



# VALUE AND MOMENTUM EVERYWHERE

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Preliminary



# Motivation

- ▶ Some of the most studied capital market phenomena are
  - *Value effect*: assets with high “book value”-to-market value outperform those with low ones
  - *Momentum effect*: recent relative winners outperform recent relative losers
  
- ▶ Value and momentum are often studied
  - only *separately*
  - only in *certain asset classes*
  - only *one asset class at a time*
  
- ▶ Literature
  - US stock selection (Statman (1980), Fama-French (1992), Jegadeesh and Titman (1993), Asness (1994))
  - Stocks in other countries (Fama and French (1998), Rouwenhorst (1998), Liew and Vassalou (2000), Griffin and Martin (2003), Chui, Titman, Wei (2002))
  - Country equity indices (Asness, Liew, and Stevens (1997), Bhojraj and Swaminathan (2006))
  - Currency momentum (Shleifer and Summers (1990), Kho (1996), LeBaron (1999))
  - Commodity momentum (Gorton, Hayashi and Rouwenhorst (2007))
  - Value effects in currencies and commodities (?)
  - Value and momentum in government bonds (?)

# What We Do

- Identify **connections** between value and momentum **across** markets
  - Providing evidence for **common** global phenomena/ factors
- Gain insight by looking across asset classes and globally at once
  - Providing **new insights**
  - Added **statistical power**
  - Consider **common explanations**: macro and liquidity risks
- Extend and unify analysis of value and momentum **“everywhere”**
  - Breadth of asset classes and markets studied in a **unified** setting
  - Study value and momentum **simultaneously** everywhere

# Main Results

- Value and momentum effects appear in **all** of the major asset classes
  - Value and momentum strategies both have positive Sharpe ratios despite being negatively correlated
  - Therefore, the 50/50 combination has higher Sharpe than either stand alone
  - Large diversification benefits from combining asset classes globally:
    1. Economic power of the combined asset class portfolios
    2. Statistical power of the combined portfolio reduces noise
  
- Striking **co-movement** patterns across asset classes:
  - Value here correlates with value there
  - Momentum here correlates with momentum there
  - Value and momentum negatively correlated everywhere

# Main Results

- Relation to **macro risk**:
  - Value and momentum both load positively on long-run consumption risk and negatively on a business cycle recession indicator
  - Support for global macroeconomic and long-run consumption risk (Bansal and Yaron (2004), Parker and Julliard (2005), Hansen, Heaton and Li (2008), Malloy, Moskowitz, Vissing-Jorgensen (2008))
  - This can only explain a (small) part of the premia
  - Can explain some of co-movement structure, but not negative correlation between value and momentum
  
- Relation to **liquidity risk**:
  - Value loads positively and momentum loads negatively on our measure of funding liquidity risk
  - Liquidity risk is priced (Pastor and Stambaugh (2003), Acharya and Pedersen (2005))
    - May explain part of value premium, but makes momentum more puzzling
  - Partly explains global comovement patterns and negative correlation between value and momentum
  - Market and funding liquidity are linked and affect co-movement (Brunnermeier and Pedersen (2008))
  
- These risks are statistically present when **looking everywhere**, are not easy to detect in any single strategy, but there is a **lot left to be explained**
  - Could be due to trading costs and limited arbitrage

# Overview of Talk

- Data and methodology
- New facts on performance of value and momentum everywhere
- Co-movement everywhere
- Exposures to macroeconomic and liquidity risks
- The power of looking everywhere at once

# Measures of Value and Momentum

- ▶ We use **simple** and, to the extent possible, standard measures
  
- ▶ **Momentum**: Return from t-12 to t-2 months
  
- ▶ **Value**:
  - Stocks: book to price
  - Country equity indices: aggregate book to price
  - Commodities: “book” to price, where “book” is the average commodity spot price 4.5 to 5.5 years ago
    - c.f. DeBondt and Thaler (1985) and Fama and French (1996)
  - Currencies: “book” to price, where “book” is the average exchange rate 4.5 to 5.5 years ago adjusted for interest-rate differentials, i.e. excess return from t-60 to t-1
    - c.f. deviation from UIP, or change in PPP if real rates are constant across countries
  - Bonds: real bond yield, i.e. yield minus expected inflation
    - c.f. book to price, where book is discounted cash-flows using expected inflation
  
- ▶ We use most recently available price in our value measure
  - Induces some negative correlation between value and momentum *within* (but not across) asset classes
  - We also replicate using lagged value measures for robustness (appendix in the paper)
  - Using most recent price is a natural value measure (hard to imagine more recent price does not provide useful information)

# Methodology

- For each asset class, construct a **long-short portfolio** with weights

$$w_{it}^{VALUE} = c_t ( \text{rank}(VALUE_{it}) - \text{average}(\text{rank}) )$$

where  $c_t$  is chosen such that the portfolio is either:

1. **Constant leverage**: \$1 long, \$1 short
2. **Constant ex-ante volatility**: 10% annualized

- Variance-covariance matrix from rolling 3-year window of returns

- Returns to value

$$r_t^{VALUE} = \sum_j w_{it}^{VALUE} r_{it}$$

- Similar for momentum.

- The 50/50 value/momentum **combo** returns are

$$r_t^{COMBO} = s_t ( 0.5 r_t^{VALUE} + 0.5 r_t^{MOM} )$$

where  $s_t$  maintains scale (either dollar long-short or 10% ex-ante volatility)

- We combine strategies across asset classes and rescale to 10% volatility ex post
  - Equal weight across asset classes and markets



# Data Sources

## ▶ Stock selection

- U.S.:

- Universe: CRSP common equity with a recent book value, at least 12 months of returns, excluding ADR's, foreign shares REITS, financials, closed-end funds, stocks with share prices less than \$1, and stocks in bottom quartile of market cap. Focus on top half of remaining universe based on market cap (top 37.5% of total universe).
- Prices and returns: CRSP
- Book values: Compustat

- U.K., Japan, Continental Europe:

- Universe: BARRA with recent book value from Worldscope, at least 12 months of returns and same filters as US.
- Prices and returns: Barra
- Book values: Worldscope

## ▶ Equity country selection

- Stock index returns and book values: MSCI

## ▶ Bond country selection

- Returns: Datastream MSCI 10-year government bond index in excess of local short rate
- Short rate and 10-year government bond yield: Bloomberg
- Inflation forecasts for next 12 months: analysts estimates compiled by Consensus Economics

## ▶ Currency selection

- Spot exchange rates: Datastream
- IBOR short rates: Bloomberg

# Data Sources

## ▶ Commodity selection

- Aluminum, Copper, Nickel, Zinc, Lead, Tin: London Metal Exchange (LME)
- Brent Crude, Gas Oil: Intercontinental Exchange (ICE)
- Live Cattle, Feeder Cattle, Lean Hogs: Chicago Mercantile Exchange (CME)
- Corn, Soybeans, Soy Meal, Soy Oil, Wheat: Chicago Board of Trade (CBOT)
- WTI Crude, RBOB Gasoline, Heating Oil, Natural Gas: New York Mercantile Exchange (NYMEX)
- Gold, Silver: New York Commodities Exchange (COMEX)
- Cotton, Coffee, Cocoa, Sugar: New York Board of Trade (NYBOT)
- Platinum: Tokyo Commodity Exchange (TOCOM)

## ▶ Macro indicators

- Recession = linear interpolation between peak (=0) and trough dates (=1)
  - US dates from NBER, Non-US dates from Economic Cycle Research Institute
- Long-run consumption growth = 3-year future growth in per capita consumption (sum of 3-year changes in above)

## ▶ Funding liquidity indicators

- TED spread (3 month LIBOR minus 3 month T-bill rate), U.S., U.K., Japan, Germany (Bloomberg and International Fund Services (IFS))
- 3-month LIBOR minus term repo rate (IFS, various brokers)

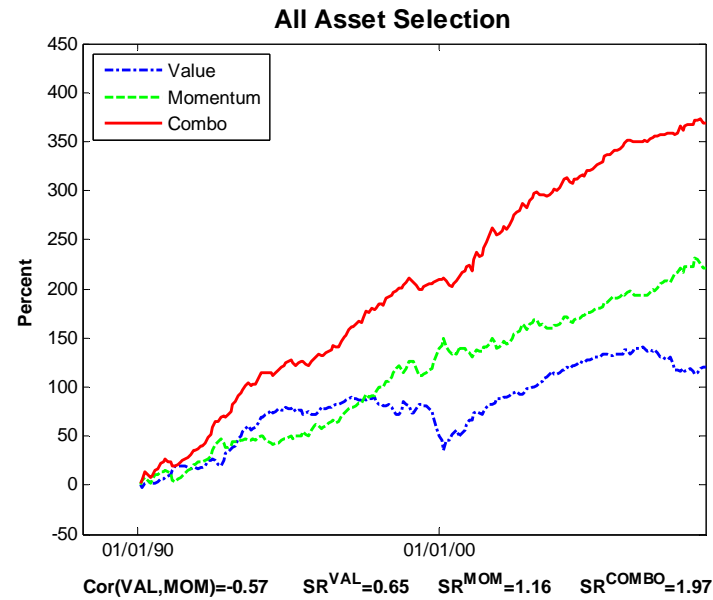
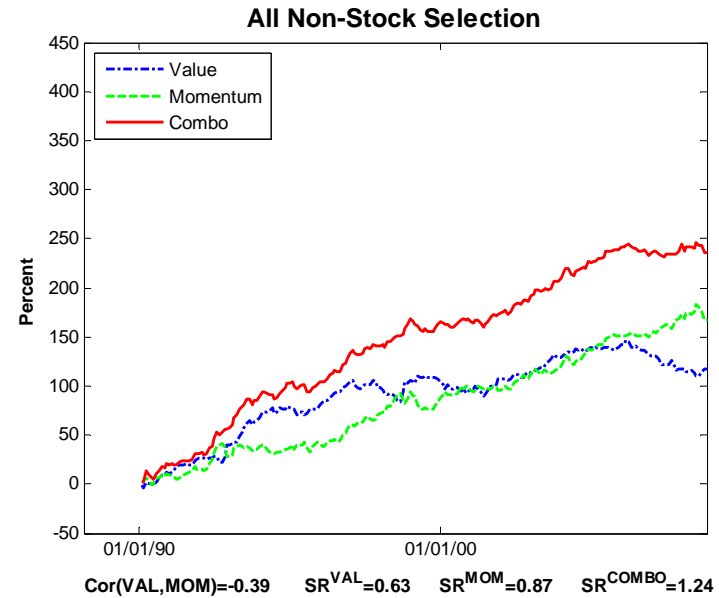
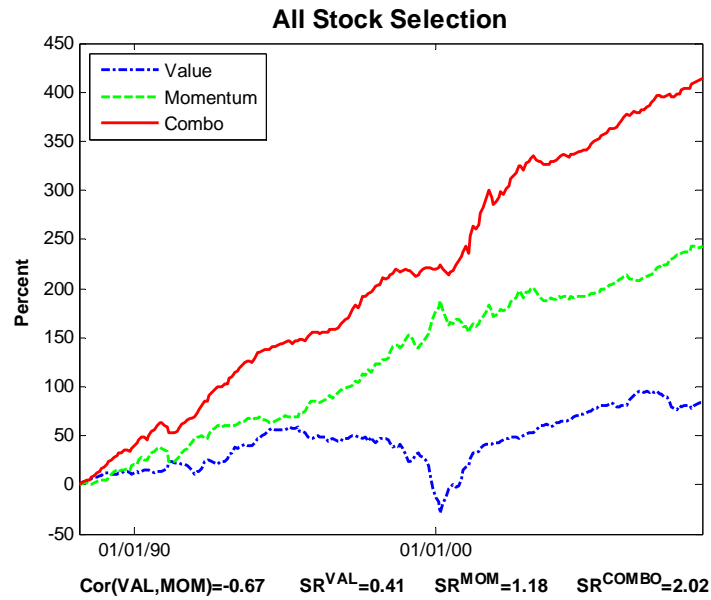
# Performance

