Risk Analysis

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7 Health Ventures
Active diversification and investment guidelines

- Diversification and risk reduction
- What is a VC return target?
- Define diversification factors and benchmark
- Examine fund risk profile
- Define corrective actions
• Active management of diversification reduces risk and is associated with higher returns.

• High risk investments - reduce risk of the total portfolio if they are negatively correlated.
Diversification
The Modern Portfolio Theory- MPT

• Private equity diversification
  – Industry sector
  – Stage
  – Geographic
  – Time of commitment

• Periodic portfolio balancing should be exercised.

• IMPORTANT – Leave some leeway to management in creating guidelines.
Diversification and risk

Sources of Risk:

- **Individual risk** (non systematic)- assigned to the specific investment (price, failure, non-liquidity)
- **Systematic risk**: Market Risk, inflation risk, etc
- **Asset diversification** (investing in many different companies) reduces individual non systematic risk
- **Asset allocation** (allocating funds to different asset classes, sectors, stages, geographies) reduces some systematic risk
Basics

A typical Healthcare fund in Israel:

- Invests in companies, grow them, exit them and create wealth through dividends and/or higher share value

- Invests mainly in Medical Technology, less so in Bio Pharma software and services.

- Its goal is to create high returns

- Bench mark of IRR is ~20% for private equity investors in technology
### Private Equity returns benchmark

<table>
<thead>
<tr>
<th>Private Equity IRRs</th>
<th>All Private Equity</th>
<th>Venture Capital</th>
<th>Buyout</th>
<th>Mezzanine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ending Q4 2000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 Year</td>
<td>21.7%</td>
<td>27.2%</td>
<td>17.4%</td>
<td></td>
</tr>
<tr>
<td>20 Year</td>
<td>19.9%</td>
<td>19.6%</td>
<td>20.4%</td>
<td></td>
</tr>
<tr>
<td>Ending Q4 2002</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Year</td>
<td>7.8%</td>
<td>28.3%</td>
<td>1.0%</td>
<td>6.3%</td>
</tr>
<tr>
<td>10 Year</td>
<td>14.8%</td>
<td>26.2%</td>
<td>8.7%</td>
<td>9.8%</td>
</tr>
<tr>
<td>20 Year</td>
<td>14.3%</td>
<td>16.6%</td>
<td>12.4%</td>
<td>10.3%</td>
</tr>
</tbody>
</table>

### Private Equity IRRs – Excess Returns Over Public Equities

<table>
<thead>
<tr>
<th></th>
<th>Private Equity</th>
<th>S&amp;P 500</th>
<th>DJIA</th>
<th>NASDAQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ending Q4 2000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15 Year IRR</td>
<td>20.7%</td>
<td>13.2%</td>
<td>14.0%</td>
<td>14.5%</td>
</tr>
<tr>
<td>Excess Returns</td>
<td></td>
<td>7.5%</td>
<td>6.7%</td>
<td>6.2%</td>
</tr>
<tr>
<td>Ending Q3 2002</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 Year IRR</td>
<td>15.2%</td>
<td>9.0%</td>
<td>6.2%</td>
<td></td>
</tr>
<tr>
<td>Excess Returns</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25 Year IRR</td>
<td>14.2%</td>
<td>9.0%</td>
<td>5.2%</td>
<td></td>
</tr>
</tbody>
</table>

http://mba.tuck.dartmouth.edu/pecenter/research/pdfs/asset_allocation.pdf
Diversification by Sector

- Means allocating funds to different industry sectors (cardiology, orthopedics, etc.)
- Industry sector allocation usually limits total allocation of not more than 25% per sector

- Single company exposure: Should not exceed 10% of total allocation (rarely if ever - 20%)
Diversification by stage

Different risk is associated with each stage: early- RD risk, growth- market risk, late- execution risk

• Defined largely by the target IRR
• Over-allocation to late stage (60%) reduces risk and return (to about 15%) and exposes to systematic risk
• Roughly, in order to achieve ~20% IRR allocation to stages should be equal- 33% early, growth, and mature companies (needs fine tuning)
Timing allocation

• Some years are “bad”

• Funds should not be invested in one year

• Cycles in private equity are 3-4 years—which should be a minimum for spreading the investment
Geographic allocation (Home bias)

- Most US investors allocate between 10-25% to non USA investments (Adam st-30%)

- Non US is allocated to growth markets, in SE Asia, China and Europe. Israel is grouped with either.

- No good info about Israel: probably similar returns to US funds, IVC claims high correlation with NASDAQ
  - Means that US investments do not make sense for Israeli funds!! However funding risks at critical times are lower in the US.

- Higher risk due to distance, lower country risk.

- Access to good local groups is key- as the distance is a risk factor in itself
Law of large numbers

- Success rate: Individual company in an experienced fund portfolio: 11%-25%
- Hence the golden rule of 1 in 10 is a blockbuster, and 3 in 10 are success - holds true.
- Law of large numbers - need about 10 companies per fund.
- Normally - Single company allocation is less then 10% of the fund.
- Number of planned companies: 9-10,
## Risk Management

<table>
<thead>
<tr>
<th>Company</th>
<th>Stage</th>
<th>Risk Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Technology</td>
</tr>
<tr>
<td>A</td>
<td>Late</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Development</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Development</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>Early</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>Development/Late</td>
<td></td>
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<tr>
<td>New opportunities</td>
<td></td>
<td></td>
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<tr>
<td>New Opportunities</td>
<td></td>
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</tbody>
</table>

*Note: The table represents the risk type for different stages and companies.*
Summary

• Risk management is an active, ongoing process.
• It is one of the major criteria for investment.
• It is one of the major criteria for divesting companies.
• It is especially important in venture funding as a tool to increase returns.