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A note on the valuation of asset management firms

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Abstract Market capitalization relative to assets under management is often used to value asset management firms. Huberman's (2004) dividend discount model implies that cross-sectional variations in this metric are explained by cross-sectional differences in operating margins, and yet we find no evidence of this in our data set. We show that a superior model—inspired by the work of Berk and Green (2004)—includes also the level of fees as an explanatory variable. This approach dramatically increases the fit of our valuation model and casts doubt on the relevance of the so-called Huberman puzzle.

Keywords Asset management firm · Valuation · Revenues · Operating margins

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1 Introduction

Huberman (2004) uses a dividend discount model to value asset management firms. He shows analytically that the ratio of market capitalization to assets under management (MCap/AuM)—a popular valuation measure that indicates the cost of buying assets rather than growing organically—is driven solely by operating margins. The following puzzle then arises: Although operating margins are usually around 30%, MCap to AuM is only in the 3–8% range. How can this inconsistency be resolved? Do differences in operating margins actually explain all the cross-sectional variation in valuations?

This note demonstrates that the main problem with the Huberman model is its assumption of unlimited capacity (i.e., unlimited growth in assets under management). Under that assumption, the level of fees does not matter; increasing fees will not increase valuation because the greater short-term income comes at the expense of future asset growth. These two effects cancel each other out, provided the asset growth rate equals the discount rate. In other words, an asset management company's present value of fee income equals its current assets under management. Of course, realistic active investment strategies (i.e., those that deviate from market weights) will exhibit capacity limits. If too many investors follow a given strategy, returns will decline and clients will eventually leave. Infinite growth is clearly unrealistic, and models built on that assumption will yield valuations that are too high. Hence, profit-maximizing asset management companies will not extend their AuM beyond an optimal, strategy-specific level.

This conclusion is one of the key insights in Berk and Green (2004), from which we deduce that an accurate valuation requires more than knowledge about the management company's operating margins. Asset managers that can sell a given capacity at a higher fee will call for higher valuations because in that case the growth rate (zero under fixed capacity) and the discount rate (i.e., the riskless rate) differ. In this situation, one would expect that the ability to generate revenues matters no less than the ability to turn them into profits (i.e., the operating margin). Hence, a cross-sectional model that incorporates both variables should better explain variations in valuations, and this is exactly what we find in our panel data set of 33 asset management firms for the years 1998–2013. We also find that the level of fees explains the cross-sectional variation in MCap to AuM but not the cross-sectional variation in the price-to-book ratio. Therefore, the effect of fees is specific to the valuation model employed. Finally, we find no evidence for practitioners' claims that higher-beta managers merit higher valuations. To the contrary, we find—in line with the theoretical arguments in Scherer (2010)—that the effect of beta on valuation is negligible and, if anything, slightly negative.

Our paper reflects scholars' increasing interest in the economics of the asset management industry. Initially, the academic literature focused on the valuation problems (inspired by option pricing theory) and the incentive problems (inspired by contract theory) associated with individual asset management contracts. Both Bhattacharya and Pfleiderer (1985) and Chevalier and Ellison (1997) value the incentives resulting from management contracts that contain nonlinearities, and Goetzmann et al. (2003) and Boudoukh et al. (2004) assess the nonlinearities in hedge fund and mutual fund contracts. These two strands of the literature are combined by Dangl et al. (2008), who model the various principal–agent relations among the firm (asset manager), employee (portfolio manager), and client (asset owner), thus achieving the most convincing theoretical model to date for valuing an asset management firm. Yet even though the model could be employed by a firm's own quantitative staff, the informational requirements (knowledge of all contracts and product performance, client response functions, product capacity, etc.) are too onerous for the model's use by outsiders. In any event, investors—especially in merger and acquisition transactions—prefer their decisions to depend not on the results of such a subjective exercise but on statistical evidence reflecting data that are more tangible and objective. Thus, in this paper, we use comparable market transactions; that is, we relate market valuations to observable characteristics. The aim of our paper is to build such a cross-sectional model for market valuations.

This note is organized as follows: Section 2 reviews the valuation of asset management firms by way of a dividend discount model and presents the puzzle inherent in Huberman (2004). Section 3 reviews the contributions of Berk and Green (2004) in this context and presents a simple valuation formula for an asset management company in industry equilibrium. We describe our data in Sect. 4, and Sect. 5 presents our empirical analysis. Section 6 concludes.

2 Present value and the model (and puzzle) of Huberman

What is the value of an asset management firm? We employ a discrete-time version of the standard continuous discounted cash flow model originally advanced by Ross (2004) and Huberman (2004).[1] We ignore fixed costs and define the operating margin as

$$q = \frac{\text{Earnings}}{\text{Revenues}}. \tag{1}$$

We also ignore incentive fees. Thus, our model asset management firm charges only asset-based (percentage) fees, defined as

$$f = \frac{\text{Revenues}}{\text{AuM}}. \tag{2}$$

We refer to earnings as *net income*; for an asset management company, *revenues* amount to the fee income collected for managing assets.

We can use Eqs. (1) and (2) to calculate the present value of an earnings stream. After removing the "infinite growth" assumption from our dividend discount model, we arrive at a remarkably simple valuation formula that relates an asset manager's market capitalization (P) to its assets under management (AuM):

[1] More general valuation frameworks are available, yet despite their technical feasibility for modeling purposes, from a practical standpoint they cannot be implemented without deep insider knowledge (all internal and external contract terms) of the particular asset management firm being modeled.

$$\frac{P}{\text{AuM}} = q \tag{3}$$

(see appendix for details). In fact, this valuation ratio is widely used in pricing asset management companies. Equation (3) shows that the price of an asset manager (its market capitalization) relative to its assets under management equals its operating margin. Under the assumptions stated previously, an asset management firm's value is independent of the asset class in which it invests (as proxied by benchmark beta). Thus, equity firms are ceteris paribus, no more valuable than fixed-income firms, unless the management of equity necessarily involves higher operating margins or higher management alpha. However, operating margins usually amount to around 30%, whereas prices for asset management transactions (or for publicly traded firms) are closer to 3%. The "puzzle" presented by that difference is raised in Huberman (2004) and leaves but two possibilities. Either the preceding analysis is wrong, or the prices of asset management companies are biased. Because a seeming irrationality might reflect nothing more than an insufficient understanding of the evidence, we are led to ask: What did our discounted cash flow model miss? How can we modify valuation models so that they yield results more nearly resembling the actual data?

