Valuation of Asset Management Firms: Solving the HUBERMAN-Puzzle

Bernd Scherer, October 2014
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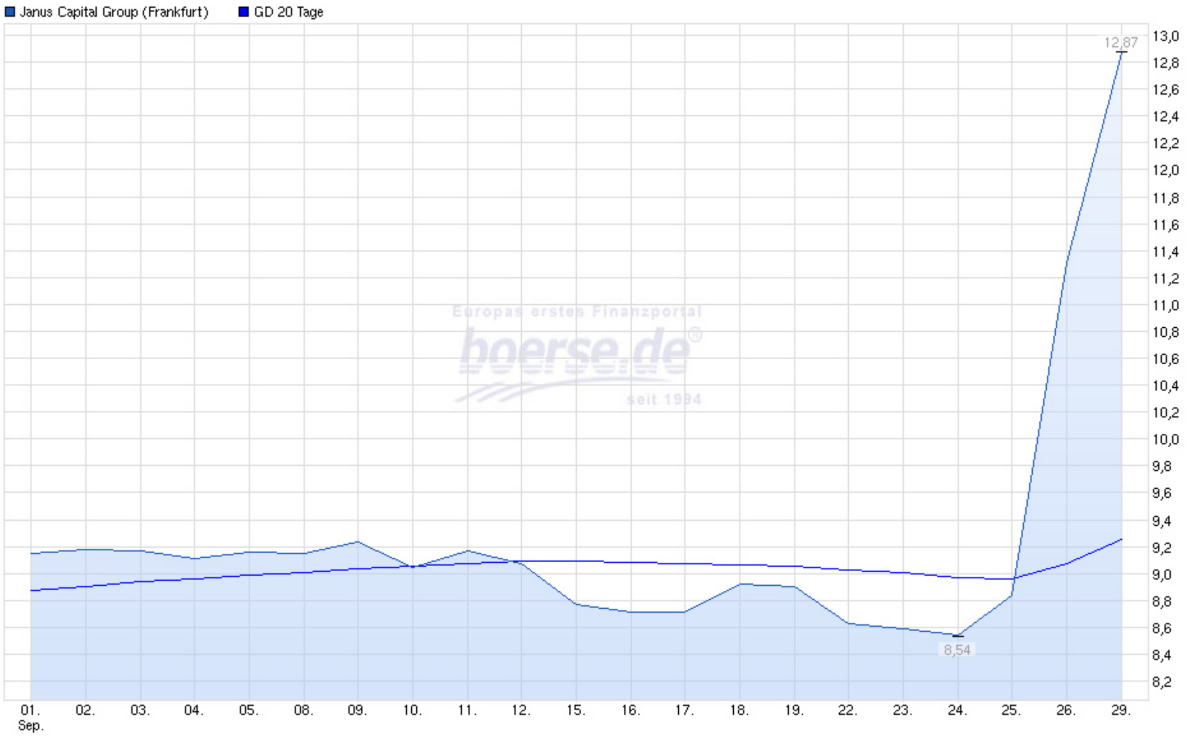
Motivation: Net of Gross

Figure 1 – Allianz Share Price

Wie Groß ist Gross?

Figure 2 – Janus Share Price



Huberman - Puzzle

- Asset management firms trade at prices of 3% to 10% of assets under management, while HUBERMAN (2004) found that a discounted discount model (DCF) would imply much higher valuations of 30% of assets under management (AuM).

- Does the market misprice asset management firms?

Discounted Cash Flow Model for Asset Management Firms

- Discrete time version of a standard discounted cash flow model originally advanced by Ross (2004), Boudoukh et al (2003) or Cherkes (2004).

