GEST S 531

Equity: a long term perspective
Long term returns

Choice of an index? Dimson, Marsh, Staunton (2002) stress 4 important features:

1) Replicability in real life
2) Use of all sources of revenues (capital gains + remunerations)
3) Representative of the market
4) Appropriate weights (market cap.)

Which of today’s indices have all these features?
Long term returns

- Many old indices but few match today’s standards => usually only capital appreciation
- When using long term time series, small original divergence may lead to huge differences when compounding returns,
- Example from Jorion & Goetzmann (1999): 1626: Manhattan bought for 60 guilders more or less 24 USD)
  Value in 1995 if r = 5% versus if r = 3%?
  1,6 billion USD versus 1,3 million USD!!!
• In finance: CAPM
  \[ r_e = r_f + \beta_e \times \text{risk premium} \]
• Previously, discussions on the notion of “risk free asset” (Cf sovereign bond part)
• On top of that to apply the CAPM, one has to know the value of the risk premium.
• Risk Premium = \( r_m - r_f \)
• But what is it worth?
• What would you say?
Equity Risk Premium

• Interview of 226 financial analysts:
  – Mean for the future 10 & 30 years: 7%, for the future 1 to 5 years: 6-7%
  – Scenario for 30 years, pessimistic: 2%, optimistic: 13%!
  – More recent surveys => important decrease in the mean (but pre-2008)

• Aswath Damodaran (prof. NYU)
  http://pages.stern.nyu.edu/~adamodar/

• Couple of years ago, survey made (+/- 21500 visitors of his site voted):
## Equity Risk Premium

<table>
<thead>
<tr>
<th>Premium</th>
<th>Proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-2%</td>
<td>4%</td>
</tr>
<tr>
<td>2-4%</td>
<td>15%</td>
</tr>
<tr>
<td>4-6%</td>
<td>42%</td>
</tr>
<tr>
<td>6-8%</td>
<td>24%</td>
</tr>
<tr>
<td>8-10%</td>
<td>9%</td>
</tr>
<tr>
<td>&gt; 10%</td>
<td>6%</td>
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</tbody>
</table>
Equity Risk Premium

Source: Dimson, Marsh, Staunton (2002), *Triumph of the optimists*
Equity Risk Premium

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Equity Risk Premium

• Premium: academics point of view (textbooks)
• Brealey & Myers (2000): 72 years period, risk premium = 9%.
• Bodie, Kane & Marcus first edition idem (changes since)
• End of the 1990’s, textbooks: 8,5% on average (see Dimson, Marsh & Staunton, 2006)
• But which equity premium are we talking about?
Equity Risk Premium

  - Required risk premium: incremental return of a diversified portfolio over $r_f$ required by an investor
  - Historical: Historical differential between the return of the stock market over Treasury bonds
  - Expected: Expected differential between the return of the stock market over Treasury bonds
Fernandez (2004)