3 Present value and the industry dynamics of Berk and Green

Scholars and practitioners alike have long struggled to explain three stylized facts about the asset management industry. First, there is a vast amount of evidence that "active" managers do not outperform their (risk-adjusted) benchmarks. So why does the portfolio manager position exist, and why are these individuals among the most well-paid professionals in an economy? Do they possess a special skill deserving of such compensation—or is this instead a case of market failure? Second, there is an equally vast amount of evidence that outperformance is not persistent. If that is true, then do only irrational investors chase past returns? Third, if fees are percentage based, then a doubling in AuM also doubles revenue. So why are percentage fees still used, and why is performance-based compensation so rare? Is all this evidence of less than optimal competition, making necessary the regulation of the asset management industry? Behavioral economists are naturally enamored of a narrative that focuses on investor irrationality. In Tversky and Kahneman's (1971) work on the "law of small numbers," for example, investors simply overestimate the representativeness of recent performance data.

In stark contrast, Berk and Green (2004) offer a rational equilibrium model for the asset management industry that addresses all the foregoing questions. In these authors' view, investors competitively provide capital for funds by allocating more money to high-performing funds—subject to a Bayesian updating rule whereby the investor learns about the skill of individual managers via past performance records. Portfolio managers exhibit different abilities to generate overperformance (skill) yet face diseconomies of scale. Recent empirical evidence by Pastor et al. (2015) supports this hypothesis. Diseconomies of scale typically stem either from limitations in the universe of available funds or from the market effect of transaction costs. In other words, size matters: not absolute size, but size relative to strategy capacity (i.e., the maximum amount of assets for which alpha is not yet eroded via increased transaction costs or changed relative prices). The exception is 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).

The model proposed by Berk and Green (2004; hereafter B&G) therefore explains all the academic puzzles to which we have alluded. Return chasing is rational behavior because it pays to invest in better managers before their alpha is eroded by size. Weak performance by active managers is not surprising, given that any overperformance is simply translated into higher fee income. That explains why percentage fees are an efficient way for asset management firms to retain value added—rather than giving it to investors for too little. Limited predictability is then a consequence of inflows that considerably weaken the persistence of alpha, not of inconsistent skills. The most important takeaway from B&G is that investment processes suffer from considerable diseconomies of scale. This fact needs to be incorporated into valuation models because it caps the value of asset management firms. Hence, we cannot continue, assuming that an asset management firm's level of AuM increases ad infinitum.

Suppose we model asset management firms while assuming that they have already reached their optimal size. This size differs depending on the manager's skill and the capabilities of the strategy used. That is, firms that employ extremely skilled managers with little alpha decay will be valued higher than firms with less skilled asset managers—even though both firms generate zero alpha in equilibrium. Once a fund reaches its optimal size (AuM*), its earnings become a fixed annuity stream. In that event, each year the asset management firm receives

$$\text{Earnings} = \text{AuM}^{*} \times f \times q. \tag{4}$$

Under a flat term structure of risk-free rates of r_{f}, the asset management company's value relative to its assets under management can be written as

$$\frac{P^{*}}{\text{AuM}^{*}} = \frac{q \times f}{r_{\mathrm{f}}} \tag{5}$$

(see appendix). Suppose, for instance, that long-term rates are 5%. Then an asset management firm with a 30% operating margin and 0.5% average fees will trade at 3% of MCap relative to AuM. This number is far more realistic than the 30% value implied by the Huberman (2004) model. In our empirical application, we test Eqs. (5) versus (3).

4 Data

To value asset managers, we employ several data sources not previously used; we have data starting from 1998 and ending in 2013. This is likely the most comprehensive database ever used to address whether a naive or, instead, a B&G-adapted dividend discount model is an accurate way to value asset managers.

We started by downloading a novel list of asset managers from Morningstar Direct. For identification purposes, Morningstar provides an International Securities Identification Number (ISIN) code; we used that code—our primary reference point—to gather asset managers' annual AuM variables from Bloomberg. Several checks were employed to ensure the quality of these data. First, we cross-checked a sample of asset managers' AuM levels reported to Bloomberg with the firms' annual reports retrieved from the Electronic Data Gathering, Analysis, and Retrieval (EDGAR) system. We found an almost perfect match between Bloomberg's AuM values and the ones reported in firms' annual reports. Second, we ensure that Bloomberg provides AuM information only for "pure" asset managers (i.e., those without significant banking or insurance business).[2] We excluded firms that are not pure asset managers because our aim is to value the asset management business, not general financial intermediation firms. As discussed by Huberman (2004), it is a challenge to identify asset management firms and estimate their AuMs. We resolve this issue by using Morningstar's proprietary list of asset managers in combination with Bloomberg's high-quality AuM data, an approach that enables us to value asset management firms more accurately than have previous studies.

To complete our sample, we gathered relevant year-end values of accounting variables from Compustat for the period 1998–2013. We first aggregated the market value of equity (P) from all stock series of the focal manager. Second, we downloaded the revenue and net income for each of the asset management firms. These variables are used to calculate operating margin q (defined as net income divided by revenues) as well as fees f (revenues divided by AuM). Operating margin and fees are the two main independent variables we use to assess our valuation models. Finally, for control variables we downloaded the book value of equity and also estimated equity market beta, which is defined as the annual beta of the asset manager's daily market returns relative to an equal-weighted US stock market (CRSP) portfolio.

