A Neoclassical Look at Behavioral Finance

The Closed End Fund Puzzle

by

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Neoclassical Finance

- Efficient Markets
  - Information is captured in prices
- No Arbitrage
  - Risk Neutral Pricing
  - Theory of Derivatives
  - Asset Pricing Models

Neoclassical Finance

- Key Assumptions:
  - There are enough well financed smart investors to close arbitrage opportunities
  - Such arbitrageurs are rewarded which means that there must always be profit opportunities in the market
  - A theory of ‘sharks’ **NOT** a theory of rational man

The Behavioral Challenge

- Two Pillars:
  - People aren’t rational
  - Kuhn argues that science progresses through cataclysmic paradigm shifts:
    - Data mounts that doesn’t fit the established orthodox views
    - New theories develop

Samuelson:

“Science progresses funeral by funeral”

Behavioral Finance

- Taking Kuhn to heart, currently its defined more by what it doesn't like about neoclassical finance than by what it offers as alternatives:
  - Anomalies in the data force us to reconsider and abandon neoclassical finance
  - Prices are determined by 'everyman' and cannot be arbitraged

Examples of Anomalies

- MCI: A company whose ticker symbol is ‘MCI’ and whose price goes up and down with the ‘real’ MCI even though they are completely unrelated (Rashes, M.S. (2001), ‘Massively Confused Investors Making Conspicuously Ignorant Choices (MCI-MCIC)’. Journal of Finance, October)
- Momentum or P/E strategies in the stock market
- Internet stocks and the whole US market are overvalued

Anomaly Characteristics

- They are ‘small’
  - Small $ (e.g., MCI Jr. vs. MCI)
  - Not scalable, e.g., illiquid
- Statistically suspect
  - Volatility Tests
- Fleeting
  - E.g., the small stock premium, see Schwert [2000]
  - Heisenberg Principle of Finance
- Not profit opportunities
  - Bid/Ask spreads
  - Information costs, e.g., complex mortgage instruments

