

# Growth/Value/Momentum Returns as a Function of the Cross-sectional Dispersion of Stock Returns

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# Major Points

- ◆ Current definitions for equity styles such as growth, value and momentum are problematic
- ◆ These styles can be efficiently represented as options on the cross-sectional dispersion of stock returns in a market

# What Do the Terms Growth, Value and Momentum Mean?

- ◆ Would we invest in any enterprise that had an expected growth rate of zero?
- ◆ Is not any stock a good “value” if the price is greatly less than we perceive the market clearing price?
- ◆ Does a stock have good momentum if its down 10% when the market is down 20%?
- ◆ Is this whole discussion just a false syllogism? Like a comparison between “apples” and “fruit”. (see Arthur Clarke.. Boston portfolio manager.. Not the science fiction writer)

# Obviously We Can Impose Our Definitions on the Process

- ◆ Index publishers such as Frank Russell and Salomon Smith Barney use fundamental information such as book-to-market ratio at a moment in time to define a taxonomy
- ◆ Other research entities such as Morningstar have their own definitions
- ◆ Academic researchers such as Fama and French have formed their taxonomy based on some security or corporate characteristic

# We Can Also Form Taxonomies without External Definitions

- ◆ diBartolomeo and Witkowski, FAJ, 1997
- ◆ Group all funds by what they call themselves (growth, value, income, etc.)
- ◆ Form indices of returns by group
- ◆ Use returns based style analysis to find group members loadings on the various group indices
- ◆ Reassign group members that have dominant loadings on the index from another group
- ◆ Repeat entire process until all funds appear correctly classified

# Characteristic Based Data is Often Unreliable Or Problematic

- ◆ Enron, Worldcom, etc.
- ◆ Accounting standards across countries still vary widely
- ◆ Emerging markets such as the Peoples Republic of China are problematic. No penalties for false financials if it is illegal at all.
- ◆ Robustness is lacking due to severe problems with outliers (Knez and Ready 1997)
- ◆ Overlaps in definitions. Can't a stock be a good value and have high growth (or momentum) at the same time?

# Different Active Management Styles Represent Differential Responses to Price Movement

“Price-sensitive active management strategies can be replicated by option payoffs”

Jarrold Wilcox, *Better Risk Management*,  
JPM, 2000

# Value and Volatility

- ◆ Value approaches are often referred to among hedge funds and trading desks as “convergence strategies” as they depend on the convergence between the market price and a manager’s definition of the fair price of some security. The greater the noise in the market environment, the more obfuscation and impediments to the convergence process.

# Momentum and Volatility

- ◆ Momentum strategies buy stocks on price strength and sell on price weakness. This is similar to a Constant Proportion Portfolio Insurance (Black and Perold, 1992) applied to the cross-section of stock returns.
- ◆ CPPI mimics being long a put option on the underlying asset (plus a long position in the underlying). Option buyers are advantaged when realized volatility is greater than the volatility expected when the option was established
- ◆ If momentum strategies are comparable to being long an option, then anti-momentum strategies (value?) must be comparable to being short an option, so low volatility conditions would be most favorable

# Defining Volatility as the Basis of Style

- ◆ We could just take the cross-sectional dispersion of securities in a particular market on a period by period basis
- ◆ Beta differences will cause cross-sectional dispersion in volatile (market index across time) conditions
- ◆ So let us define our dispersion measure as the cross-sectional standard deviation of alpha (residual returns, net of beta effect)
- ◆ Or think of it as the “excess standard deviation” (standard deviation of stock returns) minus (the product of the absolute value of the observed market risk premium times the cross-sectional dispersion of the beta values)
- ◆ diBartolomeo (2000) relates periods of high cross-sectional dispersion to positive serial correlation in stock returns (i.e. momentum strategies working)

# A Mathematical Treatment

- ◆ Lilo, Mantegna, Bouchard and Potters<sup>1</sup> use the term “Variety” to describe cross-sectional dispersion of stock returns
- ◆ They call our measure “idiosyncratic variety” (noted as  $v(t)$ )
- ◆ They find that the average correlation between stocks is approximately:

$$C(t) = 1 / [1 + (v^2(t)/r_m^2(t)) ]$$

<sup>1</sup> Thanks to Emanuel Derman for making me aware of this paper

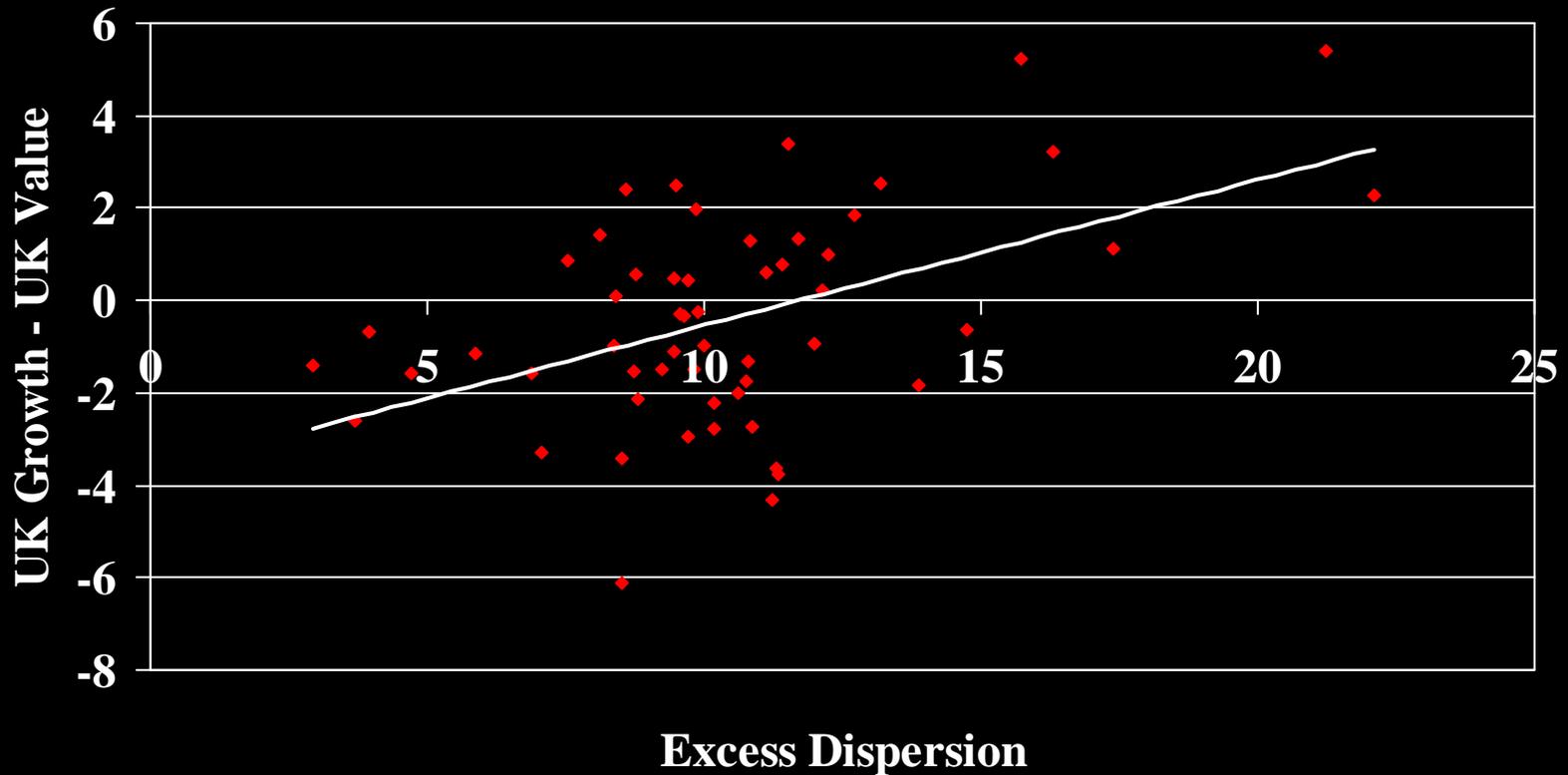
# Summing Up the Idea

- ◆ Value strategies should work best in periods of low excess cross-sectional dispersion of stock returns. Another way to characterize this is periods when correlations among securities is highest
- ◆ Momentum/growth strategies should work best in periods of high excess cross-sectional dispersion as they are like being long an option.
- ◆ Strongin, Petsch, Segal and Sharenow (2002) find value strategies work best when confined within sector (small cross-sectional dispersion), while growth strategies work best with no sector constraints (high dispersion)
- ◆ Solnik and Roulet (2000) examine the dispersion of country returns as a way of estimating correlations between markets