<table>
<thead>
<tr>
<th>Authors</th>
<th>Conclusion about market risk premium</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ibbotson and Chen (2003)</td>
<td>5.9% arithmetically, 3.97% geometrically</td>
</tr>
<tr>
<td>Brealey and Myers (1996)</td>
<td>8.2 - 8.5%</td>
</tr>
<tr>
<td>Brealey and Myers (2000)</td>
<td>6 - 8.5%</td>
</tr>
<tr>
<td>Copeland, Koller and Murrin (1995)</td>
<td>5 - 6%</td>
</tr>
<tr>
<td>Copeland, Koller and Murrin (2000)</td>
<td>4.5 - 5%</td>
</tr>
<tr>
<td>Ross, Westerfield and Jaffe (1993)</td>
<td>8.5%</td>
</tr>
<tr>
<td>Van Horne (1992)</td>
<td>3 - 7%</td>
</tr>
<tr>
<td>Weston, Chung and Siu (1997)</td>
<td>7.5%</td>
</tr>
<tr>
<td>Bodie and Merton (2000)</td>
<td>8%</td>
</tr>
<tr>
<td>Damodaran (1994)</td>
<td>5.5%</td>
</tr>
<tr>
<td>Damodaran (2001)</td>
<td>4%</td>
</tr>
<tr>
<td>Mayfield (2004)</td>
<td>5.9%</td>
</tr>
<tr>
<td>Claus and Thomas (2001)</td>
<td>3.4%</td>
</tr>
<tr>
<td>Harris and Marston (1999)</td>
<td>7.14%</td>
</tr>
<tr>
<td>Dimson, Marsh and Staunton (2003)</td>
<td>5% arithmetically, 3% geometrically</td>
</tr>
<tr>
<td>Jagannathan, McGrattan and Shcherbina (2001)</td>
<td>7% during 1926-70. 0.7% after that.</td>
</tr>
<tr>
<td>Welch (2000)</td>
<td>7% arithmetically, 5.2% geometrically</td>
</tr>
<tr>
<td>Welch (2001)</td>
<td>5.5% arithmetically, 4.7% geometrically</td>
</tr>
<tr>
<td>Pensions and Investments (1998)</td>
<td>3%</td>
</tr>
<tr>
<td>Greenwich Associates Survey (1997)</td>
<td>5%</td>
</tr>
</tbody>
</table>
CAPM?

- Great variety of answers. Impact important for valuation especially for companies with a high β!
- Theoretically, what could be viewed as a reasonable figure?

- How could we get there….
Equity Risk Premium

Mehra & Prescott (1985), US risk premium = 6% for the period 1889-1978
⇒ If so, coefficient of risk aversion should be largely higher than 2 (a figure usually considered as reasonable)
⇒ Indeed, the riskiness of equities cannot explain this difference
⇒ Premium should be at most 1% (Mehra & Prescott, 2003)
Equity Premium Puzzle

- Surprising element: it’s a “Puzzle” and it has been a long-lasting one...
- Kocherlakota (1996): It’s still a puzzle
- Question: $r_f$ too low, premium too high? Both elements?
- Sbrancia (2011): role of financial repression in reducing $r_f$
- Difference in transaction costs (bonds versus equity)?
- People VERY risk averse?
Equity Premium Puzzle

- Many theoretical attempts to explain the puzzle even sometimes at the expense of the intuition of basic economic models (Critique of Jorion & Goetzmann, 1999).
- Brown, Goetzmann, & Ross (1995) suggest one may be confronted with a simple “Survival Bias”
- Most studies based on data from the USA or the UK which are markets which were almost never interrupted => *ex post* risk premium on these markets seems really reassuring
Survival?

• But what about markets which were interrupted or even disappeared?
• Theoretical analysis shows the following implications:
  1. Existence of a bias for expected returns
  2. The size of this bias is an increasing function of returns’ volatility
  3. An *ex ante* risk premium equal to zero may generate a positive risk premium if one conditions on survival…
Survival?

• Surviving markets have a higher average return in their first years than afterwards=> impression of mean reversion, tendency to reject the random walk!
• Analysis of earning announcements: Literature => strong link between announcements and post-announcement performance due to firms in financial distress surviving the announcement?
• Increasing the sample size by relying on longer time series: Allows overcoming statistical issues due to the lack of data. But at a price: a potential bias which needs to be taken into account!!!
Survival?

- Beyond Equity Premium Puzzle, survival bias frequent in many analyses
- WWII, Abraham Wald analyzed bombers’ survivability following encounter with enemy fire
- Aim analyze information on hits on aircrafts coming back to ameliorate survival (choice to be made as reinforcing everything to costly and plane to heavy). Imagine 4 parts: fuselage, engine, fuel system and wings,

- Hits on planes coming back often located in the same places (fuselage and wings). Where should you put additional armor?
“Global stock markets”

- Jorion & Goetzmann (1999): US market is not enough. If 0.4% chances to disappear: one occurrence in 250 years!
- => necessity to increase the sample and analyze other markets
- Study based on 39 markets with and without interruptions
“Global stock markets”

Measure: Equity Premium = \( R_s - R_{tb} \)
= \( CR_s + IR_s - [\text{Inflation} + \text{Real Rate}] \)
= \[ CR_s - \text{Inflation} \] + \[ IR_s - \text{Real Rate} \]

• With \( R \), return, \( s \); stocks, \( tb \); treasury bills \( CR \);
  Capital Return, \( IR \); Income Return.