- We consider within each asset class
  - The return of
    - Value
    - Momentum
    - 50/50 combo
  - Correlation of value and momentum
  - Both \$1 long-short and constant volatility (in order to combine asset classes)

## Table 2: Performance of Value and Momentum Strategies Scaled to Constant Volatility

	Value SR (t-stat)	Momentum SR (t-stat)	Combo SR (t-stat)	Cor(val,mom)	Avg. # securities
<b>Panel A: Stock Selection</b>					
U.S. <i>03/73-02/08</i>	0.21 (1.23)	0.78 (4.60)	1.13 (6.69)	-0.60	1,367
U.K. <i>12/84-02/08</i>	0.30 (1.43)	1.26 (6.08)	1.67 (8.05)	-0.61	486
Japan <i>02/85-02/08</i>	0.89 (4.28)	0.23 (1.09)	1.12 (5.41)	-0.53	947
Continental Europe <i>02/88-02/08</i>	0.33 (1.49)	1.12 (4.89)	1.69 (7.41)	-0.53	1,096
<b>Global stock selection</b> <i>02/88-02/08</i>	<b>0.40</b> <b>(1.78)</b>	<b>1.18</b> <b>(5.28)</b>	<b>2.00</b> <b>(8.97)</b>	<b>-0.67</b>	
<b>Panel B: Non-Stock Selection</b>					
Equity country selection <i>02/80-02/08</i>	0.58 (3.08)	0.68 (3.62)	1.08 (5.70)	-0.41	18
Bond country selection <i>01/90-02/08</i>	0.45 (1.92)	0.41 (1.73)	0.51 (2.19)	0.07	10
Currency selection <i>08/80-02/08</i>	0.44 (2.30)	0.45 (2.35)	0.64 (3.38)	-0.41	10
Commodity selection <i>02/80-02/08</i>	0.30 (1.60)	0.58 (3.05)	0.84 (4.44)	-0.39	27
<b>All non-stock selection</b> <i>01/90-02/08</i>	<b>0.63</b> <b>(2.67)</b>	<b>0.96</b> <b>(4.09)</b>	<b>1.33</b> <b>(5.67)</b>	<b>-0.38</b>	
<b>All asset selection</b> <i>01/90-02/08</i>	<b>0.64</b> <b>(2.73)</b>	<b>1.22</b> <b>(5.21)</b>	<b>2.01</b> <b>(8.58)</b>	<b>-0.56</b>	

# Cumulative Returns (1990-9/30/2008)



# Performance, Summary

- Ubiquitous positive returns to value and momentum everywhere
- Negative correlation between value and momentum within asset classes
  - Helps clarify some of the variation in performance of any single strategy (e.g., momentum in Japan)
- 50/50 combo portfolio higher SR and more stable across markets and asset classes
- Large diversification benefits from combining markets and asset classes
  - Greater challenge for theory to explain
  - Presents opportunity to identify common movements among value and momentum
- While we use current prices in our value measure, “lagging value”:
  - improves value’s stand alone Sharpe ratio
  - weakens negative correlation with momentum
  - has little (slightly negative) impact on 50/50 combo performance.

# Over-Optimistic or Pessimistic for Real-World Implementation?

## ➤ Over-optimistic

- No transactions or financing costs
  - makes performance closer for stock vs. non-stock and val vs. mom
- Backtests never hits a funding-liquidity problem
- Going forward returns may be lower
  - data-mining (though having looked everywhere reduces this risk)
  - because some people trade on these strategies

or, not, e.g. because returns are compensation for risk?

## ➤ Over-pessimistic

- We used only the simplest value and momentum measures; weighting each strategy the same
- There are many possible improvements (that must be balanced vs. the dangers of data-mining); e.g., improved value/momentum measures, variable strategy weighting (statically and dynamically)

# Comovement Everywhere

Panel A: Average of individual correlations								
	Stock selection, value	Non-stock selection, value	Stock selection, momentum	Non-stock selection, momentum	Stock selection, value	Non-stock selection, value	Stock selection, momentum	Non-stock selection, momentum
	Monthly return correlations				Quarterly return correlations			
Stock selection, value	0.38*	0.09	-0.26*	-0.11	0.56*	0.12	-0.43*	-0.16*
Non-stock selection, value		0.07	-0.10	-0.06		0.10	-0.15	-0.07
Stock selection, momentum			0.36*	0.21*			0.50*	0.22*
Non-stock selection, momentum				0.15*				0.18*

*Excludes correlation within the same market*

\*Significant at the 5% level.



# Comovement Everywhere

Panel B: Correlation of average return series								
	Stock selection, value	Non-stock selection, value	Stock selection, momentum	Non-stock selection, momentum	Stock selection, value	Non-stock selection, value	Stock selection, momentum	Non-stock selection, momentum
	Monthly return correlations				Quarterly return correlations			
Stock selection, value	1.00	0.17*	-0.67*	-0.22*	1.00	0.30*	-0.83*	-0.40*
Non-stock selection, value		1.00	-0.19*	-0.38*		1.00	-0.29*	-0.56*
Stock selection, momentum			1.00	0.47*			1.00	0.69*
Non-stock selection, momentum				1.00				1.00

\*Significant at the 5% level.

# Comovement Everywhere

<b>Panel C: Correlation of average stock selection with each non-stock strategy</b>								
	Country Selection value	Fixed Income value	Foreign Exchange value	Commodity value	Country Selection momentum	Fixed Income momentum	Foreign Exchange momentum	Commodity momentum
<b>Monthly return correlations</b>								
All stock selection, value	0.24*	0.05	0.06	0.04	-0.29*	-0.04	-0.07	-0.10
All stock selection, momentum	-0.19*	-0.03	-0.07	-0.13*	0.50*	0.18*	0.23*	0.19*
<b>Quarterly return correlations</b>								
All stock selection, value	0.40*	0.09	0.08	0.04	-0.46*	-0.04	-0.10	-0.16*
All stock selection, momentum	-0.34*	-0.05	-0.11*	-0.18*	0.69*	0.29*	0.38*	0.30*

\*Significant at the 5% level.

# Comovement Everywhere

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	Stock selection, combo	Non-stock selection, combo	Stock selection, combo	Non-stock selection, combo
	<b>Monthly return correlations</b>		<b>Quarterly return correlations</b>	
Stock Selection, combo	0.29	0.10	0.44	0.12
Non-stock selection, combo		0.06		0.07

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*\*Significant at the 5% level.*

# Common Components

- Time-series regressions of value (momentum) here on value and momentum elsewhere:

$$r_{i,t}^{value} = \alpha_i + \beta_i \left( \frac{1}{7} \sum_{k \neq i} r_{k,t}^{value} \right) + \gamma_i \left( \frac{1}{7} \sum_{k \neq i} r_{k,t}^{momentum} \right) + \varepsilon_{i,t}^{value}$$

$$r_{i,t}^{momentum} = \alpha_i + \beta_i \left( \frac{1}{7} \sum_{k \neq i} r_{k,t}^{value} \right) + \gamma_i \left( \frac{1}{7} \sum_{k \neq i} r_{k,t}^{momentum} \right) + \varepsilon_{i,t}^{momentum}$$

	Coefficient estimate			t-statistic			R-square
	intercept	Value elsewhere	Momentum elsewhere	intercept	Value elsewhere	Momentum elsewhere	
U.S. value	0.00%	0.59	-0.14	0.02	3.70	-0.98	11.4%
U.K. value	-2.28%	1.01	-0.32	-0.89	6.78	-2.50	30.9%
Japan value	6.24%	0.56	0.00	2.18	3.54	0.03	7.9%
Continental Europe value	1.68%	1.08	-0.24	0.71	7.69	-1.98	35.4%
Equity country selection value	3.60%	0.38	-0.11	1.37	2.65	-0.84	6.8%
Bond country selection value	2.40%	0.28	0.13	0.89	1.95	1.05	1.8%
Currency selection value	4.44%	0.17	-0.08	1.47	1.05	-0.59	1.6%
Commodity selection value	5.04%	-0.15	-0.36	1.73	-1.00	-2.62	3.2%
Average of stock selection value	1.41%	0.81	-0.17	0.50	5.43	-1.36	21.4%
<b>Global stock selection value</b>	<b>4.92%</b>	<b>0.10</b>	<b>-0.19</b>	<b>1.68</b>	<b>1.31</b>	<b>-2.31</b>	<b>5.5%</b>
Average on non-stock selection value	3.87%	0.17	-0.11	1.37	1.16	-0.75	3.3%
<b>All non-stock selection value</b>	<b>7.68%</b>	<b>0.06</b>	<b>-0.14</b>	<b>2.57</b>	<b>0.76</b>	<b>-1.60</b>	<b>4.0%</b>