Table 1 reports the asset manager universe and the main variables of interest (in our panel data set) that are used in this empirical application. There is considerable variation in all variables with respect to the cross section (average values across different asset management companies differ considerably) and also across time (for a given cross-sectional unit, i.e., a given asset manager as given by the volatility of the respective variable). Our universe contains 33 asset management firms. Thus, our sample is not only much wider than that of Huberman (2004) but also much longer, since our data range from 1998 to 2013 for some firms. The table also shows that asset management firms tend to be high-beta companies: Only four of the listed firms exhibit a beta of less than 1. The betas of most of our sample firms are considerably greater than 1, as in the case of Janus (JNS, with an average beta across time of 1.82). These high values are a direct result of the business model used by asset management firms—namely, maintaining a long position on capital markets (fee income rises and falls with these markets) as well as high operational leverage (high fixed costs relative to variable costs).

A first test of our preliminary hypotheses consists of comparing the average valuations, fees, and margins reported in Table 1 (each across time per firm). Therefore, in Fig. 1 we plot average valuations (market value to AuM and price/book) versus

2 We also use GICS (Global Industry Classification System) codes to ensure that the matched manager is a pure asset manager.

Table 1 Data summary

Firm	n_{obs}	Start	End	$M\ (P/\text{AuM})$ (%)	$S\ (P/\text{AuM})$ (%)	$M\ (P/B)$	$S\ (P/B)$	$M\ (f)$ (%)	$S\ (f)$ (%)	$M\ (q)$ (%)	$S\ (q)$ (%)	$M\ (b)$	$S\ (b)$
AMG	14	1998	2013	1.4	0.32	3.33	1.7	0.50	0.09	11.78	2.36	1.44	0.35
AMP	8	2005	2013	3.1	0.66	1.52	0.5	2.15	0.39	9.76	1.60	1.64	0.21
APO	2	2012	2013	2.4	0.62	1.30	0.6	2.42	0.15	14.27	4.80	1.31	0.55
ART	2	2010	2011	1.3	0.49	5.12	4.7	0.77	0.20	22.94	2.81	1.41	0.21
BEN	16	1998	2013	3.9	0.70	3.05	0.6	0.97	0.17	23.16	3.58	1.39	0.24
BLK	14	1999	2013	1.2	0.29	3.62	2.3	0.23	0.05	21.20	4.45	1.01	0.48
BX	3	2007	2013	5.5	1.33	1.94	0.8	2.46	0.53	25.46	24.81	1.36	0.35
CG	2	2012	2013	0.8	0.19	2.25	1.7	2.05	0.43	1.51	1.17	0.95	0.80
CIFC	3	2009	2013	1.0	0.61	1.22	0.2	3.81	2.71	46.04	59.00	1.09	0.66
CLMS	9	2005	2013	1.0	0.38	1.90	1.1	1.07	0.22	5.92	1.06	1.75	0.52
CNNG	2	1998	1999	0.6	0.42	2.31	1.6	0.28	0.00	15.30	0.91	0.51	0.36
CNS	10	2004	2013	3.6	0.70	4.81	1.7	0.70	0.22	17.95	9.35	1.51	0.22
DHIL	9	2005	2013	3.1	0.67	9.69	7.0	0.89	0.13	20.71	6.64	0.98	0.41
EPHC	4	2009	2012	2.0	0.24	5.94	1.9	0.35	0.05	24.50	5.21	1.75	0.35
EV	16	1998	2013	2.7	0.73	8.10	5.0	0.73	0.14	17.35	5.25	1.27	0.37
FIG	2	2012	2013	2.6	1.09	2.01	0.7	1.93	0.16	11.96	5.50	1.57	0.45
FII	15	1998	2013	1.3	0.61	9.01	5.8	0.36	0.09	20.23	3.23	1.04	0.36
GBL	15	1999	2013	4.3	0.95	3.46	0.9	0.93	0.11	23.01	5.62	1.11	0.49
GROW	11	2000	2013	4.4	3.34	4.18	3.1	1.33	0.69	15.13	7.07	1.26	0.72
IVZ	7	2007	2013	1.9	0.34	1.41	0.3	0.67	0.13	16.05	2.79	1.76	0.19
JNC	8	1998	2006	2.6	0.44	8.05	6.3	0.50	0.06	29.11	1.86	0.64	0.43

Table 1 continued

Firm	n_{obs}	Start	End	M (P/AuM) (%)	S (P/AuM) (%)	M (P/B)	S (P/B)	M (f) (%)	S (f) (%)	M (q) (%)	S (q) (%)	M (b)	S (b)
JNS	14	2000	2013	2.1	0.86	2.35	1.9	0.66	0.13	20.86	23.08	1.82	0.36
KKR	4	2010	2013	5.6	1.22	2.24	0.3	10.73	5.13	4.09	3.07	1.47	0.28
LM	15	1998	2013	1.4	0.80	2.12	1.3	0.64	0.35	13.81	10.21	1.49	0.23
MN	2	2012	2013	0.4	0.07	1.23	0.3	0.74	0.01	0.72	0.02	1.03	0.14
NEU	4	1999	2002	4.7	2.03	8.02	2.9	1.29	0.12	18.59	0.54	1.20	0.55
PJC	5	2004	2013	3.8	1.56	0.76	0.3	4.13	1.57	6.65	1.81	1.60	0.14
PZN	7	2007	2013	0.4	0.12	6.16	2.2	0.56	0.19	4.47	2.17	1.57	0.22
TROW	14	1998	2013	3.2	0.41	4.68	0.9	0.58	0.09	25.10	3.94	1.50	0.21
VRTS	4	2010	2013	1.9	0.96	4.00	1.4	0.59	0.08	27.62	29.41	1.59	0.27
WDR	16	1998	2013	4.8	1.64	9.72	5.5	1.35	0.24	16.59	6.33	1.39	0.41
WETF	3	2011	2013	5.5	1.23	21.07	6.0	0.48	0.05	17.41	15.35	1.69	0.95
WHG	12	2002	2013	2.5	0.38	5.30	1.3	0.49	0.07	20.42	2.67	0.68	0.57

This table reports the mean M and standard deviation S of each variable as calculated for each firm across time. The number of observations (n_{obs}) and data period covered (start to end) by each firm are also shown. Here, P/AuM is defined as the ratio of an asset manager's market capitalization to its assets under management, and P/B is the price-to-book ratio (here, the book value of an asset manager relative to its assets under management). Operating margin (q) is defined as net income divided by revenues, and fees (f) are revenues divided by assets under management. Equity beta (b) describes the annual beta of the asset management firm's daily market returns relative to an equal-weighted US stock market (CRSP) portfolio