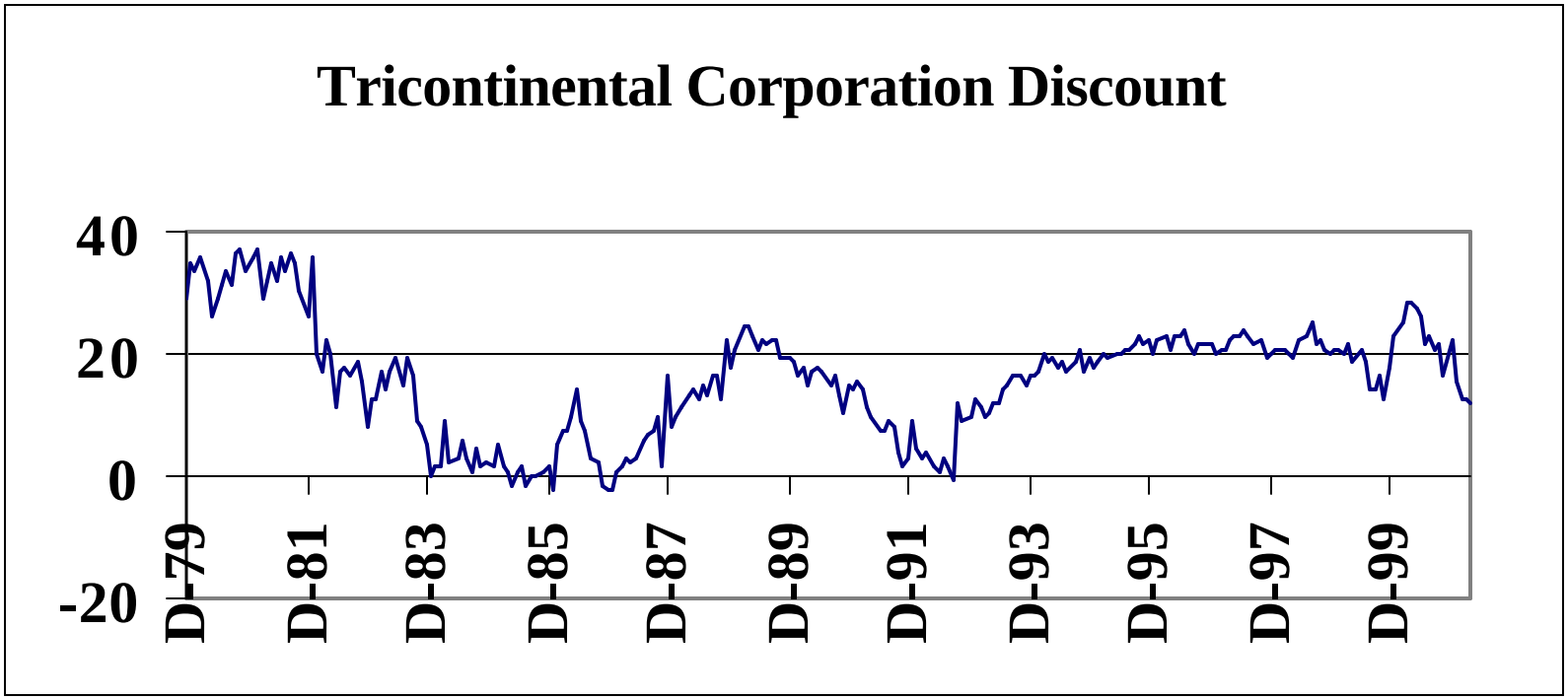
Prices ≠ Fundamentals

- Internet Stocks and the whole market
- Royal Dutch Shell and Shell Trading
- But, ‘fundamentals’ are inherently ambiguous and depend on some pricing theory