- Let r denote the return on a given mandate (gross of fees, but net of trading costs) and R the return on its "benchmark" (comparable, i.e. risk adjusted market return). We ignore fixed costs and define operating margins (θ) as

(1) $$\theta = \frac{earnings}{revenues}$$

- We also ignore incentive fees, i.e. the asset management firm only charges asset based percentage fees (f), defined as

(2)
$$f = \frac{revenues}{AuM}$$

- Earnings are given by

(3)
$$\begin{aligned} earnings &= AuM \cdot \frac{revenues}{AuM} \cdot \frac{earnings}{revenues} \\ &= AuM \cdot f \cdot \theta \end{aligned}$$

- What is the price of this earnings stream over n years? First, we identify the earnings for the (equity) owners of the asset management firm at the end of year 1 (assuming zero capital inflows and fees applied to end of period net asset value)

(4)
$$earnings_1 = AuM\left(1+r\right)f\theta$$

- What is left to investors is

(5)
$$AuM\left(1+r\right)\left(1-f\right)$$

- The general expression for earnings at the end of year i

(6) $$earnings_i = AuM\left(1+r\right)^i\left(1-f\right)^{i-1} f\theta$$

- The series of cash flows to discount is given below

$$\begin{aligned}
earnings_1 &= AuM\left(1+r\right) f\theta \\
earnings_2 &= AuM\left(1+r\right)^2\left(1-f\right) f\theta \\
earnings_3 &= AuM\left(1+r\right)^3\left(1-f\right)^2 f\theta \\
\dots \\
earnings_n &= AuM\left(1+r\right)^n\left(1-f\right)^{n-1} f\theta
\end{aligned}$$

- At what rate should these cash flows be discounted, i.e. what is the discount rate for cash flows containing the same form of systematic risks?

- Given that we defined benchmark returns as risk adjusted returns, we can use benchmark returns.[1] These leads to the specification of a discounted cash flow model

(7) $$P\left(n\right)=\frac{AuM\left(1+r\right)f\theta}{\left(1+R\right)}+\frac{AuM\left(1+r\right)^{2}\left(1-f\right)f\theta}{\left(1+R\right)^{2}}+\frac{AuM\left(1+r\right)^{3}\left(1-f\right)^{2}f\theta}{\left(1+R\right)^{3}}+\ldots+\frac{AuM\left(1+r\right)^{n}\left(1-f\right)^{n-1}f\theta}{\left(1+R\right)^{n}}$$

- Further simplification results in

(8) $$P\left(n\right)=\frac{AuM\cdot f\cdot\theta}{\left(1-f\right)}\left(\sum_{i=1}^{n}\left[\frac{\left(1+r\right)\left(1-f\right)}{\left(1+R\right)}\right]^{i}\right)=\frac{AuM\cdot f\cdot\theta}{\left(1-f\right)}\left(\frac{\frac{\left(1+r\right)\left(1-f\right)}{\left(1+R\right)}-\left[\frac{\left(1+r\right)\left(1-f\right)}{\left(1+R\right)}\right]^{n}}{1-\frac{\left(1+r\right)\left(1-f\right)}{\left(1+R\right)}}\right)$$

[1] Suppose we use the CAPM as asset pricing model. The risk adjusted discount rate for fees on a US small Cap portfolio would be the expected returns on US small cap stocks, which in turn would be $R=R_{US-small-cap}=r_f+\hat{\beta}_{US-small-cap}\cdot\left(R_{World}-r_f\right)$.

- To create more insight into (7) we assume $r = R$, i.e. performance gross of fees equals benchmark performance to arrive at

(9) $$P = P(n) = AuM \cdot \theta\left[1 - (1 - f)^{n-1}\right]$$

- Assuming an infinite time horizon ($n = \infty$) we get

(10) $$P = AuM \cdot \theta$$

- Under the stated assumptions the valuation of an asset management firm is independent from the asset class it invests in. Equity firms are ceteris paribus not more valuable than fixed income firms. This will only change if the management of equity mandates comes with higher operating margins or management alpha ($r > R$).

- A common valuation metric for asset management firms is price as a fraction of assets under management. According to our analysis, the price of an asset manager relative to its assets under management equal his operating margin.

(11) $$\frac{P}{AuM} = \theta$$

- However operating margins usually amount to around 30%, while prices for asset management transactions (or publicly traded firms) are more around 3%. This “puzzle” is raised in Huberman (2010). Either the above analysis is wrong or prices of asset management companies are biased.

- What did our discounted cash flow model miss? How should we adapt valuation models to arrive at more realistic valuations?

What Did We Miss?

1. We did not take into account the effect of performance on flows. This is the reason, the value of the firm in (10) is independent from the level of fees. High fees lower growth of assets under management as only a fraction $(1-f)$ remains to grow in the next period. However this is entirely offset in present value terms by higher fees today.