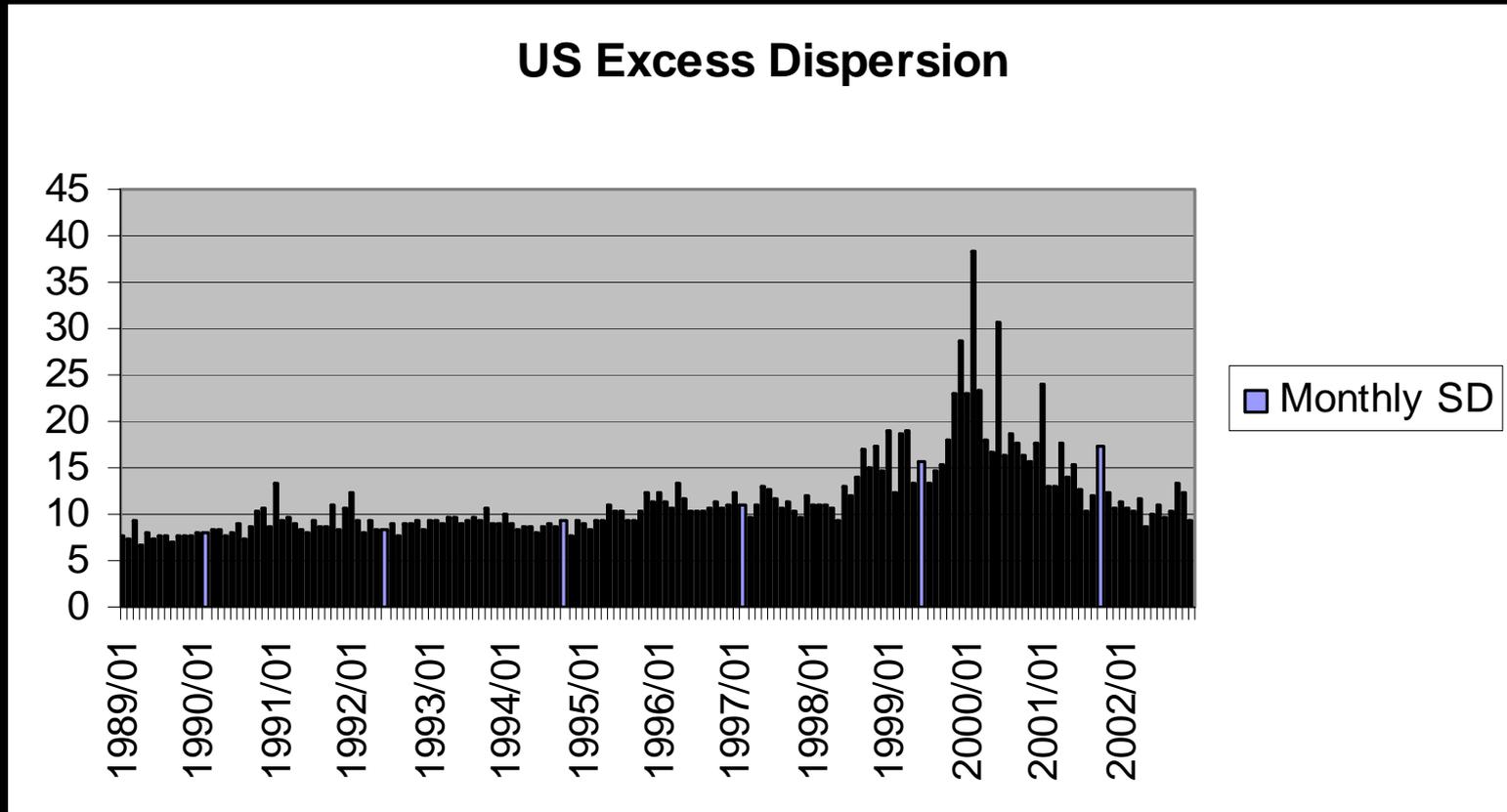
# A Simple Empirical Test on UK Data

- ◆ Compute the monthly “excess” cross-sectional standard deviation of stock returns using beta values from the Northfield UK Risk model
- ◆ Compute the “Growth-Value” return spread from the Salomon Smith Barney UK Primary Market indices
- ◆ Data from January 1996 through September 2002
- ◆ Correlation coefficient of .48 with significant T statistic
- ◆ Comparable results to data for the US
- ◆ Captures the build and collapse of the late 1990s “bubble” nicely. Consistent with Derman (2002)

# Monthly UK Style Returns Versus Excess Dispersion January 1998 through September 2002



# US Excess Dispersion 1989-2002



# US Empirical Results

- ◆ Compute the Russell 1000 Growth-Value spread and the Russell 2000 Growth-Value spread monthly 1989-2002
- ◆ Compute “excess standard deviation” measure for all US stocks over \$250 Million Capitalization using Northfield Fundamental Beta values
- ◆ Monthly Correlation over 14 years
  - Russell 1000            0.27            Russell 2000            0.33
- ◆ Monthly Correlation over Last 5 years
  - Russell 1000            0.45            Russell 2000            0.52
- ◆ All T statistics greater than 3.5

# Directions for Future Research

- ◆ Option traders profit on differences between volatility at which an option is priced, and the volatility later realized. We need to consider lagged relationship between style returns and excess dispersion
- ◆ Consider richer definitions of valuation and momentum than simple book/market ratios
- ◆ Explore use of “excess dispersion” as a proxy for style in covariance risk models based on time series estimations

# Conclusions

- ◆ Popular equity management styles such as value, growth and momentum can be viewed as bets on the future excess dispersion of the cross-section of stock returns
- ◆ Risk controls for portfolios defined as style neutral can be viewed as being neutral to future movements in the volatility level

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