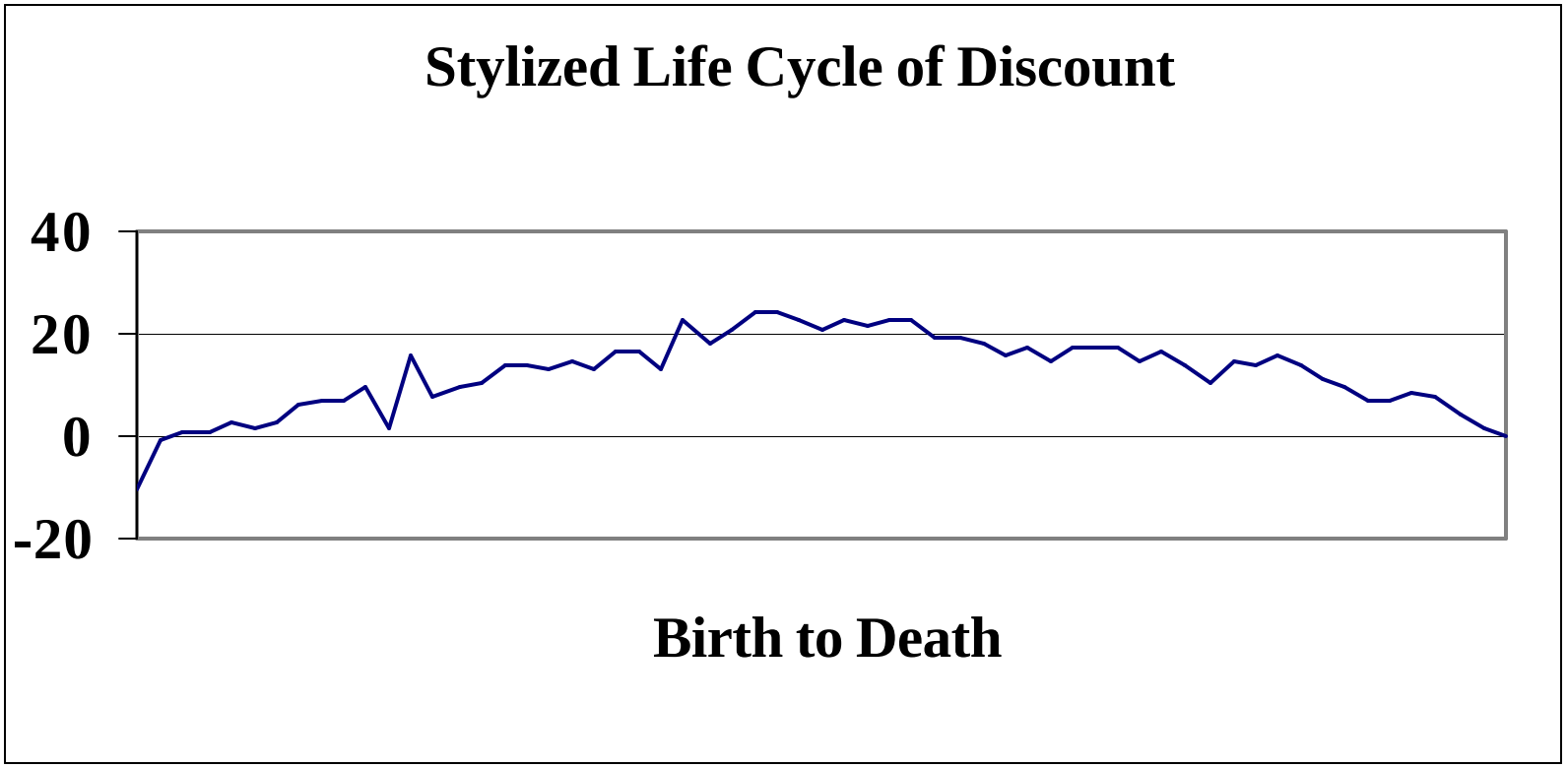
Closed End Funds

- Fundamentals are unambiguous; net asset value (NAV)

Example


Tricontinental Corporation Discount
40
20
0
-20
D-79
D-81
D-83
D-85
D-87
D-89
D-91
D-93
D-95
D-97
D-99

Discount Life Cycle



Closed End Funds

- Data
  - Trade at discounts from NAV
  - Discounts are correlated across funds
  - Discounts narrow as market rises
  - Discounts disappear when funds are opened up
  - Begin life at an IPO premium!
  - Country funds rise and fall in value depending not just on domestic returns but also with the US market

Closed End Funds

- Discounts are an affront to the Law of One Price
- An enduring puzzle
- Closed end funds are the poster children of Behavioral Finance
- Have generated a huge behavioral literature
  - Lee, Schleifer, and Thaler [1991]
  - De Long, Schleifer, Summers, and Waldmann [1990]

Neoclassical Explanation (Malkiel [1977])

- Agency costs
  - Discounted value of management fees
    - Too small
    - Discount is insensitive to interest rates
    - Constant percentage of NAV implies discount couldn’t move with market
- Tax effects
  - Embedded capital gains
- Liquidity of fund holdings

Behavioral Explanation

- Discounts and premiums are a function of investor sentiment
- Investor sentiment is correlated across investors implying discounts are correlated across funds
- Arbitrage is costly and problematic
  - Managers fight opening up their funds and fight takeovers
  - Correlated investor sentiment makes arbitrage risky; discounts could widen
- But, even if arbitrage isn't possible, then why don't large holders buy discounted funds instead of holding their underlying assets?

Neoclassical Analysis Reprised

- Earlier work dismissed management fees
- But, early analysis used an inappropriate technology to value fees; discounted projected cash flows
- Fees are a derivative on the fund NAV
- An interesting case of scientific sociology; everyone just quoted the previous papers as ‘proof’ that fees didn’t matter

Valuing Fees: Proposition 1

- Fix fees and expenses as a percentage of NAV, δ
- Dividend payout is a percentage of NAV, ξ
- Fee based discount is:
  - Discount = $\delta/(\delta + \xi)$