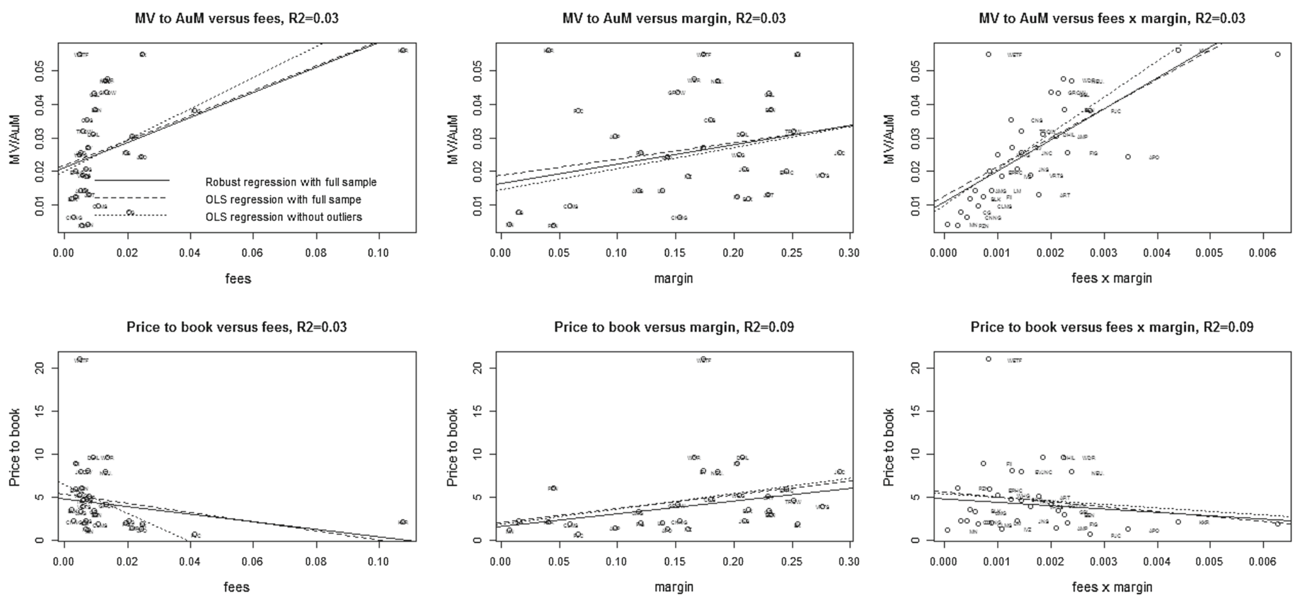

Fig. 1 Average valuation versus fees, margin, and profitability. This figure plots average valuation measures versus average fees, average margins, and average profitability (i.e., fees multiplied by margin, or earnings divided by assets under management). We also display lines of best fit for full sample robust regression, full sample OLS regression, and OLS regression with influential data points removed. All variables are as defined in the caption to Table 1

average fees, average margins, and average profitability (i.e., fees multiplied by margin earnings divided by AuM).[3] The black regression line resembles the line of best fit for a robust regression (M estimator) using the full sample information. For comparison, we also display lines of best fit for a full sample robust regression, a full sample OLS regression, and an OLS regression with influential data points removed.[4] If all three lines coincide, outliers are not a problem. The respective R^2 values are given in the scatter plot headers. We observe a tight (51% explained variance) relation between valuation as given by the ratio of market value to AuM and profitability as implied by our Eq. (5). By themselves, operating margins and fees explain little of the variation in market value to AuM. Repeating the analysis while using the price/book ratio to measure valuation reveals that margins, fees, and profitability display inconsistent (changing sign of slopes) and weak explanatory power. We view these results as preliminary evidence in favor of our dividend discount model, since our derived profitability measure explains variations only in market value to assets under management. Also, it turns out that eyeballing outliers can be misleading as none of them is influential enough to materially change the regression slope.

5 Empirical results

In this section, we perform an empirical test of the Huberman (2004) model, as represented by Eq. (3), versus the B&G-inspired modification that is Eq. (5). Taking logs in both expressions, we obtain

$$\log\left(\frac{P}{\text{AuM}}\right) = a + b\log(q) + e \quad \text{and} \tag{6}$$

$$\log\left(\frac{P^*}{\text{AuM}*}\right) = a + y\log(q) + k\log(f) + u, \tag{7}$$

respectively.

It would be unrealistic to expect either of these models to yield anything like an exact fit to the empirical data (e.g., $a = -\log\left(r_f\right)$ with $k = y = 1$). After all, we modeled neither direct fees (incentive contracts with options) nor indirect, performance-based fees (option-like payoff of good performance on future fund flows). These shortcomings clearly compromise our approach, but they cannot be overcome because the data needed for complete valuation models are neither currently available nor remotely in sight.[5] In lieu thereof, we focus on three features of these equations.

[3] These data are given in Columns 5, 7, 9, 11, and 13 of Table 1.

[4] Influential data points are discovered by calculating Cooks distance for each regression. BX (Blackrock) and KKR (Kohlberg/Kravies/Roberts) are identified as influential (Cooks distance exceeding 1).

[5] Optionality in fee income would render the dividend discount model as a theoretical tool close to useless. Empirically, our approach might still work if income from performance-based fees is reasonably steady, i.e., if the optionality does not materialize. Asset management firms with performance-based fees have an even stronger incentive to monitor capacity and limit assets under management as eroding alpha cuts directly into their revenue stream.