# Common Components, continued

	Coefficient estimate			t-statistic			R-square
	intercept	Value elsewhere	Momentum elsewhere	intercept	Value elsewhere	Momentum elsewhere	
U.S. momentum	2.64%	-0.12	0.75	0.97	-0.78	5.64	20.3%
U.K. momentum	8.88%	-0.43	0.94	3.74	-3.13	8.05	39.2%
Japan momentum	0.60%	-0.14	0.35	0.23	-0.92	2.79	7.5%
Continental Europe momentum	3.60%	-0.07	1.11	1.64	-0.51	9.95	41.8%
Equity country selection momentum	-0.12%	-0.02	0.98	-0.03	-0.14	7.45	28.6%
Bond country selection momentum	-0.48%	0.17	0.48	-0.16	1.21	3.75	7.1%
Currency selection momentum	0.96%	0.12	0.50	0.30	0.73	3.48	6.5%
Commodity selection momentum	5.52%	0.07	0.37	1.93	0.45	2.79	4.3%
Average of stock selection momentum	3.93%	-0.19	0.79	1.65	-1.34	6.61	27.2%
<b>Global stock selection momentum</b>	<b>7.20%</b>	<b>-0.01</b>	<b>0.49</b>	<b>2.72</b>	<b>-0.21</b>	<b>6.65</b>	<b>22.4%</b>
Average of non-stock selection momentum	1.47%	0.08	0.58	0.51	0.56	4.37	11.6%
<b>All non-stock selection momentum</b>	<b>2.16%</b>	<b>0.17</b>	<b>0.57</b>	<b>0.85</b>	<b>2.20</b>	<b>6.87</b>	<b>24.2%</b>
U.S. combo	5.28%	0.22	0.72	1.81	1.39	5.06	11.8%
U.K. combo	7.68%	0.57	0.96	2.96	3.77	7.46	20.6%
Japan combo	6.84%	0.35	0.52	2.55	2.31	4.09	7.2%
Continental Europe combo	7.44%	0.66	1.05	3.05	4.53	8.51	25.2%
Equity country selection combo	2.52%	0.26	0.69	0.98	1.91	5.39	12.8%
Bond country selection combo	0.12%	0.37	0.48	0.05	2.49	3.65	5.9%
Currency selection combo	2.88%	0.29	0.35	1.08	2.05	2.73	3.5%
Commodity selection combo	9.12%	-0.13	0.05	3.26	-0.89	0.40	0.9%
Average of stock selection combo	6.81%	0.45	0.81	2.59	3.00	6.28	16.2%
<b>Global stock selection combo</b>	<b>15.36%</b>	<b>0.05</b>	<b>0.44</b>	<b>6.53</b>	<b>0.80</b>	<b>6.96</b>	<b>16.5%</b>
Average of non-stock selection combo	3.66%	0.20	0.39	1.34	1.39	3.05	5.7%
<b>All non-stock selection combo</b>	<b>7.20%</b>	<b>0.22</b>	<b>0.44</b>	<b>3.00</b>	<b>2.90</b>	<b>6.25</b>	<b>12.4%</b>

# Common Components, Summary

- Value loads positively on value elsewhere, with a little residual alpha left over.
- Momentum loads positively on momentum elsewhere, with a little more residual alpha left over.
  - Implies: common global factor structure in value and momentum, but can't "explain" entire premium
- Value and momentum load negatively on each other elsewhere.
  - Implies: value and momentum may load oppositely on some common global factor(s).
- 50/50 combo portfolio loads positively on value and momentum, but with substantially more alpha than either stand alone strategy.
- What are candidates for common factors and which ones are exaggerated or diminished when combining value and momentum?

# Macroeconomic and Liquidity Risk

Table 6, Panel A: Multivariate regressions on macroeconomic and liquidity risk factors

Dependent variable =	Global Stock Selection		All Non-Stock Selection		All Asset Selection			
	Value	Momentum	Value	Momentum	Value	Momentum	Mom - Val	Combo
<b>Panel A: Multivariate regression results on macroeconomic and liquidity risk factors</b>								
Long-run consumption growth	0.011 (0.40)	0.060 (2.48)	0.078 (2.57)	0.045 (1.58)	0.057 (2.46)	0.060 (2.42)	0.003 (0.07)	0.122 (6.07)
Global recession	-0.012 (-0.68)	-0.037 (-2.86)	-0.006 (-0.53)	-0.027 (-1.30)	-0.012 (-0.89)	-0.036 (-2.27)	-0.025 (-1.17)	-0.057 (-2.74)
Market excess return	-0.195 (-2.80)	-0.058 (-0.44)	0.105 (2.14)	-0.049 (-0.76)	-0.058 (-1.00)	-0.061 (-0.56)	-0.003 (-0.02)	-0.160 (-1.15)
US TED spread	-0.033 (-4.04)	0.027 (4.32)	-0.008 (-0.76)	0.008 (1.49)	-0.026 (-3.19)	0.020 (3.81)	0.046 (3.64)	0.006 (1.50)
R-square	21.2%	6.3%	5.5%	1.9%	9.8%	4.8%	6.0%	12.6%