Proposition 2:
Fixed Termination Date

- **Discount =** $d/(d + x)(1 - e^{-(d + x)T})$

Proposition 3: Dividend Payouts

$$D_f = a - b\frac{D}{S}$$

where

$$a = \frac{d}{d + \dfrac{kx}{r + k + d}}$$

and

$$b = \left(\frac{1}{r + k + d}\right)a$$

Proof of Proposition 3:

$$dD = k(xS - D)dt + \sigma_D D dz_D$$

$$dS = (mS - D)dt + \sigma S dz$$

$$F = nf(S, D)$$

$$\tfrac{1}{2}\sigma^2 S^2 f_{SS} + \rho\sigma\sigma_D SD f_{SD} + \tfrac{1}{2}\sigma_D^2 D^2 f_{DD}$$
$$+ (rS - D) f_S + k(xS - D) f_D - (r + d) f + dS = 0$$

Capital Gains Distribution Rules

- A variety of different valuations are derived dependent on the payout policy:
  - A positive feedback from discounts to payouts – an equilibrium in expectations
  - Payouts negatively dependent on performance relative to a benchmark
  - Payouts designed to maintain a constant NAV

More Extensions: IPO Premiums

- A simple information story where the buyers get strong initial signals would accommodate this finding
  - IPO's are designed to prevent buyers from inferring information from prices
- The first buyers may simply be 'irrational'
- Nothing in neoclassical finance requires people to be rational and there is no inconsistency in my agreeing that
  - Most of the time most of the people can be wrong
  - The efficient market protects the sheep from the wolves but nothing protects the sheep from themselves

Data Set

- Sources: Time period: January, 1980 – December, 2000

Data:	Frequency:	Source:
NAV	monthly	Wall Street Journal and checked against Bloomberg
Prices	monthly	CRSP
Dividend and Capital Gains distributions	yearly	CRSP, Bloomberg, SEC filings
Fees and expenses	yearly	SEC company filings
Market index returns	monthly	CRSP
Risk free rate	monthly	CRSP (one-month T-bill)

- Only equity funds with at least five years of observations in the twenty year period were included. A few funds were excluded due to a lack of data on management fees or distributions. The final sample had 21 funds.

- To obtain the annual change in NAV, the following year's capital gains distribution was added back in. Timing of the distributions varied from fund to fund and the adjustment was made to capture the actual gains in the year. The detailed adjustment is reported in the appendix.

Theory Meets the Data

- The sample average discount:
- 7.7%
- The simple fee based theoretical discount:
- 7.7%

Table 1

Fund Ticker Symbol	Theoretical Discount	Theoretical Discount (Expenses)	Average Discount	Management Fee	Expenses	NAV ($)	Capital Gains	Dividends
ADX	0.015	0.015	0.107	0.001	0.003	14.408	0.066	0.029
GAM	0.033	0.031	0.088	0.004	0.009	24.019	0.107	0.017
SBF	0.033	0.032	0.100	0.005	0.005	16.234	0.108	0.027
TY	0.032	0.031	0.130	0.004	0.006	28.601	0.092	0.030
PEO	0.025	0.025	0.068	0.002	0.005	21.568	0.053	0.034
ASA	0.016	0.014	0.074	0.002	0.014	47.511	0.058	0.049
CET	0.013	0.013	0.132	0.001	0.005	17.490	0.078	0.018
JPN	0.044	0.042	0.118	0.006	0.010	13.777	0.120	0.012
SOR	0.074	0.072	0.003	0.008	0.010	39.468	0.020	0.081
MXF	0.239	0.216	0.102	0.011	0.017	15.008	0.015	0.022
ASG	0.091	0.086	0.105	0.007	0.012	11.518	0.048	0.021
FF	0.034	0.033	0.078	0.006	0.010	11.674	0.161	0.011
VLU	0.182	0.156	0.150	0.010	0.019	18.978	0.035	0.010
ZF	0.069	0.066	-0.028	0.007	0.012	11.225	0.007	0.087
USA	0.070	0.068	0.072	0.007	0.010	11.167	0.054	0.039
RVT	0.085	0.081	0.097	0.007	0.012	12.872	0.059	0.016
BLU	0.052	0.051	0.062	0.006	0.009	8.394	0.094	0.015
CLM	0.097	0.086	0.164	0.008	0.017	11.385	0.057	0.014
BZL	0.132	0.118	0.092	0.015	0.029	12.703	0.096	0.002
JEQ	0.078	0.069	-0.052	0.004	0.011	10.338	0.034	0.013
ZSEV	0.203	0.177	-0.048	0.013	0.022	8.289	0.038	0.013
Average	0.077	0.071	0.077	0.006	0.012	17.458	0.067	0.027

