$50</td>
<td>$50</td>
<td>$50</td>
<td>$50</td>
</tr>
<tr>
<td><strong>Profit before tax</strong></td>
<td>$100</td>
<td>$130</td>
<td>$166</td>
<td>$209</td>
<td>$261</td>
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<tr>
<td><strong>Tax</strong></td>
<td>25%</td>
<td></td>
<td></td>
<td>$25</td>
<td>$33</td>
<td>$42</td>
<td>$52</td>
<td>$65</td>
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<td><strong>Profit after tax</strong></td>
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<td></td>
<td>$75</td>
<td>$98</td>
<td>$125</td>
<td>$157</td>
<td>$196</td>
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</table>

|                  |         |          |         |        |        |         |         |         |
| **Materials Rcvd** |        |          | $850    | $1,020 | $1,224 | $1,469  | $1,763  | $2,115  |
| **Cash In**      | $0      | $0       | $0      | $0     | $1,000 | $1,200  | $1,440  | $1,728  |
| **Cash Out for Costs** | $0   | $0       | $850    | $1,020 | $1,224 | $1,469  | $1,763  | $2,115  |
| **Cash Out for Equipment** | $600  | $0       | $0      | $0     | $50    | $50     | $50     | $50     |
| **Cash Flow**    | ($600)  | $0       | ($850)  | ($1,020) | ($274) | ($319)  | ($373)  | ($437)  |

**Profit vs. Cash Flow**

- **Sales 20%**
- **Profit after tax**
- **Cash Flow**
The timing issue

Operating strategy
What to buy?

Financing Strategy
Who will pay?
**Finance fundamentals**

**What to buy?**
- $Invest

**Who will pay?**
- YourCo

**Why you?**
- $Return

Value ?? Price > Costs

What has to be true about the relation between Price and Value??
Finance fundamentals

- How would you decide if you want to invest?
  - If $\text{Return} > $\text{Invest} + \text{risk compensation}$
- What types of investors are there??
Different types of investors face different risks, why??
The tsunami

• Debt investors – don’t care how big the bottle is as long as their glass will be full
• Equity investors – benefit from the tsunami!!
Debt investors

Loan

Defined payments

Interest & Princ

time

Debt investors

Price

Pmts

YourCo
Equity investors

- Price
- Pmts
- Equity investors

YourCo

Sell Company

Dividend
Dividend
Div

Residual payment

Invest

Seat at the table

INNOVAR
Finance fundamentals

INVEST

$Invest

$Return

Debt investors

Equity investors

YourCo
Funding your business

• Estimate: How do you think most American businesses are funded?
  – Average business is funded by $X$% debt
Funding over time


- Retained Earnings
- Debt
- Equity
Funding options

• What about all those big NYSE listed firms?

<table>
<thead>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
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<td>$23</td>
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<td>Common stocks</td>
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<td>13</td>
<td>20</td>
<td>169</td>
<td>166</td>
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<tr>
<td>Preferred stocks</td>
<td>0</td>
<td>2</td>
<td>4</td>
<td>12</td>
<td>51</td>
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<tr>
<td>Convertible debt</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>16</td>
<td>21</td>
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<tr>
<td>Total</td>
<td>$30</td>
<td>$56</td>
<td>$137</td>
<td>$1,440</td>
<td>$1,786</td>
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</table>
Your funding options?
<table>
<thead>
<tr>
<th></th>
<th>$</th>
<th>Risk</th>
<th>Speed</th>
<th>Effort</th>
<th>Control</th>
<th>Cost</th>
<th>Other</th>
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</thead>
<tbody>
<tr>
<td>Grant</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>Rules</td>
</tr>
<tr>
<td>Line of credit</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>Unrealiable</td>
</tr>
<tr>
<td>Debt</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>Interest CF Pro / Con</td>
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<tr>
<td>Conv. Debt</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>Complex</td>
</tr>
<tr>
<td>Founder Equity</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>High risk</td>
</tr>
<tr>
<td>Angels Equity</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>Finding</td>
</tr>
<tr>
<td>Venture Capital</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Late stage</td>
</tr>
</tbody>
</table>
Other sources