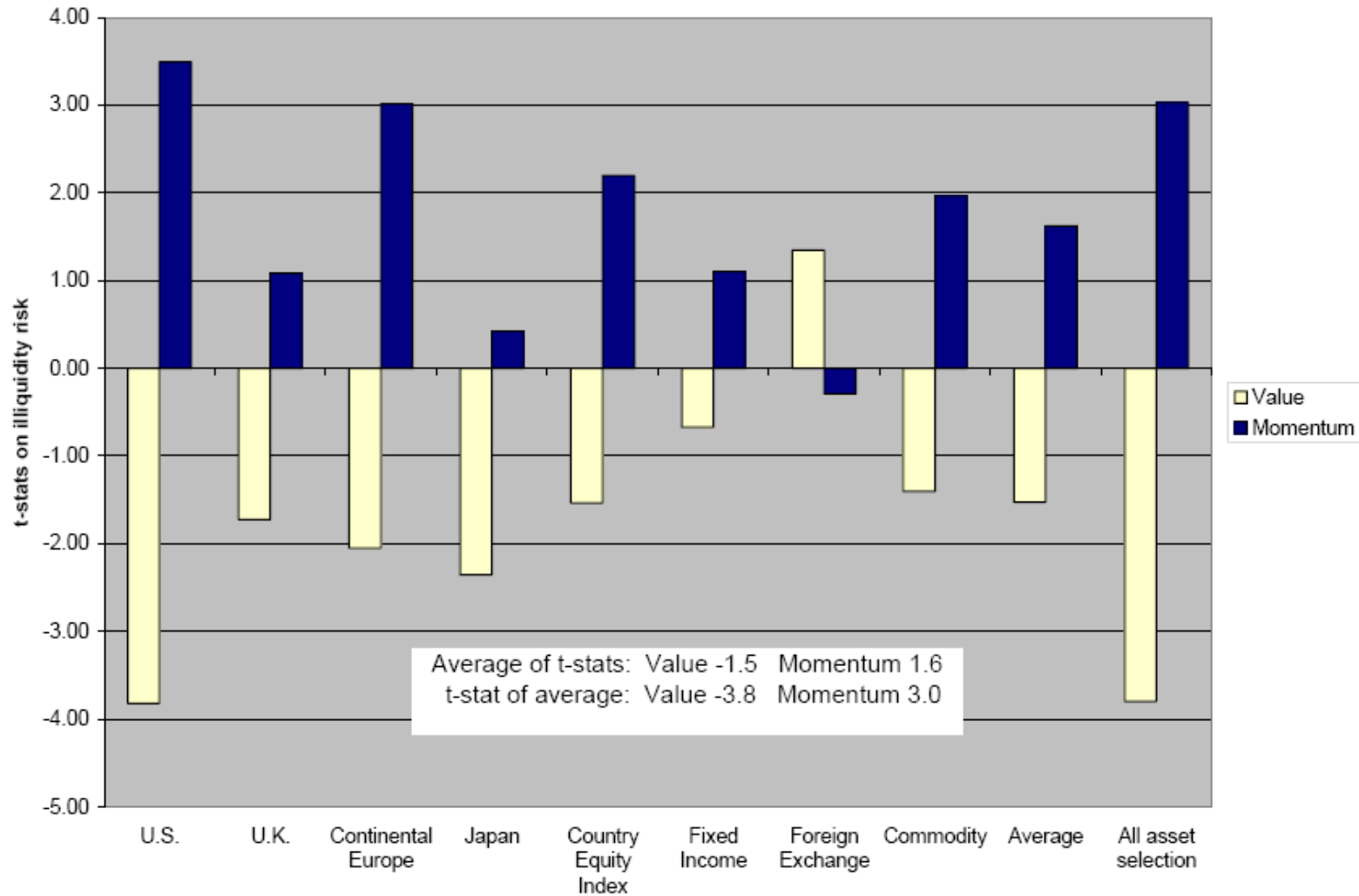
# Alternative Liquidity Risk Measures

Table 6, Panel B: Alternative Liquidity Risk Measures

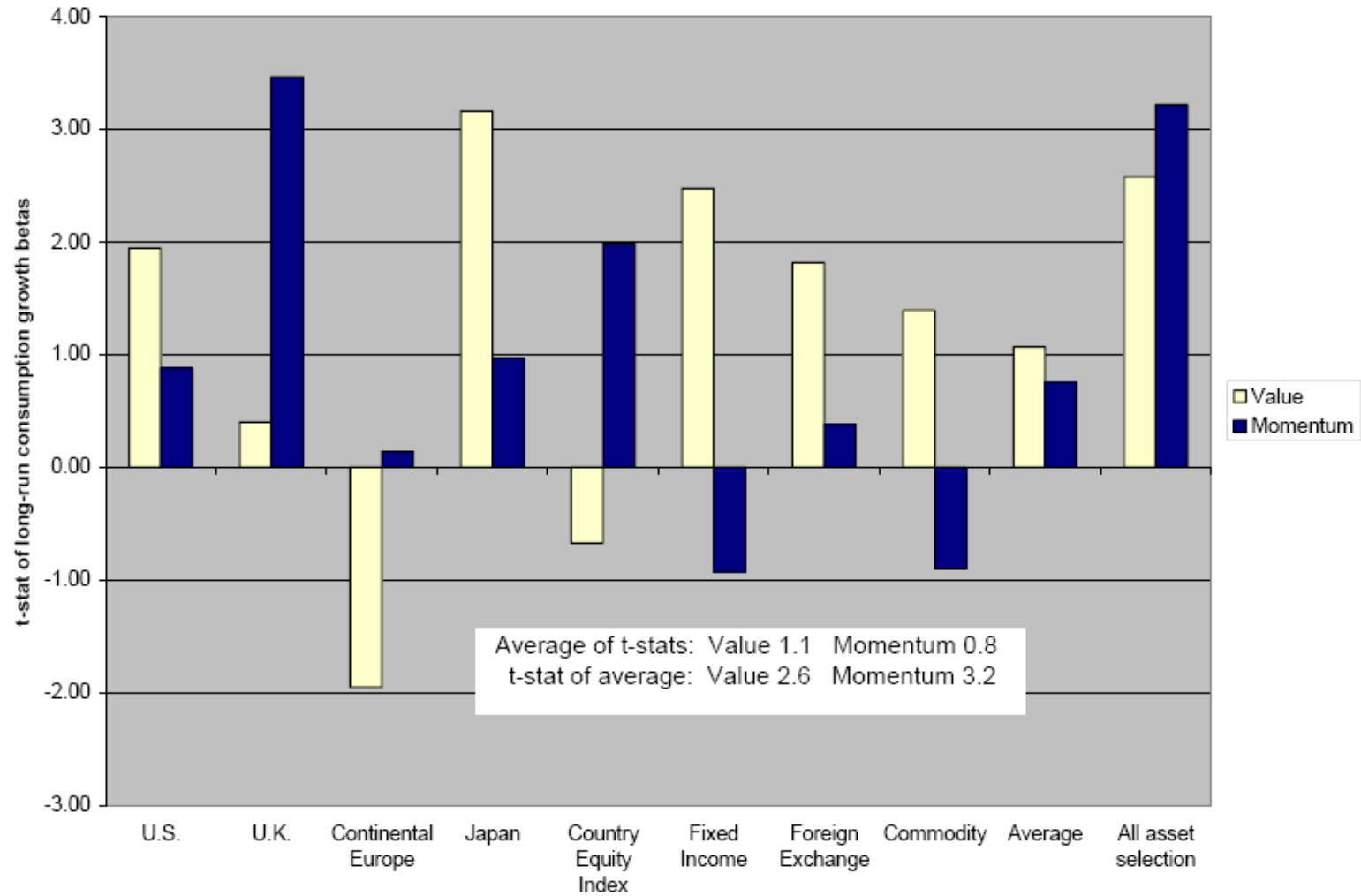
Dependent variable =	Global Stock Selection		All Non-Stock Selection		All Asset Selection			
	Value	Momentum	Value	Momentum	Value	Momentum	Mom - Val	Combo
<b>Panel B: Alternative liquidity risk measures</b>								
US Libor - term repo	-0.025 (-1.58)	0.014 (1.48)	-0.017 (-2.57)	0.011 (1.52)	-0.027 (-2.23)	0.014 (1.70)	0.041 (2.20)	-0.006 (-0.70)
Global TED spread	-0.090 (-3.61)	0.073 (3.18)	-0.017 (-1.07)	0.021 (1.43)	-0.068 (-3.64)	0.054 (2.83)	0.122 (3.44)	0.017 (1.52)
$\Delta$ Global TED spread	-0.053 (-2.48)	0.057 (2.48)	0.024 (1.56)	0.030 (1.30)	-0.018 (-0.85)	0.049 (1.96)	0.068 (1.56)	0.033 (1.98)
Illiquidity index	-0.031 (-2.70)	0.026 (2.63)	-0.009 (-1.50)	0.012 (2.51)	-0.026 (-3.17)	0.022 (2.74)	0.047 (3.03)	0.008 (1.95)
$\Delta$ Illiquidity index	-0.022 (-2.74)	0.026 (2.46)	0.006 (1.07)	0.015 (1.89)	-0.010 (-1.35)	0.023 (2.35)	0.033 (2.08)	0.015 (2.06)
Liquid-Illiquid passive returns	-0.121 (-1.55)	0.308 (2.79)	-0.098 (-1.11)	0.144 (1.44)	-0.141 (-2.17)	0.258 (2.36)	0.398 (2.79)	0.206 (1.66)



# Power of Looking Everywhere: Liquidity Risk



# Power of Looking Everywhere: Long-Run Consumption Risk



# The Power of Looking Everywhere

- We see consistency of results across markets
- We gain statistical power by looking everywhere at once
  - Average exposure vs. exposure of the average
  - Average t-stat *less than* t-stat of average
- Patterns not easily detectable when looking at only one asset class or strategy at a time

# Economic Magnitudes

- Statistical correlations we uncover are significant and interesting, but only a starting point
- Economic magnitudes of premia and correlation structure explained is small
- Macroeconomic risks may explain a (small) part of value and momentum premia, but have no hope of explaining negative correlation between them
- Liquidity risk may explain part of value premium and negative correlation between value and momentum, but only makes momentum premium more puzzling
- These patterns should be accommodated by any theory seeking to explain these phenomena
- A lot left to be explained!

# Not Everything Works Everywhere

- The power of looking everywhere at once can also highlight patterns specific to an asset class or market.
  - Provides a more general test of patterns found in U.S. equities
  
- Example: January effect in value and momentum (Table 8)

	Annualized Sharpe ratio							
	Value		Momentum		Combo		Cor(val,mom)	
	Jan.	Feb.-Dec.	Jan.	Feb.-Dec.	Jan.	Feb.-Dec.	Jan.	Feb.-Dec.
<b>Panel A: Stock Selection</b>								
U.S.	0.74	0.04	-0.22	0.81	0.19	1.12	-0.70	-0.61
U.K.	-1.24	0.05	2.37	1.12	1.20	1.54	-0.74	-0.70
Japan	1.81	0.58	-1.22	0.47	0.76	1.20	-0.78	-0.60
Continental Europe	0.63	0.28	1.16	1.05	2.70	1.54	-0.52	-0.53
<b>Global stock selection</b>	<b>0.86</b>	<b>0.31</b>	<b>0.69</b>	<b>1.17</b>	<b>1.66</b>	<b>1.93</b>	<b>-0.62</b>	<b>-0.67</b>
<b>Panel B: Non-Stock Selection</b>								
Equity country selection	0.72	0.36	1.81	0.54	2.41	0.72	-0.56	-0.41
Bond country selection	0.37	0.46	0.16	0.44	0.08	0.57	0.12	0.06
Currency selection	0.08	0.40	-0.84	0.57	-0.55	0.80	0.33	-0.48
Commodity selection	-0.25	0.20	0.25	0.83	0.08	0.93	-0.32	-0.41
<b>All non-stock selection</b>	<b>0.60</b>	<b>0.63</b>	<b>0.75</b>	<b>0.98</b>	<b>0.83</b>	<b>1.38</b>	<b>-0.07</b>	<b>-0.40</b>
<b>All asset selection</b>	<b>0.90</b>	<b>0.61</b>	<b>0.91</b>	<b>1.25</b>	<b>1.44</b>	<b>2.07</b>	<b>-0.29</b>	<b>-0.58</b>

# Conclusion

- Value and momentum works in a variety of markets and asset classes
- Their combination works better than either stand alone
- Large economic and statistical benefits to our unified approach of looking across markets and asset classes
  
- Identify interesting global co-movement structure
- Data hint toward a link between these phenomena and
  - Liquidity risk
  - Macro risk
  
- Still far from a full explanation!
- Theory must accommodate the patterns we uncover:
  - Large Sharpe ratios from combining strategies across asset classes
  - Why value and momentum both positively related to macro risk
  - Why value and momentum load oppositely on liquidity risk
    - “Cheap” assets get cheaper during liquidity events, but trending assets do better.
  - What causes the link between similar strategies in seemingly different asset classes?

# Appendix

# Other Liquidity Measures: Relation to Value and Momentum

Dependent variable =	US Stock Selection		Global Stock Selection		All Non-Stock Selection		All Asset Selection	
	Value	Momentum	Value	Momentum	Value	Momentum	Value	Momentum
Global TED spread	<b>-0.053</b> (-2.97)	<b>0.024</b> (1.40)	<b>-0.044</b> (-2.39)	<b>0.011</b> (0.69)	-0.002 (-0.15)	0.003 (0.24)	-0.029 (-1.75)	0.008 (0.55)
ΔGlobal TED spread	<b>-0.077</b> (-2.73)	<b>0.047</b> (1.60)	<b>-0.033</b> (-1.35)	<b>0.029</b> (1.19)	0.045 (2.00)	-0.005 (-0.20)	0.008 (0.30)	0.013 (0.56)
US TED spread	<b>-0.032</b> (-2.74)	<b>0.011</b> (1.18)	<b>-0.030</b> (-2.59)	<b>0.009</b> (1.03)	-0.007 (-0.68)	0.002 (0.25)	-0.024 (-2.07)	0.006 (0.75)
ΔUS TED spread	<b>-0.032</b> (-1.58)	<b>0.016</b> (0.79)	<b>-0.003</b> (-0.19)	<b>0.000</b> (0.02)	0.036 (2.58)	-0.009 (-0.56)	0.021 (1.23)	-0.005 (-0.31)
Global Liquid-illiquid passive	<b>-0.169</b> (-1.57)	<b>0.250</b> (2.22)	<b>-0.203</b> (-1.98)	<b>0.341</b> (3.20)	-0.094 (-0.98)	0.171 (2.23)	-0.190 (-1.94)	0.292 (3.15)
US Liquid-illiquid passive	<b>0.113</b> (1.15)	<b>0.160</b> (1.46)	<b>0.052</b> (0.56)	<b>0.150</b> (1.52)	-0.047 (-0.68)	0.122 (1.88)	0.003 (0.04)	0.155 (1.94)
Pastor-Stambaugh levels	<b>-0.014</b> (-0.28)	<b>-0.030</b> (-0.61)	<b>-0.055</b> (-1.05)	<b>-0.017</b> (-0.33)	-0.015 (-0.34)	-0.005 (-0.10)	-0.045 (-1.29)	-0.012 (-0.25)
Pastor-Stambaugh innovations	<b>0.050</b> (0.78)	<b>-0.097</b> (-1.71)	<b>0.026</b> (0.40)	<b>-0.058</b> (-0.89)	-0.017 (-0.36)	-0.013 (-0.23)	0.006 (0.12)	-0.040 (-0.66)
Pastor-Stambaugh VW factor	<b>-0.140</b> (-1.97)	<b>0.256</b> (5.42)	<b>-0.208</b> (-3.62)	<b>0.236</b> (4.63)	-0.070 (-1.65)	0.099 (2.53)	-0.178 (-3.88)	0.191 (4.43)
Pastor-Stambaugh EW factor	<b>-0.222</b> (-3.34)	<b>0.330</b> (5.48)	<b>-0.267</b> (-4.17)	<b>0.350</b> (6.38)	-0.103 (-2.25)	0.209 (4.94)	-0.237 (-4.93)	0.318 (6.96)
Sadka transitory comp.	<b>3.380</b> (3.29)	<b>0.353</b> (0.31)	<b>1.930</b> (1.61)	<b>0.330</b> (0.30)	-0.267 (-0.33)	0.495 (0.69)	1.063 (1.02)	0.470 (0.58)
Sadka permanent comp.	<b>0.269</b> (0.51)	<b>0.409</b> (0.61)	<b>-0.168</b> (-0.31)	<b>1.278</b> (2.33)	-0.682 (-1.20)	1.710 (3.32)	-0.543 (-1.19)	1.702 (3.41)
Acharya-Pedersen illiquidity	<b>0.015</b> (0.91)	<b>-0.022</b> (-1.38)	<b>0.007</b> (0.46)	<b>-0.022</b> (-1.25)	0.009 (0.57)	-0.015 (-1.10)	0.010 (0.66)	-0.021 (-1.33)
PC factor of all measures	<b>-0.046</b> (-6.48)	<b>0.023</b> (2.64)	<b>-0.034</b> (-3.89)	<b>0.013</b> (1.73)	0.007 (0.48)	0.000 (-0.01)	-0.017 (-1.75)	0.007 (0.82)



