A Neoclassical Look at Behavioral Finance: A Tale of Two Anomalies

By

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Neoclassical Theory

• Efficient Markets
  – Weak, semi strong, strong, no trade, rational expectations

• No Arbitrage
  = State space prices = risk neutral pricing = martingales
  = kernels → derivatives, etc.

• Asset Pricing
  – CAPM, APT, Factor models, CBM, kernels, etc.

• Corporate Finance
  – MM, Agency theory, etc.
Neoclassical Finance

• NOT a theory of rational ‘economan’
• A theory of ‘sharks’ looking for chum – ‘easy money’
Traditional Empirical Findings

• Efficient Markets:
  – Returns are serially uncorrelated – glass is full
  – It’s difficult to make excess returns using fundamentals
• NA and Risk Neutral Pricing:
  – Arbitrages are hard to find
  – The engineering side of finance – builds bridges, sets prices
• Asset Pricing: “The data has yet to meet a theory it likes” - Fama
  – CAPM betas appear unrelated to pricing
  – Representative agent CBM’s fare very poorly
  – APT (ICAPM) betas are only weakly explanatory of pricing
• Corporate Finance:
  – Event studies largely support efficient market pricing and MM
Anomalies
A Sampling of Favorites

- Stock Markets:
  - small firm effects, P/E, momentum, calendar year effects, long run predictability, bubbles, equity premium puzzles
- Violations of the LOP:
  - MCI, Royal Dutch Shell/Shell Trading, 3COM/Palm Pilot, Citizen’s Public Utilities, internet stocks, closed end funds
- Volatility:
  - noisy prices – low $R^2$, stock market volatility/fundamental volatility, weekend and trading time vols
- Successful investors who seem to ‘beat the market’
  - hedge fund alphas
  - mutual fund performance persistence
  - Warren Buffett
The Financial Hurricane Scale
Example

• The Siberian stock market is a modest but flourishing and competitive regional market
• Interestingly, for the past six years, with 4 exceptions, on the Siberian stock market, stocks have risen every Wednesday and fallen every Thursday
• Furthermore, over the past six years, on all but 3 weekends in which the returns were modest, stocks opened lower on Monday than they closed on Friday.
Is it true?

How damaging is it?
More Examples

• More stocks names begin with the letter ‘x’ than with the letter ‘e’ and their market value is more than 1/26 of the market cap

• There are more than 5 planets in the solar system
Is it true?

How damaging is it?
Is it true?

- Risk Price/Earnings
- Momentum
- Small Firm Effects
- Long Run Return Predictability
- Equity Risk Premium Puzzles

How damaging is it?
The Revisionist Behavioral View

- The glass is empty
- Data doesn’t fit the established orthodox views
- The time is ripe for a Kuhn like seismic shift
“Science progresses funeral by funeral”*

*Samuelson
The Behavioral Framework

• Investors are a bundle of conflicting emotions:
  – Framing – path dependence
  – Overconfidence – hubris in corporate finance
  – Irrational in the presence of risk
• Investor sentiment is correlated across investors and random which forces prices ≠ fundamentals
• Shifting investor sentiment makes arbitrage risky and costly and limited
• Hence prices are determined by ‘everyman’ and not by the ‘smart’ money
Migration

• Anomalies rarely persist to foster new theories
• Typically they migrate westward on the hurricane scale as the supporting interpretation of the data erodes with replication and statistical analysis
• And typically they migrate south as they yield to neoclassical analysis
• E.G., Long run predictability and the equity premium puzzle
A Revisionist Theme: Prices ≠ Fundamentals

• Unfortunately, ‘fundamentals’ are ambiguous and depend on some pricing theory, e.g., the ‘Internet bubble’

• An exception: closed end funds where fundamentals are unambiguous: fund share price vs. net asset value (NAV)

• We will ‘migrate’ this anomaly
Example

Tricontinental Corporation Discount
Migration 1: Closed End Funds

- Trade at discounts from NAV
- Discounts are correlated across funds
- Discounts narrow as market rises
- 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!
Neoclassical Analysis

• Agency costs, i.e., management fees (Malkiel [1977])
  – Too small: about 30bps, vs. discount of 15%

• Taxes – embedded capital gains
  – Appears not applicable and tax exempt institutions could take advantage

• A puzzle
The 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
Neoclassical Analysis Reprised

• Early analysis used an inappropriate technology to value fees; discounted projected cash flows

• An interesting case of scientific sociology; everyone just quoted the previous papers as ‘proof’ that fees didn’t matter
Proposition 1