First, we anticipate that the impact of both higher operating margins and higher fees will be significant and positive. Second, we expect that replacing the valuation metric on the left side of both equations will reduce the fit; that is, our explanatory variables are useful in regard to the valuation measure for which they were derived but are less helpful for explaining variation in other valuation measures. Third, we test for whether the stock market beta of an asset management firm affects its valuation. Our expectation is that there will be no such effect—or perhaps a negative one. Thus, we anticipate that c in Eq. (8) will be statistically insignificant, economically small, and potentially negative:

$$\log\left(\frac{P^*}{\text{AuM}^*}\right) = a + y\log(q) + k\log(f) + cb + t. \tag{8}$$

Although it is tempting to believe that firms with aggressive equity product offerings benefit from the windfall gains of long-term positive risk premia, that belief runs counter to rational valuation methods. The intuition is that (1) asset management fees are the simplest form of a derivative contract (fraction of the underlying asset) and (2) the derivatives pricing of perfectly hedgeable contracts is independent of real-world risk premia. If anything, we expect a negative effect of large beta exposures owing to frictional bankruptcy costs. Yet these costs might be low in the asset management industry and, in any case, asset managers are far away from their default point.[6]

To specify how the panel data will be used, we must decide on a particular panel data model. We offer several variations and thereby establish that our results are robust to changes in specifications. We start with market capitalization to AuM as a valuation measure. First, we employ repeated cross-sectional regressions of Eqs. (6)–(8); the results are given in Table 2. For each year, we run a cross-sectional ordinary least-squares (OLS) regression across all firms available for that year. This leaves us with 16 coefficients per variable in each model. We then calculate the average of these coefficients (and the t-value of that average) using the Fama and MacBeth (1973) standard errors reported in the first row of Table 2. This procedure presumes that there are no firm-specific effects, only variation across time. The results indicate that operating margin is, by itself, a poor explanatory variable for the cross-sectional variation in the asset management industry's preferred valuation measure. However, the regression coefficient is significant on average. Adjusted $\overline{R}^2$ (i.e., the averages of adjusted R^2 values) are low, and margins are rarely significant. This casts doubt on a dividend discount model that supposes asset managers to have infinite product capacity.

Our results change considerably when we add percentage fees into the repeated cross-sectional regressions. Now both variables are highly significant most of the time. Fees are significant every year, and all $\overline{R}^2$ values are high—around 80% or higher in 11 out of 16 years. When adding market beta to the cross-sectional regression, we find an association that is mostly negative and always insignificant. The only exceptions are the crisis years of 2008 and 2009. In 2008, large market betas led to lower market

[6] See Scherer (2010, 2011) concerning real-world frictions and their effect on optimal risk management by asset management firms.

Table 2 Repeated cross-sectional regressions with log(P/AuM) as dependent variable

Year	Equation (6)		Equation (7)			Equation (8)			
	log (q)	$\overline{R}^2$	log (q)	log (f)	$\overline{R}^2$	log (q)	log (f)	b	$\overline{R}^2$
1998	0.648	0.086	**0.695**	**0.969**	0.896	**0.701**	**0.965**	0.017	0.875
	0.227		**0.000**	**0.000**		**0.015**	**0.001**	0.932	
1999	−0.108	−0.105	0.08	**1.121**	0.689	0.212	**1.792**	−0.545	0.791
	0.833		0.772	**0.001**		0.399	**0.003**	0.187	
2000	0.789	0.405	**0.786**	**0.846**	0.875	**0.816**	**0.893**	−0.212	0.901
	0.012		**0.000**	**0.000**		**0.000**	**0.000**	0.089	
2001	0.645	−0.014	**0.844**	**0.942**	0.946	**0.802**	**0.992**	−0.112	0.943
	0.377		**0.000**	**0.000**		**0.004**	**0.000**	0.459	
2002	−0.064	−0.109	**0.425**	**0.948**	0.941	**0.471**	**0.922**	0.07	0.935
	0.894		**0.006**	**0.000**		**0.013**	**0.000**	0.569	
2003	−0.103	−0.082	0.082	**0.856**	0.724	0.119	**0.975**	−0.225	0.742
	0.692		0.552	**0.000**		0.391	**0.001**	0.239	
2004	0.259	0.031	**0.452**	**0.473**	0.338	**0.822**	**0.691**	−0.204	0.748
	0.258		**0.041**	**0.026**		**0.001**	**0.000**	0.222	
2005	0.183	−0.007	**0.58**	**0.741**	0.772	0.571	**0.86**	−0.056	0.777
	0.360		**0.000**	**0.000**		0.000	**0.000**	0.635	
2006	−0.084	−0.049	0.002	**0.444**	0.186	−0.028	**0.513**	−0.23	0.202
	0.626		0.989	**0.037**		0.861	**0.024**	0.277	
2007	**0.684**	0.715	**0.626**	**0.435**	0.791	**0.678**	**0.402**	0.195	0.605
	0.000		**0.000**	**0.020**		**0.002**	**0.044**	0.421	
2008	0.046	−0.09	0.411	**1.2**	0.689	0.622	**1.406**	−0.976	0.763
	0.941		0.241	**0.000**		0.073	**0.000**	0.074	
2009	**0.917**	0.438	**1.05**	**0.657**	0.795	**1.382**	**0.599**	**0.857**	0.852
	0.003		**0.000**	**0.000**		**0.000**	**0.000**	**0.031**	
2010	0.218	−0.002	**0.882**	**0.775**	0.806	**0.875**	**0.814**	0.316	0.794
	0.34		**0.000**	**0.000**		**0.000**	**0.000**	0.328	
2011	−0.069	−0.034	0.133	**0.768**	0.24	0.229	**0.939**	0.188	0.375
	0.611		0.332	**0.008**		0.077	**0.001**	0.65	
2012	**0.343**	0.138	**0.566**	**0.628**	0.607	**0.621**	**0.618**	−0.47	0.626
	0.035		**0.000**	**0.000**		**0.000**	**0.000**	0.16	
2013	**0.521**	0.287	**0.722**	**0.628**	0.783	**0.697**	**0.622**	0.136	0.777
	0.003		**0.000**	**0.000**		**0.000**	**0.000**	0.565	

For each year, this table reports the results of three cross-sectional regression models with log (P/AuM) as the dependent variable. Operating margin (q) is defined as net income divided by revenues, and fees (f) are defined as revenues divided by assets under management. Equity beta describes the annual beta of the asset management firm's daily market returns relative to an equal-weighted US stock market (CRSP) portfolio. The regression p values are reported below; boldface values indicate p values below 5%