# Other Liquidity Measures: Relation to Liquid-Minus-Illiquid

Comparison of liquidity risk measures			
Dependent variable =	Liquid - Illiquid Passive Returns		
	US	All stock selection	All asset classes
Global TED spread	<b>0.016</b> <b>(2.00)</b>	0.019 (2.94)	0.016 (2.57)
ΔGlobal TED spread	<b>0.054</b> <b>(2.46)</b>	0.057 (4.12)	0.048 (3.73)
US TED spread	<b>0.013</b> <b>(2.63)</b>	0.017 (3.86)	0.013 (3.24)
ΔUS TED spread	<b>0.042</b> <b>(2.83)</b>	0.040 (4.13)	0.036 (3.61)
Pastor-Stambaugh levels	<b>-0.045</b> <b>(-0.96)</b>	-0.009 (-0.26)	-0.005 (-0.21)
Pastor-Stambaugh innovations	<b>-0.056</b> <b>(-1.15)</b>	-0.016 (-0.43)	-0.013 (-0.51)
Pastor-Stambaugh VW factor	<b>-0.025</b> <b>(-0.36)</b>	0.017 (0.57)	0.027 (1.03)
Pastor-Stambaugh EW factor	<b>0.031</b> <b>(0.33)</b>	0.031 (0.82)	0.029 (1.05)
Sadka transitory comp.	<b>-2.392</b> <b>(-2.72)</b>	-2.783 (-3.23)	-2.590 (-3.77)
Sadka permanent comp.	<b>-0.962</b> <b>(-1.58)</b>	-0.875 (-2.21)	-0.880 (-2.48)
Acharya-Pedersen illiquidity	<b>0.017</b> <b>(1.75)</b>	0.004 (0.39)	0.010 (0.94)
PC factor of all measures	<b>0.038</b> <b>(4.28)</b>	0.036 (5.76)	0.030 (5.37)

# Other Liquidity Measures: Correlations

Correlations from 04/1987 to 09/2008

	Global TED	change Global TED	US TED	change US TED	Global Liq-Illiq	US liq-Illiq	PS_level	PS_innov	Sad_trans	Sad_perm	PS_VW_liqfac	PS_EW_liqfac	AP_illiq	PC index
Global TED	1.00	0.25	0.85	0.17	0.11	0.14	-0.07	-0.11	-0.20	-0.16	-0.02	0.07	-0.02	0.83
change Global TED	0.25	1.00	0.16	0.66	0.20	0.22	-0.15	-0.11	-0.02	0.09	0.02	0.06	0.09	0.49
US TED	0.85	0.16	1.00	0.24	0.09	0.16	-0.13	-0.15	-0.23	-0.21	0.01	0.07	0.07	0.89
change US TED	0.17	0.66	0.24	1.00	0.21	0.26	-0.18	-0.15	-0.11	-0.07	0.01	0.05	0.22	0.56
Global Liq-Illiq	0.11	0.20	0.09	0.21	1.00	0.64	-0.04	-0.05	-0.22	-0.13	0.03	0.06	0.02	0.21
US liq-Illiq	0.14	0.22	0.16	0.26	0.64	1.00	-0.12	-0.13	-0.14	-0.17	-0.03	0.07	0.12	0.31
PS_level	-0.07	-0.15	-0.13	-0.18	-0.04	-0.12	1.00	0.85	0.06	0.21	0.00	0.01	-0.13	-0.31
PS_innov	-0.11	-0.11	-0.15	-0.15	-0.05	-0.13	0.85	1.00	0.10	0.29	-0.03	-0.01	-0.05	-0.31
Sad_trans	-0.20	-0.02	-0.23	-0.11	-0.22	-0.14	0.06	0.10	1.00	0.21	0.03	0.01	-0.21	-0.26
Sad_perm	-0.16	0.09	-0.21	-0.07	-0.13	-0.17	0.21	0.29	0.21	1.00	0.05	0.10	-0.27	-0.25
PS_VW_liqfac	-0.02	0.02	0.01	0.01	0.03	-0.03	0.00	-0.03	0.03	0.05	1.00	0.78	0.00	0.02
PS_EW_liqfac	0.07	0.06	0.07	0.05	0.06	0.07	0.01	-0.01	0.01	0.10	0.78	1.00	0.01	0.10
AP_illiq	-0.02	0.09	0.07	0.22	0.02	0.12	-0.13	-0.05	-0.21	-0.27	0.00	0.01	1.00	0.24
PC index	0.83	0.49	0.89	0.56	0.21	0.31	-0.31	-0.31	-0.26	-0.25	0.02	0.10	0.24	1.00

Average absolute value of correlations = 0.22

Correlations over the 10% most extreme liquidity events

(199404, 200203, 199808, 200411, 200409, 199008, 199601, 199806, 199302, 198906, 200112, 198907, 199901, 199903, 199704, 200209, 199912, 200204, 200006, 199007, 200008, 198710, 199009, 200002)

	Global TED	change Global TED	US TED	change US TED	Global Liq-Illiq	US liq-Illiq	PS_level	PS_innov	Sad_trans	Sad_perm	PS_VW_liqfac	PS_EW_liqfac	AP_illiq	PC index
Global TED	1.00	0.71	0.94	0.78	0.19	0.44	-0.70	-0.75	-0.54	-0.74	0.03	0.06	0.33	0.94
change Global TED	0.71	1.00	0.64	0.95	0.03	0.33	-0.82	-0.82	-0.50	-0.70	0.01	-0.02	0.46	0.85
US TED	0.94	0.64	1.00	0.73	0.19	0.37	-0.72	-0.77	-0.51	-0.68	0.06	0.18	0.39	0.94
change US TED	0.78	0.95	0.73	1.00	0.06	0.38	-0.81	-0.84	-0.51	-0.70	-0.06	-0.02	0.46	0.91
Global Liq-Illiq	0.19	0.03	0.19	0.06	1.00	0.66	0.08	0.07	-0.15	-0.23	-0.19	-0.26	0.15	0.17
US liq-Illiq	0.44	0.33	0.37	0.38	0.66	1.00	-0.19	-0.17	-0.38	-0.47	-0.41	-0.43	0.41	0.45
PS_level	-0.70	-0.82	-0.72	-0.81	0.08	-0.19	1.00	0.97	0.41	0.58	-0.12	-0.16	-0.45	-0.85
PS_innov	-0.75	-0.82	-0.77	-0.84	0.07	-0.17	0.97	1.00	0.36	0.66	-0.09	-0.19	-0.46	-0.88
Sad_trans	-0.54	-0.50	-0.51	-0.51	-0.15	-0.38	0.41	0.36	1.00	0.39	-0.21	-0.13	-0.22	-0.55
Sad_perm	-0.74	-0.70	-0.68	-0.70	-0.23	-0.47	0.58	0.66	0.39	1.00	-0.06	-0.08	-0.60	-0.78
PS_VW_liqfac	0.03	0.01	0.06	-0.06	-0.19	-0.41	-0.12	-0.09	-0.21	-0.06	1.00	0.77	-0.02	0.02
PS_EW_liqfac	0.06	-0.02	0.18	-0.02	-0.26	-0.43	-0.16	-0.19	-0.13	-0.08	0.77	1.00	0.00	0.09
AP_illiq	0.33	0.46	0.39	0.46	0.15	0.41	-0.45	-0.46	-0.22	-0.60	-0.02	0.00	1.00	0.53
PC index	0.94	0.85	0.94	0.91	0.17	0.45	-0.85	-0.88	-0.55	-0.78	0.02	0.09	0.53	1.00