2. We did not take into account the effects of flows on performance. Again in a realistic setting additional flows would lead to deteriorating performance as investment strategies usually have limited capacity.

3. Third, we assumed that operating margins are unaffected by future competition. This is an unlikely scenario. The appearance of exchange traded funds (ETF) in the fund management industry is the equivalent of generic drugs in the pharmaceutical industry with the corresponding downward pressure on operating margins.

Economics of Asset Management & Capital Formation

1. There is a vast amount of evidence that active managers do not outperform their (risk adjusted) benchmarks. So why do portfolio managers exist and why are they among the most well paid professionals in an economy? What is there scarce skill that deserves this type of compensation? It there market failure?

2. There is an equally vast amount of evidence that outperformance is not persistent. So, why do investors chase past returns? Are investors irrational?

3. Under percentage fees a doubling in assets under management, also doubles revenues. So, why do percentage fees exist and why is there so little performance based compensation? Is this all evidence of missing competitive forces that calls for a regulation of the asset management industry?

- The behavioral finance narrative focuses on investor irrationality. This is a temptation behavioral economists don't cease to resist. An example for this is the work by Kahneman/Twersky (1971) on the "law of small numbers". In their view, investors simply overestimate the representativeness of recent performance data.

BERK/GREEN (2004) - Model

- In stark contrast Berk/Green (2004) offer a rational equilibrium model for the asset management industry to simultaneously address all the above questions.

  1. Investors competitively provide capital to funds by allocating more money to outperforming funds subject to a Bayesian updating rule, i.e. investor learn about the skill of individual managers using past performance records

  2. Portfolio managers display different abilities to generate outperformance (skill) and face diseconomies of scale. Recent empirical evidence by Pastor/Taylor/Stambaugh (2014) supports this hypothesis. Diseconomies of scale originate from universe limitations and transaction costs market (impact). In other words size matters, but it is size relative to strategy capacity not absolute size per se. The exception are hierarchical costs (larger firms tend to limit the scope of an individual portfolio manager, due to reputational risks attached to the failings of an individual manager).

- As a consequence of these assumptions Berk/Green (2004) can explain all of the above academic puzzles.

1. Return chasing behavior is entirely rational. It pays to invest in better managers before their alpha gets eroded by size.

2. Weak performance for active managers is no surprise as outperformance is transferred into higher fee income. This is why percentage fees are an efficient way to keep the value added in the pockets of asset management firms rather than giving them away for too little to investors.

3. Limited predictability is a consequence of inflows considerably weakening alpha persistence. The most important takeaway from Berk/Green (2004) is that investment processes suffer from considerable diseconomies of scale. This needs to be incorporated into valuation models as it caps the value of asset management firms.

Incorporating BERK/GREEN into DCF Models

- We can model asset management firms under the assumption that they have already reached their optimal size. Of course this size will differ due to the manager skill and the capacity of his strategy (how fast does alpha based on his skill decay if assets under management rise?), i.e. firms owned by very skilled managers with little alpha decay will be valued higher than firms with lowly skilled asset managers, even though both firms will provide zero alpha in equilibrium.

- If a fund has reached its optimal size, its earnings become a fixed annuity stream

$$AuM^{*} \cdot f \cdot \theta \tag{12}$$

- Assuming a flat term structure with a riskless rate of r_f, the value of the asset management firm becomes

(13) $$P = \frac{AuM^{*} \cdot \theta \cdot f}{r_f}$$

- The value of the firm relative to its assets becomes

(14) $$\frac{P}{AuM^{*}} = \frac{\theta \cdot f}{r_f}$$

- Example: If long run rates are at 5% an asset management firm with 30% operating margin and 0.5% average fees will trade at 3% (market capitalization to assets under management).

Implicit Options: Portfolio Managers as Options

- Asset owners hire asset management companies that in turn hire portfolio managers. This leads to two separate principal agent relations that will turn out to be highly interdependent.

- Dangl et al (2005) model the optimal (firm value maximizing) replacement rule for portfolio managers as an implicit option. They assume the true skills for a portfolio manager are initially unobservable. From the perspective of the hiring asset management firm, a new portfolio manager is like a real option on skill. More skilled portfolio managers will create more likely performance induced cash inflows (investors chasing past returns) and therefore are more likely to manage large fund sizes.