• Fees and expenses = $\delta\%$ of NAV
• Dividend payout = $\xi\%$ of NAV

Fee based discount:
\[ \text{Discount} \equiv D_f = \frac{\delta}{\delta + \xi} \]
Proposition 2
Dividend Payouts

\[ D_f = a - b \frac{D}{S} \]

where

\[ a = \frac{\delta}{\delta + \frac{k \xi}{r + k + \delta}} \]

and

\[ b = \left( \frac{1}{r + k + \delta} \right) a \]
Proof:

\[ dD = k(\xi S - D)dt + \sigma_D Ddz_D \]

\[ dS = (\mu S - D)dt + \sigma Sdz \]

\[ F = nf(S, D) \]

\[ \frac{1}{2} \sigma^2 S^2 f_{SS} + \rho \sigma \sigma_D S D f_{SD} + \frac{1}{2} \sigma_D^2 D^2 f_{DD} + (rS - D)f_S + k(\xi S - D)f_D - (r + \delta)f + \delta S = 0 \]
Theory Meets the Data

• The sample average discount:
  • 7.7%

• The simple fee based theoretical discount:
  • 7.7%
<table>
<thead>
<tr>
<th>Fund Ticker Symbol</th>
<th>Theoretical Discount</th>
<th>Theoretical Discount (Expenses)</th>
<th>Average Discount</th>
<th>Management Fee</th>
<th>Expenses</th>
<th>NAV ($)</th>
<th>Capital Gains</th>
<th>Dividends</th>
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<td>0.015</td>
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<td>0.010</td>
<td>13.777</td>
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<td>0.072</td>
<td>0.003</td>
<td>0.008</td>
<td>0.010</td>
<td>39.468</td>
<td>0.020</td>
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<td>CLM</td>
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<td>BZL</td>
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<td>12.703</td>
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<td>0.013</td>
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<td>Average</td>
<td>0.077</td>
<td>0.071</td>
<td>0.077</td>
<td>0.006</td>
<td>0.012</td>
<td>17.458</td>
<td>0.067</td>
<td>0.027</td>
</tr>
</tbody>
</table>

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.
Dynamics Payout Rules

• Discount depends on manager/investor split
• The split depends on the payout rule:
  – 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
<table>
<thead>
<tr>
<th>Dependent Variable:</th>
<th>Change in Discount</th>
<th>Change in Discount</th>
<th>Change in Discount</th>
<th>Change in Discount</th>
<th>Change in Discount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regressors:</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Constant</td>
<td>-0.001</td>
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<td></td>
<td>-1.562</td>
<td>1.63</td>
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<tr>
<td>NAV return (i,t)</td>
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<td>0.443</td>
<td>-0.024</td>
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<td></td>
<td>8.921</td>
<td>11.467</td>
<td>-0.951</td>
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<tr>
<td>Market Return</td>
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<td>-0.468</td>
<td>-0.024</td>
<td>-0.951</td>
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<td></td>
<td>-4.693</td>
<td>-10.895</td>
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<tr>
<td>Diff</td>
<td></td>
<td></td>
<td>0.468</td>
<td>0.443</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>10.895</td>
<td>11.467</td>
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<tr>
<td>R²</td>
<td>0.136</td>
<td>0.009</td>
<td>0.222</td>
<td>0.222</td>
<td>0.222</td>
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</tbody>
</table>

This table reports the results of stacked annual regressions of the change in discounts (where discount is defined as \((\text{NAV}(i,t)-\text{Price}(i,t))/\text{NAV}(i,t)\)). 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.
Discounts, NAV’s, and Market Returns

• Discounts are positively correlated with NAV’s and negatively correlated with market returns

• But, discounts are positively correlated with the difference between NAV and market returns – hardly behavioral

• Given the difference, neither NAV nor market returns has explanatory power
The Country Fund Anomaly

- Country funds’ discounts move with the market in which they are traded:
- Capital gains policies depend on the investors’ home market, e.g., payouts are raised when the domestic market is beating the foreign market
- Hence, country fund discounts move with the investors’ home market
Summary:
Neoclassical vs. Behavioral

- Parsimony vs. ad hocery
  - NA and market efficiency produce the answer
- Psychology offers too many answers
  - Are people optimists or pessimists – they are both
- Neoclassical theory predicts the magnitude as well as the signs of effects
- Aesthetics; I prefer theories with some distance between assumptions and conclusions
  - You want correlations, presto! Assume correlated individual irrational behavior
A Skeptic’s Perspective on the Role of Psychology in Finance

• Psychology is currently a grab bag of fascinating anecdotes and observations begging for theory
• When added to NA and efficiency, it has little to offer for price determination
• Psychology may have value for financial marketing and the flows of funds – although the value added over empirical economics is not clear
More Skepticism: Financial Physics

- No real theory yet: complex systems may have common features but the analogy has fundamental deficiencies
- At a theoretical level economic systems are more about global effects than about local interactions
- At an empirical level, some of their power law and fractal observations are interesting
Biofinance

• Companies as animals or genes or molecules
• Industries are species
• Simple minded fun
Conclusion

• Finance has unsolved problems
• Thank God for that!
• Unfortunately, though, so far it looks as though we will have to solve them ourselves