Average absolute value of correlations = 0.46

# Current versus Lagged Measures of Value

## Comparison to Fama-French Portfolios (02/1973-02/2008)

<b>Panel A: Sharpe ratio comparison</b>				
	<b>Value</b>	<b>Momentum</b>	<b>Combo</b>	<b>Corr(Val, Mom)</b>
<b>Fama-French</b>	<b>0.54</b>	<b>0.69</b>	<b>0.92</b>	<b>-0.11</b>
<i>Using most recent value measure available:</i>				
<b>AMP (\$1 long-short)</b>	<b>0.37</b>	<b>0.63</b>	<b>1.03</b>	<b>-0.55</b>
Correlation with FF	0.79	0.92	0.89	
<b>AMP (constant volatility)</b>	<b>0.21</b>	<b>0.78</b>	<b>1.13</b>	<b>-0.60</b>
Correlation with FF	0.74	0.85	0.84	
<i>Using value measure lagged an additional year:</i>				
<b>AMP (\$1 long-short)</b>	<b>0.57</b>	<b>0.63</b>	<b>0.82</b>	<b>-0.06</b>
Correlation with FF	0.88	0.92	0.92	
<b>AMP (constant volatility)</b>	<b>0.41</b>	<b>0.78</b>	<b>0.92</b>	<b>-0.26</b>
Correlation with FF	0.86	0.85	0.82	
<b>Panel B: Regression of AMP (constant volatility) on Fama-French portfolios</b>				
Dependent variable =	<b>AMP Value</b>	<b>AMP Value (lag)</b>	<b>AMP Momentum</b>	<b>AMP Combo</b>
<b>Coefficient</b>				
Intercept	1.80%	0.84%	2.16%	4.08%
RMRF	-0.10	-0.09	0.06	-0.05
SMB	0.03	-0.01	0.04	0.09
HML	0.63	0.83	-0.07	0.63
UMD	-0.27	0.00	0.61	0.46
<b>t-statistic</b>				
Intercept	1.66	0.82	2.18	4.12
RMRF	-4.63	-4.51	3.00	-2.40
SMB	1.11	-0.28	1.69	3.51
HML	19.27	27.99	-2.29	21.28
UMD	-12.69	0.06	31.20	23.80
R-square	68.0%	75.4%	72.7%	72.7%
<b>Panel C: Regression of Fama-French portfolios on AMP portfolios</b>				
Dependent variable =	<b>HML</b>	<b>UMD</b>	<b>HML+UMD</b>	
<b>Coefficient</b>				
Intercept	0.60%	-0.96%	-0.24%	
AMP Value	0.95	0.17	0.56	
AMP Momentum	0.36	1.27	0.81	
<b>t-statistic</b>				
Intercept	0.50	-0.70	-0.21	
AMP Value	25.67	3.89	19.68	
AMP Momentum	9.66	28.62	28.44	
R-square	63.0%	72.4%	66.3%	

# Current versus Lagged Measures of Value

Replicating Table 2 with Lagged Value Measures

<b>Panel A: Stock Selection</b>				
U.S. <i>03/73-02/08</i>	0.41 (2.42)	0.78 (4.60)	0.92 (5.46)	-0.26
U.K. <i>12/84-02/08</i>	0.80 (3.84)	1.26 (6.08)	1.57 (7.55)	-0.28
Japan <i>02/85-02/08</i>	0.86 (4.12)	0.23 (1.09)	0.92 (4.41)	0.03
Continental Europe <i>02/88-02/08</i>	1.08 (4.85)	1.12 (4.89)	1.69 (7.38)	0.02
<b>Global stock selection</b> <i>02/88-02/08</i>	<b>1.01</b> <b>(4.54)</b>	<b>1.18</b> <b>(5.28)</b>	<b>1.98</b> <b>(8.88)</b>	<b>-0.29</b>
<b>Panel B: Non-Stock Selection</b>				
Equity country selection <i>02/80-02/08</i>	0.84 (4.47)	0.68 (3.62)	0.94 (4.99)	0.22
Bond country selection <i>01/90-02/08</i>	0.26 (1.13)	0.41 (1.73)	0.40 (1.69)	0.22
Currency selection <i>08/80-02/08</i>	0.57 (3.02)	0.45 (2.35)	0.56 (2.95)	-0.02
Commodity selection <i>02/80-02/08</i>	0.48 (2.57)	0.58 (3.05)	0.73 (3.85)	0.06
<b>All non-stock selection</b> <i>01/90-02/08</i>	<b>0.86</b> <b>(3.67)</b>	<b>0.96</b> <b>(4.09)</b>	<b>1.15</b> <b>(4.90)</b>	<b>0.09</b>
<b>All asset selection</b> <i>01/90-02/08</i>	<b>1.21</b> <b>(5.16)</b>	<b>1.22</b> <b>(5.21)</b>	<b>1.84</b> <b>(7.82)</b>	<b>-0.05</b>

# Current versus Lagged Measures of Value

**Replicating Table 4 with Lagged Value Measures**

<b>Panel A: Average of individual correlations</b>								
	Stock selection, value	Non-stock selection, value	Stock selection, momentum	Non-stock selection, momentum	Stock selection, value	Non-stock selection, value	Stock selection, momentum	Non-stock selection, momentum
	<b>Monthly return correlations</b>				<b>Quarterly return correlations</b>			
Stock selection, value	0.32*	0.02	-0.13*	-0.02	0.44*	0.04	-0.18*	-0.05
Non-stock selection, value		0.02	-0.01	-0.03		0.03	-0.04	-0.04
Stock selection, momentum			0.36*	0.21*			0.50*	0.22*
Non-stock selection, momentum				0.15*				0.18*
<b>Panel B: Correlation of average return series</b>								
	Stock selection, value	Non-stock selection, value	Stock selection, momentum	Non-stock selection, momentum	Stock selection, value	Non-stock selection, value	Stock selection, momentum	Non-stock selection, momentum
	<b>Monthly return correlations</b>				<b>Quarterly return correlations</b>			
Stock selection, value	1.00	0.16*	-0.29*	-0.02	1.00	0.23*	-0.39*	-0.03
Non-stock selection, value		1.00	-0.08	-0.09		1.00	-0.14*	-0.18*
Stock selection, momentum			1.00	0.47*			1.00	0.69*
Non-stock selection, momentum				1.00				1.00

## Table 3: Alphas and Betas with Respect to Global CAPM

	Annual Alpha and Beta to Global Equities					
	Value		Momentum		Combo	
	alpha (t-stat)	beta (t-stat)	alpha (t-stat)	beta (t-stat)	alpha (t-stat)	beta (t-stat)
U.S. stock selection <i>03/73-02/08</i>	2.95% (1.71)	-0.22 (-6.42)	8.05% (4.47)	0.03 (0.84)	12.54% (7.30)	-0.22 (-6.37)
U.K. stock selection <i>12/84-02/08</i>	3.23% (1.36)	0.02 (0.43)	14.12% (6.19)	-0.07 (-1.46)	19.29% (8.16)	-0.08 (-1.64)
JP stock selection <i>02/85-02/08</i>	10.23% (4.45)	-0.07 (-1.52)	2.53% (1.11)	-0.01 (-0.26)	13.56% (5.65)	-0.10 (-2.04)
Cont. Europe stock selection <i>02/88-02/08</i>	3.58% (1.51)	-0.02 (-0.44)	12.24% (5.11)	-0.12 (-2.37)	18.08% (7.70)	-0.13 (-2.74)
<b>All stock selection</b> <i>02/88-02/08</i>	<b>4.39%</b> <b>(1.97)</b>	<b>-0.10</b> <b>(-2.08)</b>	<b>12.03%</b> <b>(5.38)</b>	<b>-0.09</b> <b>(-1.89)</b>	<b>20.81%</b> <b>(9.75)</b>	<b>-0.23</b> <b>(-5.17)</b>
Equity country selection <i>02/80-02/08</i>	6.44% (3.31)	-0.08 (-2.12)	7.27% (3.46)	0.04 (1.03)	10.98% (5.70)	-0.02 (-0.47)
Bond country selection <i>01/90-02/08</i>	4.02% (1.81)	0.13 (2.85)	3.56% (1.56)	0.02 (0.38)	4.67% (1.99)	0.07 (1.51)
Currency selection <i>08/80-02/08</i>	(0.05) (2.30)	0.00 (0.05)	5.36% (2.35)	-0.03 (-0.75)	6.72% (3.36)	-0.03 (-0.70)
Commodity selection <i>02/80-02/08</i>	3.39% (1.59)	0.02 (0.58)	6.37% (3.00)	-0.01 (-0.29)	8.68% (4.37)	0.02 (0.47)
<b>All non-stock selection</b> <i>01/90-02/08</i>	<b>6.32%</b> <b>(2.69)</b>	<b>0.05</b> <b>(1.10)</b>	<b>9.38%</b> <b>(4.00)</b>	<b>-0.03</b> <b>(-0.60)</b>	<b>13.12%</b> <b>(5.56)</b>	<b>0.00</b> <b>(-0.10)</b>
<b>All asset selection</b> <i>01/90-02/08</i>	<b>6.69%</b> <b>(2.84)</b>	<b>-0.04</b> <b>(-0.72)</b>	<b>12.24%</b> <b>(5.22)</b>	<b>-0.07</b> <b>(-1.49)</b>	<b>20.48%</b> <b>(8.88)</b>	<b>-0.16</b> <b>(-3.28)</b>