• Here, only possible to measure the first part of the equation.
Figure 1. Real returns on global stock markets. The figure displays average real returns for 39 markets over the period 1921 to 1996. Markets are sorted by years of existence. The graph shows that markets with long histories typically have higher returns. An asterisk indicates that the market suffered a long-term break.

Source Jorion and Goetzmann (1999)
### “Global stock markets”

- **Separation on basis of markets’ continuity:**
  
<table>
<thead>
<tr>
<th>Real return</th>
<th>$ Return</th>
</tr>
</thead>
<tbody>
<tr>
<td>-0.47%</td>
<td>3.11%</td>
</tr>
<tr>
<td>0.75%</td>
<td>4.68%</td>
</tr>
</tbody>
</table>
  
- **39 countries**
  
<table>
<thead>
<tr>
<th>Mean</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.88%</td>
<td>2.35%</td>
</tr>
<tr>
<td>5.09%</td>
<td>5.20%</td>
</tr>
</tbody>
</table>

- **11 continuous countries**

(c) Kim Oosterlinck
Dividend effect?

- If dividends explain higher US returns the dividends in other countries should syst. be higher…
- Test on smaller sample (because of data availability)
- Index industrialized countries
- Dividend effect US = 4.14%, average 4.25% (Japan: 1.84%)
Impact on EPP?

- EPP: Preliminary remark in period of stress riskless asset disappears often! (cf part on sovereign debts)
- If EPP reflects a “Survival Bias” then => Expectations of a non-zero probability of a large crash of the market
- Back to a form of “Peso Problem”
Large US premium?

- Potential mix of
  - Survival Bias
  - And pricing of a rare event which did not materialize

- Test the existence of a risk premium reflecting the failure of the market

- Approach: Event study around market interruption dates
Figure 2. Real stock prices before interruption. The figure displays the performance of an equally weighted index where real returns are aligned on the interruption date. The total sample of 25 is further divided into a sample for which the interruption turns out to be temporary, and a sample for which the interruption is permanent.
A smaller puzzle?

- Dimson, Marsh & Staunton (2006), new database, equity premium over 106 years and 17 countries.
- If US T-Bills are $r_f$ then world annual risk premium = 4.7%
- New analyses: conclusion, survivorship bias is negligible
- BUT data
- Cf: Le Bris et Hautcoeur (2008) for France!!!
Re-emerging markets

- Jorion & Goetzmann (1999b) Same idea than previously: High observed returns on emerging markets should be set into perspective since they are often “re-emerging markets”
Efficient Market Hypothesis

• Informational content of prices and distinction between three forms of market efficiency
• If markets are efficient in the weak form, past prices cannot help predict future prices
• If markets are efficient in the semi-strong form, exploiting public information doesn’t lead to higher returns
• Finance literature replete with attempts to find ways to “beat the markets”. Data mining or discovery of real anomalies?
Weak efficiency?

- If markets are efficient in the weak form, past returns should not allow predicting future ones.
- Fama & French (1988)
  - Mean-reverting component of stock prices (1926-1985)
  - Not visible for the short term (autocorrelation minimal for daily and weekly holdings)
  - But present for 3 to 5 years horizons
  - Degree of predictability 40% for large companies, 25% for small ones
Momentum?

- Jegadeesh and Titman (1993): portfolio constructed by buying “winners” and selling “losers” (1965-1989) => significant abnormal positive return for short term portfolios (3 to 12 months), However disappearance of part of the effect for longer holding periods…
- Rouwenhorst (1998): effect exists internationally
- Jegadeesh and Titman (2001): momentum profits still present during the 1990s
Momentum and Mean Reversion?