- This is consistent with Chevallier/Ellison (1996) that find manager of large funds tend to display longer tenure. It is therefore not surprising that the value of the asset management firm increases with the value of this option. As times passes by (realized performance is observed), the uncertainty attached to a portfolio manager’s level of skill becomes smaller.

- To keep his job a senior portfolio manager must demonstrate above average levels of skill, i.e. the asset management firm would be willing to fire even portfolio managers with well above average skill levels. This is more intuitive than it sounds. Not doing so would forgo the options value of hiring a new portfolio manager that might offer extraordinary levels of skill. In other words once PIMCO is reasonably sure Bill Gross is “only” a well above average manager and not a god like superstar it will pay for them to replace him by a new portfolio manager that still has considerable “optionality in his CV”.

- However in most cases it will be underperforming portfolio managers that will be replaced by new initially average looking portfolio managers. This has important implications for the first principal agency problem between asset owning clients and the asset management firm. Underperforming asset management firms will suffer less - both in flows and valuation - than outperforming firms gain. This is intuitive. First, underperformance is less informative about future expected performance as a manager change (towards an average looking manager) becomes likely. Second, the (rising) real option value attached to manager change in turn will limit the downside in firm value. Lynch/Musto (2003) also found that underperforming funds are more likely to change their strategy.

- From this perspective a firm of boutique with a wide variety of products looks attractive as it essentially resembles a portfolio of real options. Still it would be a mistake to treat these growth options separately. Multiproduct firms exercise strong control to monitor boutiques as reputational externalities damage all boutiques simultaneously. Underperforming managers are therefore likely to be terminated earlier to limit reputational damage. This is consistent with Fung/Hsieh (1997) that found that reputational costs mitigate incentives of taking excessive risks.

Implicit Options: Performance and Flows

- Chevalier/Ellison (1997) show that fund flows depend on past performance in a nonlinear (convex) fashion. Outperforming funds will receive large inflows (and therefore additional fee income) while underperforming funds remain stagnant. Hence, asset management firms receive nonlinear payoffs from past performance even if they only take linear (percentage) fees.

- This is clearly reflected in Morningstar's rating system where 5 star funds (usually those that outperform their peers in a given product category) receive the bulk of all inflows. Kim (2010) shows that year end rankings are more important for flows than yearend performance. Investment policies that maximize the value of the asset management firm now differ from policies in the interest of the fund investor.

- While asset management firms want to increase or decrease the riskiness of the fund as a function of *past* (year to date) returns, investors only benefit from changes in risk that are subject to the *future* investment opportunity set. The tendency of asset management firms to increase (decrease) risk after a period of underperformance (outperformance) is called fund tournament. From a valuation perspective the convex relation between flows and performance needs to be incorporated in any valuation exercise.

Explicit Options: Incentive Fees and High Watermarks

- Incentive fees (manager receives a fraction of the outperformance he generates, but does not participate in underperformance) are examples of explicit nonlinear payoffs in fund management compensation.

- Intellectually they trace back to Bhattacharya/Pfleiderer (1985) who showed that a principal (asset owner) needs a nonlinear contract to ensure the best agent (portfolio manager) makes the best portfolio decisions. While these contracts are subject to risk shifting incentives (increasing risks, increases the value of a convex payout profile), most funds offer either position or risk transparency (clients don't see positions but aggregated risk reports) and hence principals can efficiently monitor inappropriate risk taking behavior. The irrelevance theorem, discovered by

- Stoughton (1993) does hence not apply (risk can be determined by the principal). Moreover, reputational aspects (blow out limits future job opportunities) will further weaken the incentive to engage in excess risks. Optimal benchmark choice, i.e. choosing the appropriate risk factors (limiting the possibility for a portfolio manager to shirk) becomes more important. In order to further dampen the optionalities in manager payoffs, most clients nowadays introduce high watermarks (past net asset value peaks have to be reached again, before any new incentive fee accumulates). Goetzman et al (2003) establish closed form solutions for the value of fees in funds run with a high watermark. However they focus on valuation of a given schedule only, ignoring risk changing incentives that in turn would have an impact (increase) on valuation.