# Table 7: Dynamics of Value and Momentum

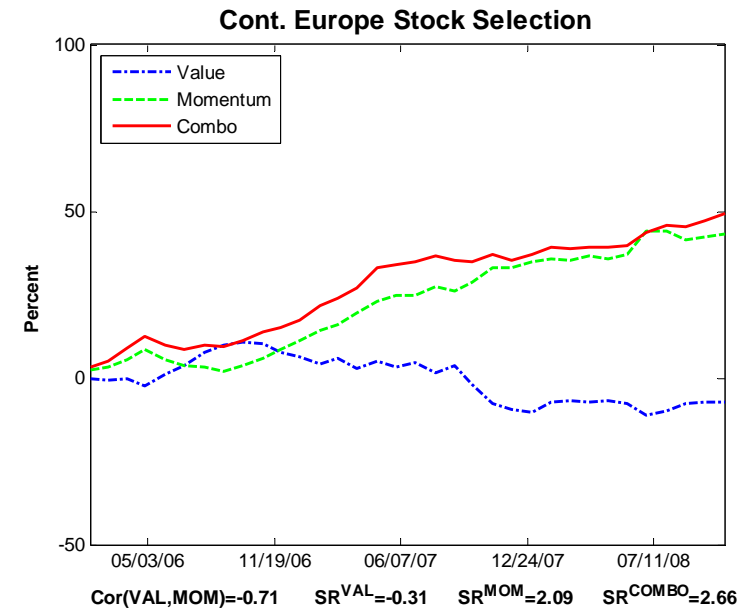
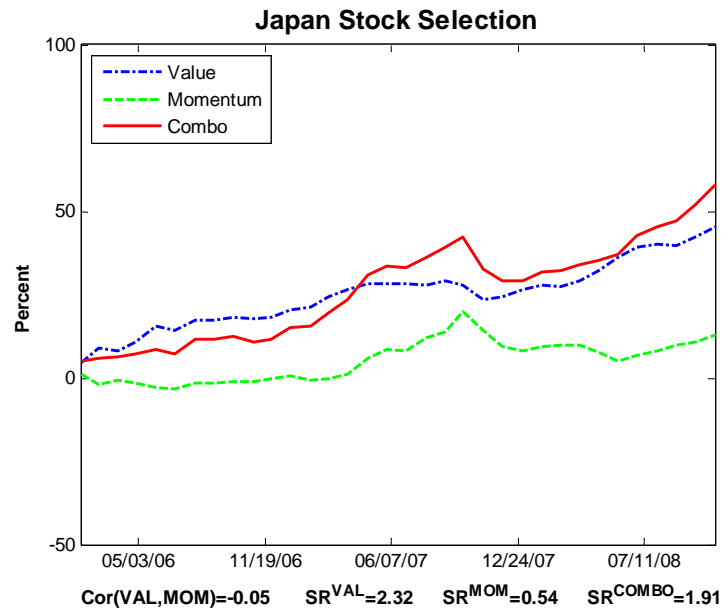
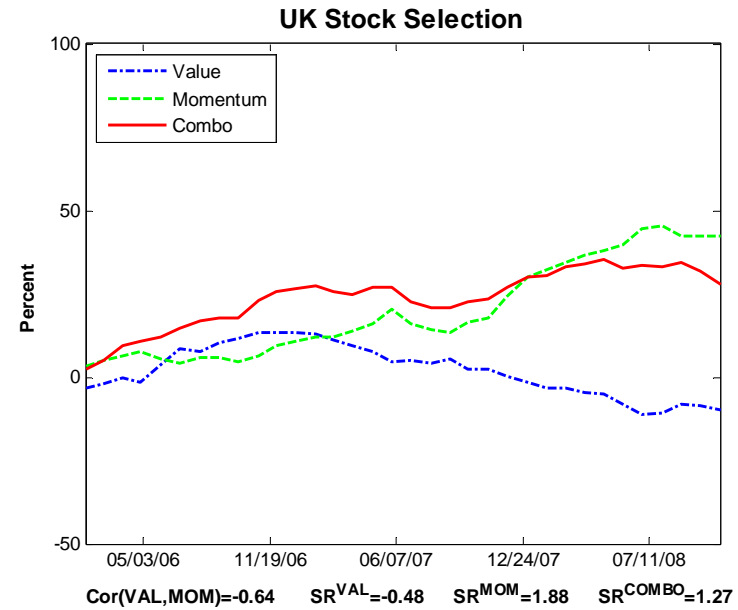
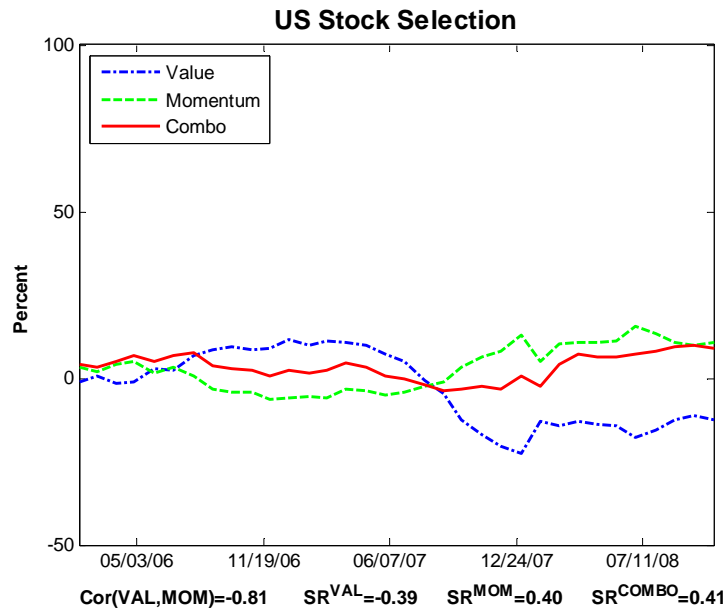
	Sharpe ratios			Average correlations, $\rho$			
	Value	Momentum	Combo	$\rho(\text{val, val})$	$\rho(\text{mom, mom})$	$\rho(\text{val, mom})$	$\rho(\text{combo, combo})$
<b>Panel A: Stock selection strategies</b>							
1990-1999	0.68	1.58	2.67	0.10	0.19	-0.25	0.11
2000-2008	0.27	0.95	1.65	0.55	0.49	-0.42	0.43
Near trough of business cycle	-0.28	0.87	1.37	0.43	0.34	-0.42	0.11
Near peak of business cycle	0.25	1.59	2.06	0.27	0.40	-0.23	0.26
Low future consumption growth	-0.72	1.63	1.81	0.22	0.29	-0.31	0.06
High future consumption growth	0.26	2.33	2.95	0.19	0.23	-0.30	0.05
Low liquidity	-0.34	1.21	1.68	0.59	0.40	-0.49	0.05
High liquidity	1.10	1.04	1.85	0.18	0.36	-0.22	0.29
<b>Panel B: Non-stock selection strategies</b>							
1990-1999	1.07	0.95	1.75	0.08	0.16	-0.11	0.03
2000-2008	0.11	0.96	0.89	0.05	0.16	-0.12	0.10
Near trough of business cycle	1.00	0.67	1.61	0.14	0.22	-0.18	0.02
Near peak of business cycle	1.67	1.01	2.02	0.01	0.18	-0.10	0.07
Low future consumption growth	1.00	-0.06	0.59	0.13	0.22	-0.13	0.10
High future consumption growth	0.29	1.26	1.09	0.01	0.12	-0.06	0.10
Low liquidity	-0.95	1.33	0.30	0.02	0.05	-0.06	0.10
High liquidity	0.71	1.45	2.07	0.15	0.21	-0.14	0.05

**Table 1: Performance of Value and Momentum Strategies  
Across Markets and Asset Classes \$1 Long-Short**

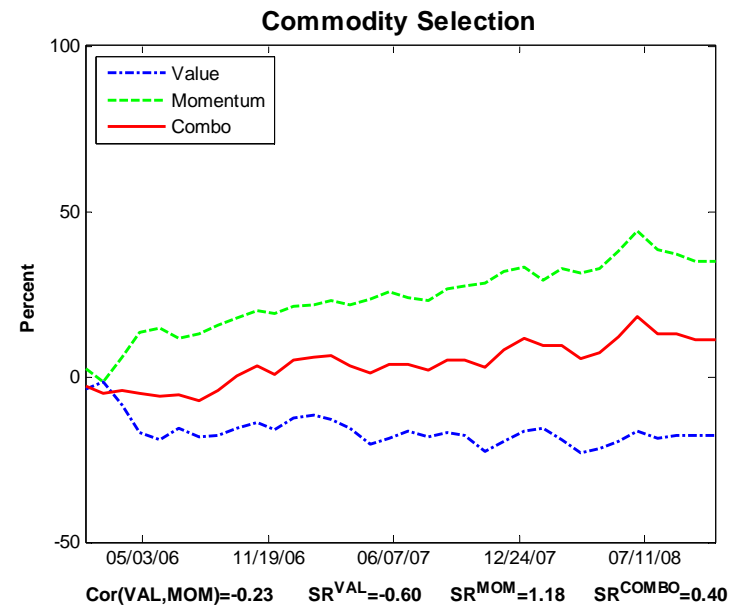
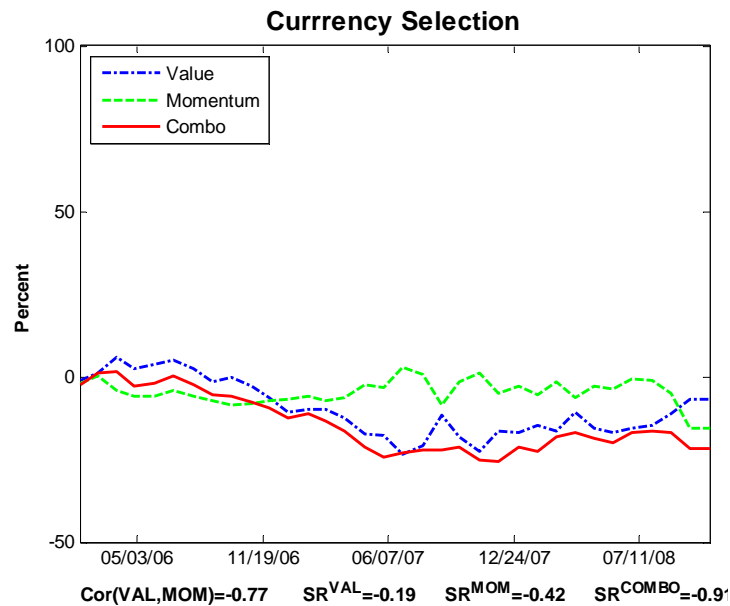
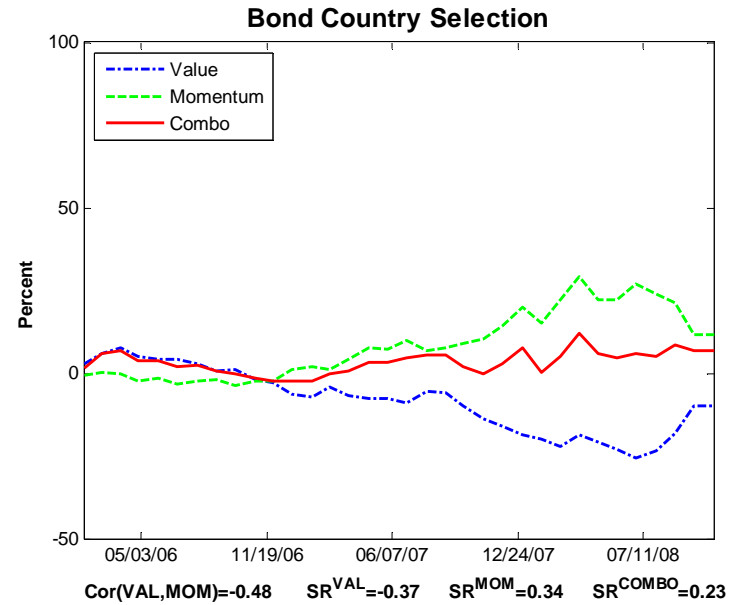
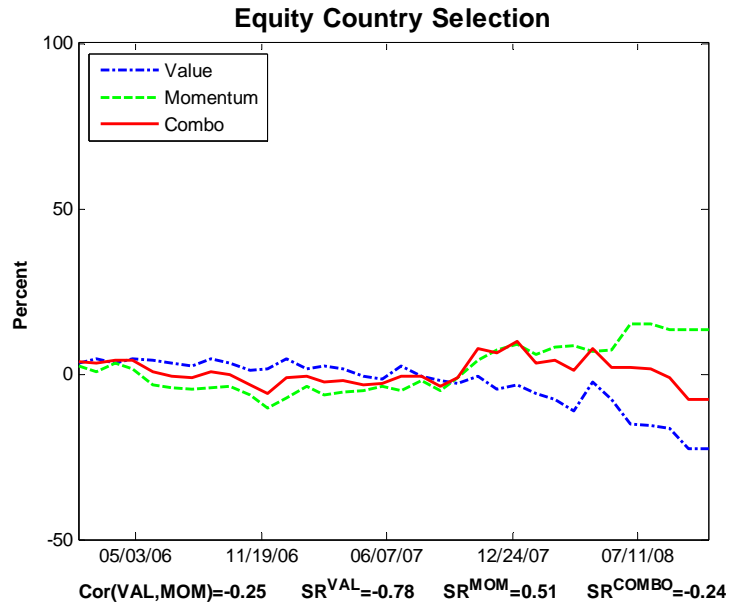
	Value	Momentum	Combo	Cor(val,mom)	Avg. # securities
<b>Panel A: Stock Selection</b>					
<i>U.S. 02/73-02/08</i>					
mean	5.0%	10.3%	11.4%	-0.55	1,367
(t-stat)	(2.04)	(3.77)	(6.30)		
volatility	14.5%	16.2%	10.8%		
Sharpe	0.34	0.64	1.06		
<i>U.K. 12/84-02/08</i>					
mean	4.8%	13.5%	14.1%	-0.59	486
(t-stat)	(1.75)	(4.42)	(7.46)		
volatility	13.2%	14.7%	9.1%		
Sharpe	0.36	0.92	1.55		
<i>Japan 01/85-02/08</i>					
mean	11.6%	3.5%	11.8%	-0.58	947
(t-stat)	(4.27)	(1.06)	(5.62)		
volatility	13.1%	16.0%	10.1%		
Sharpe	0.89	0.22	1.17		
<i>Continental Europe 02/88-02/08</i>					
mean	5.3%	12.1%	13.3%	-0.44	1,096
(t-stat)	(2.34)	(4.29)	(7.00)		
volatility	10.1%	12.3%	8.3%		
Sharpe	0.52	0.98	1.60		
<b>Panel B: Non-Stock Selection</b>					
<i>Equity country selection 02/80-02/08</i>					
mean	5.0%	5.1%	8.6%	-0.25	18
(t-stat)	(2.40)	(2.16)	(3.56)		
volatility	11.0%	12.5%	12.9%		
Sharpe	0.45	0.41	0.67		
<i>Bond country selection 01/90-02/08</i>					
mean	0.9%	-0.1%	0.6%	-0.14	10
(t-stat)	(1.41)	(-0.10)	(0.95)		
volatility	2.7%	2.6%	2.6%		
Sharpe	0.33	-0.02	0.22		
<i>Currency selection 08/80-02/08</i>					
mean	0.8%	4.2%	4.4%	-0.48	10
(t-stat)	(0.48)	(2.27)	(2.53)		
volatility	9.3%	9.7%	9.1%		
Sharpe	0.09	0.43	0.48		
<i>Commodity selection 02/80-02/08</i>					
mean	9.3%	6.0%	6.0%	-0.38	27
(t-stat)	(1.77)	(1.18)	(2.44)		
volatility	27.7%	27.0%	12.9%		
Sharpe	0.33	0.22	0.46		