- What if we take a more long term perspective? Cooper, Gutierrez and Hameed (2004) period 1929-1995 => influence of the state of the market! Positive state lead to positive momentum, negative to negative ones!
- Goetzmann (1993): Mean reversion in stocks? Alternately bull and bear markets versus random walk. Lack of data may limit tests therefore focus on long term
- Data: securities traded in London (over 300 years) and New York (over 200 years). Yearly Index : NYSE: 3,9%, LSE: 2,1%
Mean reversion

• Goetzmann (1993): Series of tests to determine the existence of a random walk
• Conclusions:
  • Some persistence of mean reversion
  • In function of the tests used, evidence or not of autocorrelation. For the positive ones, long-Term memory for the LSE for the 1700-1989 period nor for the NYSE
• Exploitation of the observation in an arbitrage fashion “another matter entirely”…
Anomalies / Predictability

- Many theories/anomalies have been suggested/observed. What is their validity on a long period of time?
- Over performance of:
  - Small versus large caps?
  - Value companies
    - high Book/Market,
    - high dividend yield (Dividend/P),
    - high earning yields (Earnings/P)
Small versus large caps

• Banz (1981). Small companies get higher returns than other even when risk is taken into account [on average higher return of 4.3%]
• Tiniest stocks (micro-caps) perform best
• Fama & French (1992), small capitalizations outperform large capitalizations (period 1963-1990).
• Small cap effect apparently mostly observable for the first weeks of January! (Keim, 1983; Reinganum, 1983 and Blume and Stambaugh, 1983)
Small versus large caps


Source: Dimson, Marsh and Staunton (2004)
Small versus Large caps

• Suggested explanation: taxation! Tax deduction and sale of loss making investments (not 100% convincing)

• Alternative explanation: small firms less scrutinized by institutional investors (less information => require a premium). “Neglected firm effect” but also probably liquidity premium

• Behavioral explanation: Regret avoidance

• Actors regret more non-conventional decision than conventional ones, In case of error higher regret in the first case (conventional error <=> bad luck). Courage to invest in small (unconventional firms) => higher required return
Small versus Large caps:

1. Going back in time. Siegel (2002): essentially due to an over performance end 70’s-begin 80’s. AND, high instability of the “over performance”

2. Internationally valid? => Many studies in the 1980s and begin 1990s tend to confirm the finding

Equity weighted minus capitalization weighted

Source: Dimson, Marsh and Staunton (2004)

Kim Oosterlinck (c)
Initial and subsequent research

Reversal in International Small-Cap Performance


Source: Dimson, Marsh and Staunton (2004) 41
Value Companies

- Value Companies ⇔ low rated companies
- Value companies ⇔ low price compared to fundamentals or have experienced recent price decline

- Are investment in value companies leading to higher returns? Test on basis of a series of ratios:
  - Higher **dividend yield** \((\text{Dividend}/P)\) ⇒ higher returns?
  - Higher **book to market ratio** (low market to book) ⇒ higher returns?
  - Higher **earnings yield** (low P/E) ⇒ higher returns?
Longer look at dividend yield

• Fama & French (1988) and others: higher market return when high dividend yield is observed
• Goetzmann & Jorion (1995): Dividend yield good possibility to predict stocks’ long term returns?
• Data: NYSE and London LT data: over the whole sample: limited predictability
• But predictability” seems possible for subsamples:
  – For the pre-1926 period in the USA
  – Is high for post-1926 UK
  – And may be significant but counter-intuitive!
Longer look at dividend yield

• Potential Explanations in changes in predictability:
  – High stability of returns before 1926
  – Survival bias and impact of 1974 (outlier). Reflect the possibility that markets could have disappeared in the UK

• Survival bias seems confirmed by a series of econometric tests
Longer look at dividend yield

Performance of High and Low Yielders Within Top 100 U.K. Stocks—1900–2003


Source: Dimson, Marsh and Staunton (2004) 45
Longer look at dividend yield

Source: Dimson, Marsh and Staunton (2004)
Book to Market ratio

- Several papers: average returns positively related to Book to Market ratio. Fama & French (1992), separation of companies in function of their Book/Market ratio for the period 1963-1990:
  - 1\textsuperscript{st} decile: monthly return of 1.65%,
  - Last decile monthly return of 0.72%
  - Many subsequent papers on the same topic with an effect which seems to be lasting
US Book to Market ratio

Panel B. Stocks Ranked by Book-to-Market

Cumulative value (log scale)

- CRSP index: 10.1% p.a.