Implicit Options: Restart Options

- If a fund falls behind its high watermark it becomes increasingly difficult to collect future incentive fees as the call option on future performance moves out of the money. From first passage probability we can calculate the likelihood for a fund - that trades 30% below its high watermark and displays a Sharpe ratio of 0.5 with a 10% volatility target - to return to its high watermark anytime within the next 5 years. It is a mere 43.64%.

- Mathematically we can also calculate the expected number of years it takes to return to the high watermark with a given confidence by solving the first passage probability numerically for time, equating it with the required confidence. For example: for a 95% required confidence the time period we are expected to wait, such that a return to the high water mark will have taken place within that very period is 17.54 years If this number becomes too large the asset manager might find it optimal to restart, i.e. close the fund and reopen. Lan et al (2013) provide tools to value this option. Sometimes closure is not even an option for the underlying manager but instead enforced by employees leaving the firm due to the limited prospect of earning future bonuses. Anecdotical evidence tells us that hedge funds most often implode from within.

Comparable Transactions

- We have seen above that company valuation is a highly subjective exercise as it requires the calibration of a large number of key variables. Investors (particular in MA transactions) often feel they want to found their investment decisions on statistical evidence based on more tangible and objective data. One method is to use comparable market transactions, i.e. relate market valuations to observable characteristics.

- The objective is to build a model (find explanatory variables, functional form …) that bests explains the cross section of market valuations.

- Motivated by (11) and (14) we could run a cross sectional regression with operating margins and percentage fees as explanatory variables:

(15) $$\log\left(\frac{P}{AuM}\right)_i = a + b\log\left(\theta_i\right) + c\log\left(f_i\right) + v_i$$

- Once equation (15) is fitted, it can be used to price new “deals” according to the characteristics of the respective deal (even if time series data are unavailable) or to use the sign and size of the residuum, v_i, as an indicator of over/undervaluation.

Table 1

Data for publicly traded money management firms by the end of 2002. Source: Huberman (2010, p.15)

Company	$\frac{P}{AuM}$	$f = \frac{revenues}{AuM}$	$\theta = \frac{EBIT}{revenues}$
Franklin	3.49	1.04	25
Blackrock	0.94	0.21	37
Eaton Vance	3.81	0.94	35
Federated	1.49	0.36	47
Gabelli	5.13	1.02	44
Nurveen	3.33	0.50	53
Janus	2.72	0.83	32
Neuberger	5.15	1.16	39
T. Rowe	2.42	0.65	34
Waddell	6.61	1.56	35
Average	3.51	0.83	38

Table 2

We report the results for 3 OLS regression (p-values in brackets) variants of (15) with $\log\left(\frac{P}{AuM}\right)$ as left hand variable. Data are given in Table 1. *** (99% confidence), ** (95% confidence), * (90% confidence)

Regression #	(1)	(2)	(3)
Constant	1.42 (0.00***)	1.95 (0.59)	-1.60 (0.06*)
$f = \frac{revenues}{AuM}$	0.92 (0.00***)	-	0.84 (0.004***)
$\theta = \frac{EBIT}{revenues}$	-	-0.23 (0.82)	1.03 (0.00***)
$\bar{R}^2$	0.87	-0.11	0.96

- Contrary to the naive discounted cash flow model, operating margins on their own have no impact on $\frac{P}{AuM}$ as a valuation metric. Instead a combination of operating margins (profitability) as well as percentage fees (pricing power) seems to catch much more of the cross sectional variations.

- This is more consistent with our Berk/Green (2004) version of a discounted cash flow model. While this is interesting, readers should not read too much into it. We have a small sample, for a given period of time and we almost surely failed to include other explanatory variables.

- This brings us to another use of the above regression model. In line with empirical corporate finance models, we could test for the importance of various value drivers for asset management firms. For example it would be interesting to test whether firms with a high percentage of institutional business are more highly valued than firms with more retail exposure, whether multiproduct firms deserve higher or lower valuations, whether firms that hedge their market exposures deserve higher valuations, etc.

(16) $$\log\left(\frac{P}{AuM}\right)_i = a + b\log\left(\theta_i\right) + c\log\left(f_i\right) + d\log\left(\frac{institutional - AUM}{Aum}\right) + controls + v_i$$

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