Table 3 Panel regressions with $\log(P/\text{AuM})$ as dependent variable

Variable	Equation (6)	Equation (7)		Equation (8)		
	Operating margin	Operating margin	Fees	Operating margin	Fees	Beta
FM	0.25	0.47	0.76	0.60	0.86	0.00
	(3.19)	**(6.25)**	**(12.29)**	**(6.97)**	**(9.46)**	(0.04)
OLS	0.27	0.46	0.66	0.47	0.68	–0.02
	(5.05)	**(10.80)**	**(14.14)**	**(10.63)**	**(14.04)**	(–0.29)
OLS/HAC	0.27	0.46	0.66	0.47	0.68	–0.02
	(2.75)	**(4.89)**	**(13.14)**	**(4.53)**	**(12.32)**	(–0.26)
FE	0.24	0.42	0.66	0.42	0.68	0.08
	(4.39)	**(9.90)**	**(14.33)**	**(9.65)**	**(14.01)**	(1.08)
FE/cluster	0.24	0.42	0.66	0.42	0.68	0.08
	(1.55)	**(3.66)**	**(7.49)**	**(3.33)**	**(7.05)**	(0.58)

For Eqs. (6), (7), and (8), this table reports the coefficients and their t values based on the Fama and MacBeth (1973) approach (FM), pooled OLS regression without (OLS) and with (OLS/HAC) heteroscedasticity-adjusted standard errors, and fixed-effects panel regressions without (FE) and with (FE/cluster) standard errors clustered by firms. The regression t values are reported in parentheses; boldface values are significant at the 99% level

capitalization relative to AuM; that is, asset management firms with large betas were given lower valuations. In 2009, when markets rebounded, the effect of market beta on valuation reversed. On average, the sensitivity of valuations to market beta was essentially nil over our sample period.

We next run a set of pooled regressions, whose results are presented in Table 3. We start with the ordinary pooled OLS as well as OLS with heteroscedasticity-adjusted errors (HAC in the tables), while assuming no effects across time or across cross-sectional units. Our results remain qualitatively unchanged. In contrast to the Huberman model, fees are always significant. In addition, stock market exposure (as measured by beta) has no effect on valuation.

Finally, we run fixed-effects panel regressions with variations across firms and also, as suggested by Petersen (2008), with variations across time and standard errors clustered by firms. Variation across time is plausible given not only the financial crisis but also the time variation in discount rates. However, the results presented in the two last rows of Table 3 remain much the same. Contrary to Huberman's (2004) theoretical paper, we find strong evidence that fees play a significant role in valuations. All regressions that we run confirm our conjecture that asset management firms with large stock market exposure (via their equity business) do *not* command a valuation premium.

These results are promising, but it could be that our variables based on fees and operating margins are useful for explaining relative valuations generally but are not structurally related to the dividend discount model. We can test this "anti-conjecture" by replacing our valuation metric with a more generic valuation measure: the price-to-book ratio. Will the explanatory power of our model persist? If operating margins and fees can just as well explain the cross section of price/book values, then we could

Table 4 Repeated cross-sectional regressions with log(P/B) as dependent variable

Year	Equation (6)		Equation (7)			Equation (8)			
	log (q)	$\overline{R}^2$	log (q)	log (f)	$\overline{R}^2$	log (q)	log (f)	b	$\overline{R}^2$
1998	0.686	0.075	0.686	0.008	−0.079	0.857	−0.108	0.484	−0.155
	0.24		0.28	0.986		0.236	0.835	0.472	
1999	0.168	−0.096	0.23	0.371	−0.127	0.299	1.115	−0.832	−0.177
	0.736		0.655	0.409		0.631	0.249	0.401	
2000	**0.852**	0.3	**0.852**	0.051	0.231	**0.893**	0.115	−0.291	0.196
	0.031		**0.04**	0.899		**0.04**	0.785	0.471	
2001	0.932	0.018	0.968	0.173	−0.1	0.725	0.466	−0.654	−0.157
	0.313		0.328	0.714		0.492	0.459	0.45	
2002	0.809	0.211	0.916	0.207	0.161	1.16	0.071	0.373	0.12
	0.088		0.083	0.516		0.079	0.848	0.453	
2003	−0.501	0.169	−0.534	−0.153	0.096	−0.485	0.003	−0.296	0.04
	0.102		0.109	0.676		0.164	0.994	0.509	
2004	0.572	0.192	0.493	−0.195	0.152	0.735	0.045	−0.415	0.289
	0.066		0.144	0.526		0.098	0.888	0.295	
2005	0.429	0.08	0.233	−0.364	0.105	0.216	−0.05	−0.267	−0.115
	0.143		0.476	0.252		0.515	0.9	0.456	
2006	0.066	−0.061	0.071	0.023	−0.137	0.057	0.055	−0.108	−0.215
	0.785		0.785	0.944		0.835	0.877	0.763	
2007	0.219	−0.039	0.372	−0.639	0.099	0.393	−0.656	0.112	0.034
	0.54		0.286	0.09		0.294	0.101	0.82	
2008	0.374	−0.048	0.469	0.31	−0.085	0.746	0.58	−1.28	0.007
	0.514		0.436	0.448		0.236	0.204	0.199	
2009	0.493	0.056	0.49	−0.019	−0.016	0.048	0.059	−1.141	0.012
	0.19		0.217	0.953		0.93	0.854	0.265	
2010	0.517	0.101	0.447	−0.081	0.062	0.464	−0.172	−0.797	0.07
	0.076		0.215	0.737		0.209	0.596	0.399	
2011	0.04	−0.044	0.003	−0.14	−0.087	0.117	0.039	−0.343	−0.093
	0.787		0.985	0.687		0.454	0.898	0.51	
2012	**0.447**	0.226	**0.335**	−0.314	0.303	**0.368**	−0.32	−0.283	0.283
	0.008		**0.045**	0.068		**0.041**	0.068	0.559	
2013	**0.383**	0.138	0.311	−0.227	0.171	0.266	−0.238	0.244	0.144
	0.035		0.091	0.178		0.191	0.168	0.596	