End of year

Source: Dimson, Marsh and Staunton (2004)
Price/Earning Ratio

• Basu (1977): portfolios with small P/E have higher return than those with large P/E, even when correcting for risk (betas)
• Campbell & Shiller (1988): Earning yields predictors of market return
• Dimson, Marsh and Staunton (2004) compare again the initial effect and the subsequent one
• Value firms effect seems to be lasting even though on a smaller level
Price/Earning Ratio

Persistence of Value-Growth Effect Internationally Since Discovery—Value Premiums (% per month)

Value Stocks

• Why would value stock overperform?
• Over-optimism regarding the other companies? Linked to behavioral finance: people tend to rely too much on recent information good results one year => high price increase => high P/E and in the long run low return Value stocks ⇔ distressed => higher risk => higher return?
• Chance? Spurious data?
• By construction focus only on companies with strictly positive values => bias since companies with negative earnings are omitted
Value Anomalies?

• Real mispricing or error when correcting risk by using the CAPM?

• Every test is actually a joint test: one is testing simultaneously market efficiency (the anomaly) and the validity of the model used to take risk into account (usually CAPM)

• Fama (1998): Incoherence regarding the uncovered anomalies, statistical correctness debatable

• Small changes in hypotheses may lead to reversals of conclusions
Value Anomalies?

• Increasing literature regarding anomalies and increasing discovery of “new” anomalies…
• Are markets inefficient?
• Risk premium issue versus Inefficiency
• Or is it just data mining with short-lived effects?
• Historical perspective tend to indicate that there are many reversals and that in many cases survivorship issues need to be taken into account
• Controversy still live…
Globalization

• Recent phenomenon? Rouwenhorst (2004) in 1774: “Mutual Fund” Eendragt Maakt Magt, categories to invest in:

1. Banks from Denmark and Vienna
2. Danish Tolls
3. Russia & Sweden
4. Brunswick & Mecklenburg
5. Postal services from Saxony and Peat from Brabant
6. Spanish canals
7. British colonies
8. Danish Colonies in America
Globalization

• Bordo, Eichengreen, Irwin (1999): Impression today: globalization more important than ever
  Globalization maximum nowadays? Which globalization? Trade and finance

• Finance:
  – Importance of financial flows from European center to the periphery (Financial Flows/GDP higher before)
  – BUT less sectors at the time (mostly railroads and sovereign debts). Ex UK: +/- 40% Rail, 30% Debt, 10% Mining
  – Thus apparently more integration today
Why? Suggestions: Information Asymmetries (explains railways & debts), Problems of contracts (difficult to control), Macroeconomic risks (exchange despite Gold standard), Accounting Standards

What when crisis occurred? Then: Gold standard => limited room of maneuver

BUT more credibility “Lender of last resort”? OK for the core but not for the periphery

However not more severe today (Role of institutions or Age of markets?)
Long-Term Global market correlations

• International diversification: positive in terms of risk. But are the benefits constant over time?
• Goetzmann, Li, Rouwenhorst (2001), World equity markets correlations for 150 years, data on many markets but limitations!!!
• Separation in seven periods
• Early Integration (1875-1889), Turn of the Century (1890-1914), WWI (1915-1918), Interwar (1919-1939), WWII (1940-1945), Bretton Woods (1946-1971), Present (1972-2000)
Long-Term Global market correlations

- Many changes over time. Peaks end 19th century, end 20th century and during the Great Depression
- Causes? Diversification potential today?
- Decomposition of diversification benefits
- Variation of the correlation itself
- Variation of investment opportunities
- Last decades: Increase in opportunities BUT also increase in average correlation => benefits of international diversification… not so high!