The theoretical discounts are calculated by using Proposition 1. The first column of discounts uses only management fees and the second adds in total expenses.

Discounts, NAV's, and Market Returns

- Discounts are positively correlated with NAV's
- Discounts are negatively correlated with market returns
- But, they are **positively** correlated with the difference between NAV and market returns
- Given the difference, neither NAV nor market returns has explanatory power

Table 2

Dependent Variable:	Change in Discount	Change in Discount	Change in Discount	Change in Discount	Change in Discount
Regressors:					
Constant	-0.001	0.001	0.004	0.004	0.004
	-1.562	1.63	4.452	4.452	4.452
NAV return (i,t)	0.317		0.443	-0.024	
	8.921		11.467	-0.951	
Market Return		-0.137	-0.468		-0.024
		-4.693	-10.895		-0.951
Diff				0.468	0.443
				10.895	11.467
R^2	0.136	0.009	0.222	0.222	0.222

This table reports the results of stacked annual regressions of the change in discounts (where discount is defined as (NAV (i,t)-Price(i,t))/NAV(i,t)). Different combinations of regressors are used, including diff (diff is defined as the difference between the return in NAV and the value-weighted market return), market return and NAV return. T-statistics are reported beneath the coefficients. Results are corrected for heteroscedasticity by using Whites' standard errors, yet statistical significance is not affected even when not taking it into account.

Distribution Dynamics

- Capital Gains Distributions are significantly positively related to discounts and past distributions

Table 3

Dependent Variable:	CGR	CGR	CGR	CGR	CGR
Regressors:					
Constant	0.048	0.038	0.026	0.023	0.036
	15.143	5.519	5.405	5.204	5.09
Discount(i,t)	0.09	0.078		0.04	0.079
	4.600	3.454		1.777	3.445
CGR(i,t-1)		0.202	0.526	0.502	0.201
		1.484	6.235	5.72	1.479
NAV return			0.034	0.024	
			2.16	1.432	
Market Return					0.01
					0.633
Diff(nav-mkt)					
R^2	0.072	0.152	0.292	0.304	0.153

This table reports the results of stacked annual regressions of the capital gains ratio, CGR=CG(i,t)/NAV(i,t), on different sets of regressors including the discount, Discount(i,t)=(NAV(i,t)-Price(i,t))/NAV(i,t). T-statistics are reported under the coefficients. Results are corrected for heteroscedasticity by using Whites' standard errors, yet statistical significance is not affected.

Some Further Anomalies

- Discounts are correlated:
  - They move with NAV and NAV's rise when the market rises
- Country funds' discounts move with the market in which they are traded:
  - Capital gains policies depend on the investors' home market, hence, country fund discounts move with the investors' home market

Neoclassical vs. Behavioral

- Parsimony vs. Ad hocery
  - No arbitrage and efficiency produce the answer
- Psychology produces too many answers and no theory
  - Are people optimists or pessimists – they are both
- Neoclassical theory predicts magnitude as well as signs of effects
- Aesthetics; I like theories with some distance between assumptions and conclusions
  - You want correlations then just make individual behavior correlated

Gratuitous Concluding Remarks

- Psychology is a hodgepodge of interesting empirical observations devoid of theory
- Psychology has value for marketing and flows of funds but not for valuation
- Arbitrage may be limited, but
  - In the behavioral models it is so by force majeur
  - Behavioral models limit both markets and institutional structures to produce results
- Bubbles aren’t bubbles until they burst
- Two assets with identical cash flows may sell for different prices, but not for long