• Franchisor funding
  – Loans for: equipment, the franchise fee, operational costs or any/all of above

• Leasing assets

• Personal sources
  – Home mortgages and equity, credit cards, friends/family, your cash (max 75%)

• Government loans
SBA Loans

- **Criteria**
  - Sound business, trustworthy character, ability to repay with some skin in the game

- **Size**
  - Median $130,000 - $140,000 with highest around
  - Range $5,000 (microloans) to $5M
  - Average loan around $371,000

- **Help**
  - SBA District/Branch Offices – at least one in every state
  - SBDCs – Small Business Development Centers; (~900 with higher education institutions)
  - WBCs- Women’s Business Centers (~100 educational centers nationwide)
Financing Sources

- Idea
- Seed
- Early
- Expansion/Late
- Global

$\uparrow$

Family
Angels
Venture
IPO
Retained Earnings
Initiate Dividends!

$\downarrow$ time

INNOVAR
Funding by industry

- Do you think funding choices differ by industry?

<table>
<thead>
<tr>
<th>INDUSTRY</th>
<th>Debt %</th>
<th>INDUSTRY</th>
<th>Debt %</th>
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</thead>
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<td>Steel</td>
<td></td>
</tr>
<tr>
<td>Energy</td>
<td></td>
<td>Retail (Food)</td>
<td></td>
</tr>
<tr>
<td>Automotive</td>
<td></td>
<td>Chemical</td>
<td></td>
</tr>
<tr>
<td>Utilities</td>
<td></td>
<td>Pharma/Biotech</td>
<td></td>
</tr>
<tr>
<td>Paper and Forest</td>
<td></td>
<td>E-comm/Software</td>
<td></td>
</tr>
</tbody>
</table>
Funding by industry

- Do you think funding choices differ by industry?

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</tr>
</thead>
<tbody>
<tr>
<td>Maritime</td>
<td>63%</td>
<td>Steel</td>
<td>31.69%</td>
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<tr>
<td>Energy</td>
<td>60%</td>
<td>Retail (Food)</td>
<td>29.25%</td>
</tr>
<tr>
<td>Automotive</td>
<td>57%</td>
<td>Chemical</td>
<td>21.47%</td>
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<tr>
<td>Utilities</td>
<td>46%</td>
<td>Pharma/Biotech</td>
<td>12.5%</td>
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<tr>
<td>Paper and Forest</td>
<td>37.45%</td>
<td>E-comm/Software</td>
<td>6.02%</td>
</tr>
<tr>
<td><strong>Market Average</strong></td>
<td><strong>31.81%</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
How do investors value you?

• Financial Planning
  – Liquidity plan
  – Sales plan
  – Costs plan
  – Profitability

• All boils down to...
  – Timing and size of profits
  – Risk and probability of success
Investment Decision

\[ Value = \frac{Future\ Profit_{st}}{(1+r)^t} \]

If Value < Investment, Reject!!
Value = \frac{\text{Future Profits}_t}{(1+r)^t}

Future Profits > Investment Accept!
How big a bite?

• Determined by risk and timing of the profits you forecast!!

Market for capital is competitive, so the investor considers the return they could earn in other similarly risky projects and requires that of YOU!

*You can find cost of capital by industry: Aswath Damodaran NYU Stern website
## VC required returns

### Sweet Spot
5-10x in 4-8 Years

<table>
<thead>
<tr>
<th>Years to Exit</th>
<th>5x</th>
<th>6x</th>
<th>7x</th>
<th>8x</th>
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IRR between 25-75%
How will you decide if you want to invest?
– Invest if $Return > $Invest + risk compensation
In summary

• Value > Price > Costs
  – Model these using assumptions linked to the activities required
  – Near term model helps estimate amount needed now
  – Long term model helps estimate the value of the business

• Costs include the required return paid to investors for taking on the risk of your business
  – Debt
  – Equity
  – Market for capital is competitive