For each year, this table reports the results of three cross-sectional regression models with log (P/B) as the dependent variable. Operating margin (q) is defined as net income divided by revenues, and fees (f) are defined as revenues divided by assets under management. Equity beta describes the annual beta of the asset management firm's daily market returns relative to an equal-weighted US stock market (CRSP) portfolio. The regression p values are reported below; boldface values indicate p values below 5%

Table 5 Panel regressions with $\log(P/B)$ as dependent variable

Variable	Equation (6)	Equation (7)		Equation (8)		
	Operating margin	Operating margin	Fees	Operating margin	Fees	Beta
FM	0.41	0.40	−0.06	0.43	0.06	0.00
	(4.55)	**(4.24)**	(−0.96)	**(4.20)**	(0.61)	(−**2.72**)
OLS	0.34	0.30	−0.15	0.31	−0.12	−0.23
	(5.57)	**(4.56)**	(−**2.20**)	**(4.84)**	(−1.65)	(−**2.44**)
OLS/HAC	0.34	0.30	−0.15	0.31	−0.12	−0.23
	(4.67)	**(3.83)**	(−**2.09**)	**(3.94)**	(−1.51)	(−**2.49**)
FE	0.29	0.24	−0.15	0.27	−0.13	−0.14
	(4.55)	**(3.61)**	(−**2.23**)	**(4.04)**	(−1.75)	(−1.20)
FE/cluster	0.29	0.24	−0.15	0.27	−0.13	−0.14
	(3.16)	**(2.47)**	(−0.91)	**(2.55)**	(−0.69)	(−0.88)

For Eqs. (6), (7), and (8), this table reports the coefficients (and their t values) based on the Fama and MacBeth (1973) approach (FM), pooled OLS regression without (OLS) and with (OLS/HAC) heteroscedasticity-adjusted standard errors, and fixed-effects panel regressions without (FE) and with (FE/cluster) standard errors clustered by firms. The regression t values are reported in parentheses; boldface values are significant at the 99% level

hardly claim that this evidence supports our alternative to the Huberman model; rather, we would simply have found a set of variables that explain cross-sectional valuation differences. Yet that is not the objective of this paper: Our aim is to find a model specification in line with the empirical data, the logic of dividend discount models, and the Berk and Green (2004) view of the asset management industry.

To that end, we repeated the analysis just described but instead used price/book as our valuation metric. The results are summarized in Tables 4 and 5. Again we start with repeated cross-sectional regressions (Table 4) followed by pooled regressions (Table 5). All variables are now largely insignificant most of the time; moreover, explanatory power is mainly poor and with many negative (and generally very low) $\overline{R}^2$ values. We conclude that our variables are specific to the chosen valuation measure. In other words, the variables we selected are not broadly correlated with valuation yet are specifically related to our chosen valuation metric. This result is confirmed by all the other regressions. The coefficient for fees switches sign and becomes negative, which is extremely unlikely and hence an indication that some explanatory variables have been omitted. The effect of market beta on price/book as a valuation measure remains mostly negative and small and is often insignificant. This finding confirms our conjecture.

In short, the results change substantially when a different valuation measure is used. Fees and operating margin are strongly associated with market value to AuM but not with price to book.

6 Conclusion

Inspired by the work of Berk and Green (2004), we introduce limited capacity into the Huberman (2004) dividend discount model. This creates a natural ceiling on the asset manager's ability to increase assets under management. Equipped with this more realistic assumption, we repeatedly estimate a simple cross-sectional valuation model. In line with our conjectures, the model provides a much improved explanation of the cross section of asset management valuations. These results bolster the credibility of the B&G model while calling into question the relevance of the Huberman "puzzle," since operating margins are not the only factor driving the valuation of asset managers. In particular, we show that cross-sectional variation in fees plays a much larger role than do margins. Finally, asset managers' valuations are not affected by the beta attributable to operational leverage.

Appendix: Present-value model for asset management firms

We decompose the earnings of an asset management firm (for any given year) into the product of assets under management, percentage fees, and operating margins:

$$\text{Earnings} = \text{AuM} \times \frac{\text{Revenues}}{\text{AuM}} \times \frac{\text{Earnings}}{\text{Revenues}} = \text{AuM} \times f \times q. \tag{9}$$

We now ask: What is the value of this earnings stream over n years? Let r denote the return on a given asset management mandate (e.g., a mutual fund) gross of fees but net of trading costs, and let R be the return on its "benchmark" (the comparable, or risk-adjusted, market return). First, we write the earnings for the (equity) owners of the asset management firm at the end of year 1—while assuming zero capital inflows and fees that are applied to the end-of-period net asset value—as follows:

$$\text{Earnings}_1 = \text{AuM}\,(1+r)\,fq. \tag{10}$$

What is left to the investors in the asset management firm's products then amounts to

$$\text{AuM}\,(1+r)\,(1-f)\,. \tag{11}$$

A more general expression for earnings at the end of year i is given by

$$\text{Earnings}_i = \text{AuM}\,(1+r)^i\,(1-f)^{i-1}\,fq. \tag{12}$$

The series of cash flows to discount can then be written as:

$$\begin{aligned}
\text{Earnings}_1 &= \text{AuM}\,(1+r)\,fq,\\
\text{Earnings}_2 &= \text{AuM}\,(1+r)^2\,(1-f)\,fq,\\
\text{Earnings}_3 &= \text{AuM}\,(1+r)^3\,(1-f)^2\,fq,
\end{aligned}$$

$$\vdots$$
$$\text{Earnings}_n = \text{AuM}\,(1+r)^n\,(1-f)^{n-1}\,fq. \tag{13}$$

At what rate should these cash flows be discounted? That is, what is the discount rate for cash flows containing the same form of systematic risks? A natural choice for such risk-adjusted returns are benchmark returns.[7] These lead to the specification of the following discounted cash flow model:

$$P\,(n) = \frac{\text{AuM}\,(1+r)\,fq}{1+R} + \frac{\text{AuM}\,(1+r)^2\,(1-f)\,fq}{(1+R)^2} + \cdots + \frac{\text{AuM}\,(1+r)^n\,(1-f)^{n-1}\,fq}{(1+R)^n}. \tag{14}$$

Further simplification results in

$$\begin{aligned} P\,(n) &= \frac{\text{AuM}\times f\times q}{1-f}\left[\sum_{i=1}^{n}\left(\frac{(1+r)\,(1-f)}{1+R}\right)^i\right] \\ &= \frac{\text{AuM}\times f\times q}{1-f}\left[\frac{\frac{(1+r)(1-f)}{1+R}-\left(\frac{(1+r)(1-f)}{1+R}\right)^{n+1}}{1-\frac{(1+r)(1-f)}{1+R}}\right]. \end{aligned} \tag{15}$$

To create more insight into Eq. (15), we assume $r = R$; that is, the performance gross of fees equals the benchmark performance (hence alpha equals zero). Then

$$P = P\,(n) = \text{AuM}\times q\left[1-(1-f)^{n-1}\right]. \tag{16}$$

Assuming an infinite time horizon ($n = \infty$), we arrive at Eq. (3) in the main text:

$$\frac{P}{\text{AuM}} = q. \tag{17}$$

We can extend the model by adding alpha to portfolio returns; recall that $(1+r) = (1+R)\,(1+a)$. Thus,

[7] Suppose the CAPM is used as our asset pricing model. Then the risk-adjusted discount rate for fees on a US small cap portfolio would be the expected returns on those stocks, or $R = R_{\text{US\_small\_cap}} = r_f + \hat{b}_{\text{US\_small\_cap}}\left(R_{\text{US\_market\_portfolio}} - r_f\right)$.

$$P\left(n\right)=\frac{\text{AuM}\times f\times q}{1-f}\left[\sum_{i=1}^{n}\left(\frac{\left(1+r\right)\left(1-f\right)}{1+R}\right)^{i}\right]$$
$$=\frac{\text{AuM}\times f\times q}{1-f}\left[\sum_{i=1}^{n}\left(\frac{\left(1+R\right)\left(1-a\right)\left(1-f\right)}{1+R}\right)^{i}\right]$$
$$=\frac{\text{AuM}\times f\times q}{1-f}\left[\sum_{i=1}^{n}\left(\left(1+a\right)\left(1-f\right)\right)^{i}\right]. \tag{18}$$

We also assume that $(1 + a)(1 - f) = 1$; that is, $f = a(1 - f)$. Thus, fees are set so as to leave the client with no alpha. Adjusting Eq. (18) to reflect these equalities yields

$$P\left(n\right)=\frac{\text{AuM}\times f\times q}{1-f}\left[\sum_{i=1}^{n}1^{i}\right]=\frac{\text{AuM}\times a\times\left(1-f\right)\times q}{1-f}\left[\sum_{i=1}^{n}1^{i}\right]$$
$$=\text{AuM}\times a\times q\times n. \tag{19}$$

Hence, it is clear that when alpha is not limited, the firm valuation goes to infinity.

Now suppose the asset management company receives a fixed level of earnings forever because its assets under management are fixed at full capacity, $\mathbf{AuM}^{*}$. In this case, the firm's earnings are

$$\text{Earnings}=\text{AuM}^{*}\times f\times q. \tag{20}$$

Discounting this cash flow to infinity creates a corresponding firm value, p^{*}, of

$$p^{*}=\lim_{n\to\infty}\left[\frac{\text{AuM}^{*}\times q\times f}{1+r}+\frac{\text{AuM}^{*}\times q\times f}{\left(1+r\right)^{2}}+\cdots+\frac{\text{AuM}^{*}\times q\times f}{\left(1+r\right)^{n}}\right]$$
$$=\text{AuM}^{*}\times q\times f\left[\frac{1}{1+r}+\frac{1}{\left(1+r\right)^{2}}+\cdots+\frac{1}{\left(1+r\right)^{n}}\right]$$
$$=\text{AuM}^{*}\times q\times f\left[\frac{\frac{1}{1+r}-\frac{1}{\left(1+r\right)^{n+1}}}{1-\frac{1}{1+r}}\right]$$
$$=\text{AuM}^{*}\times q\times f\left[\frac{1}{r}\right]. \tag{21}$$

This expression is equal to Eq. (5) in the main text.

References

Berk, J.B., Green, R.C.: Mutual fund flows and performance in rational markets. J. Polit. Econ. **112**, 1269–1295 (2004)

Bhattacharya, S., Pfleiderer, P.: Delegated portfolio management. J. Econ. Theory **36**, 1–25 (1985)

Boudoukh, J., Richardson, M., Stanton, R., Whitelaw, R.: The Economics of Asset Management, NYU Stern Working Paper (2004)
Chevalier, J., Ellison, G.: Risk taking by mutual funds as a response to incentives. J. Polit. Econ. **105**, 1167–1200 (1997)
Dangl, T., Wu, Y., Zechner, J.: Market discipline and internal governance in the mutual fund industry. Rev. Financ. Stud. **21**(5), 2307–2343 (2008)
Fama, E., MacBeth, J.: Risk, return and equilibrium: empirical tests. J. Polit. Econ. **81**, 607–636 (1973)
Goetzmann, W.N., Ingersoll, J., Ross, S.A.: High watermarks and hedge fund management contracts. J. Financ. **58**, 1685–1717 (2003)
Huberman, G.: What is the NPV of Expected Future Profits of Money Managers? Working Paper, Columbia University (2004)
Pastor, L., Stambaugh, R.F., Taylor, L.: Scale and skill in active management. J. Financ. Econ. **116**(1), 23–45 (2015)
Petersen, M.: Estimating standard errors in finance panel data sets: comparing approaches. Rev. Financ. Stud. **22**(1), 435–480 (2008)
Ross, S.A.: A Neoclassical Look at Behavioral Finance: The Closed End Funds Puzzle (Chapter 4). Princeton University Press, Princeton (2004)
Scherer, B.: Should asset managers hedge their fees at risk? J. Appl. Corp. Financ. **22**(4), 96–102 (2010)
Scherer, B.: Market risks in asset management companies. Quant. Financ. **12**(10), 1547–1556 (2011)
Tversky, A., Kahneman, D.: Belief in the law of small numbers. Psychol. Bull. **76**, 105–110 (1971)

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