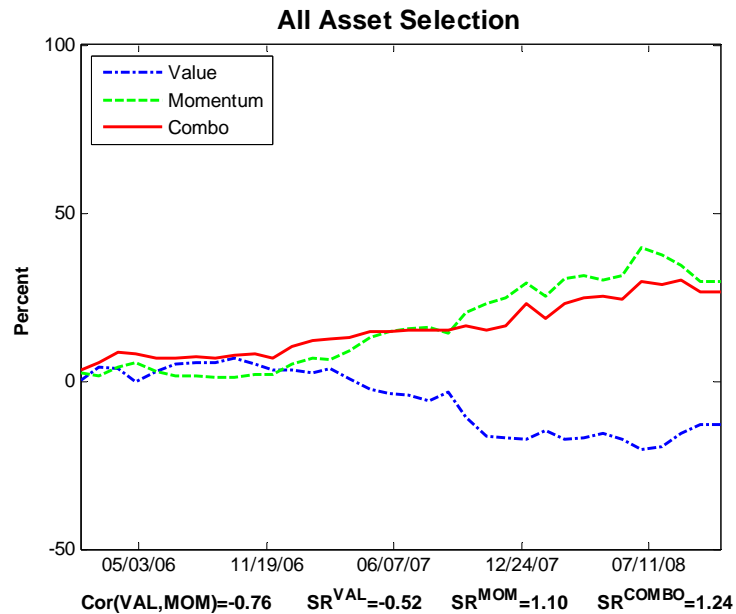
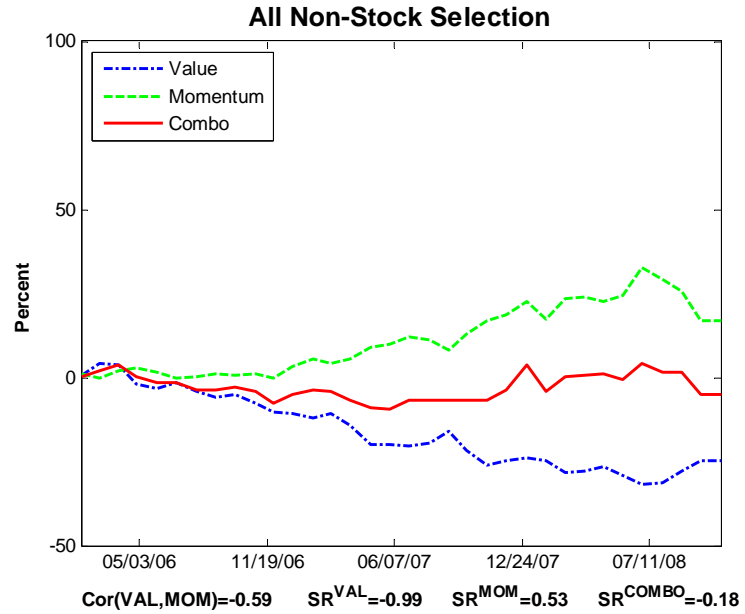
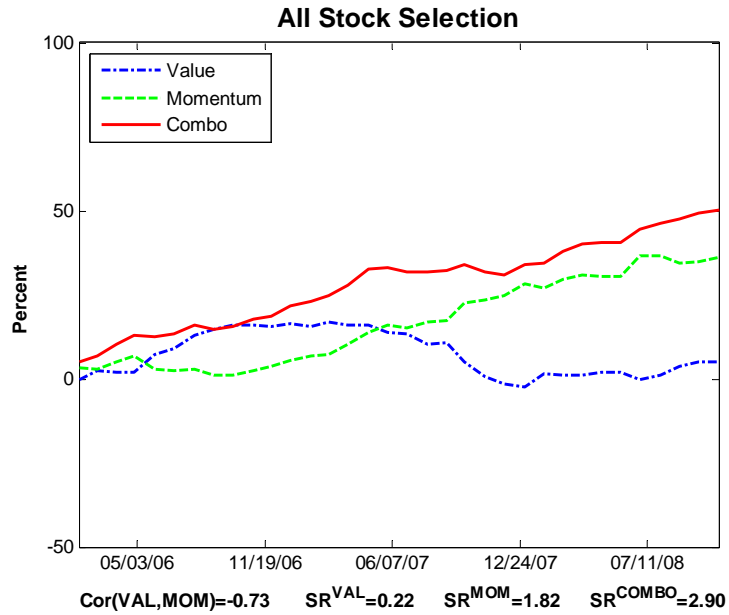
# Cumulative Returns to Stock Selection: Recent Returns



# Cumulative Returns to Non-Stock Selection: Recent Returns



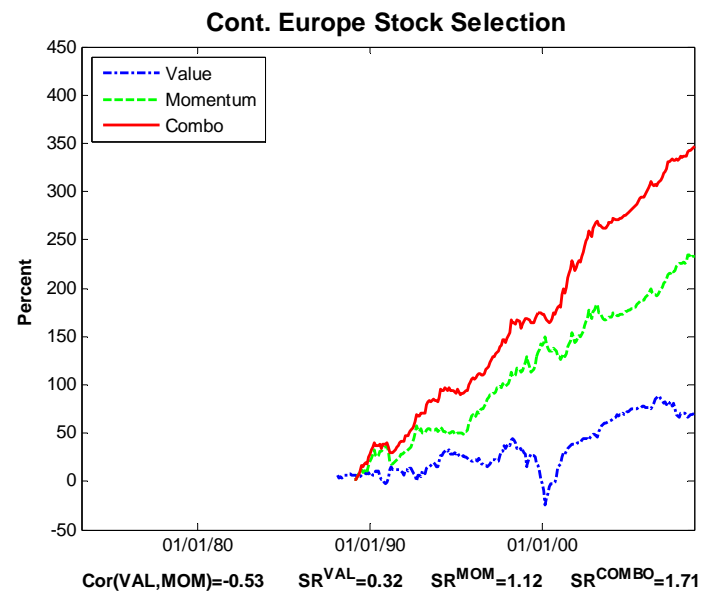
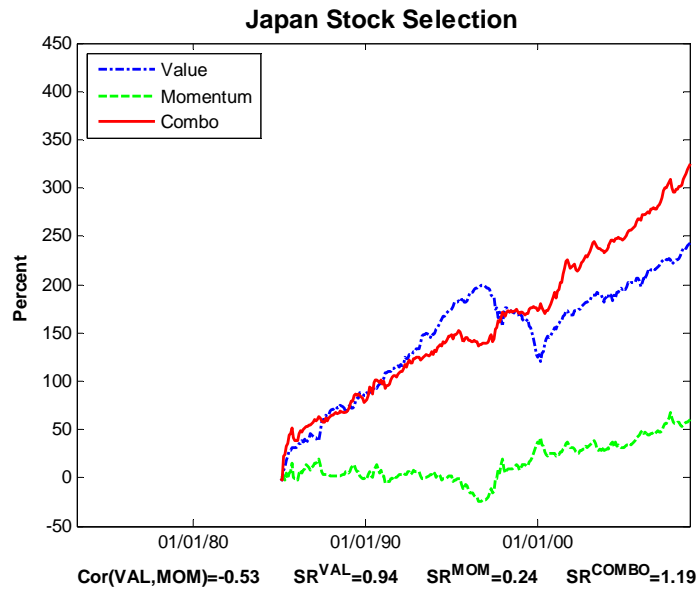
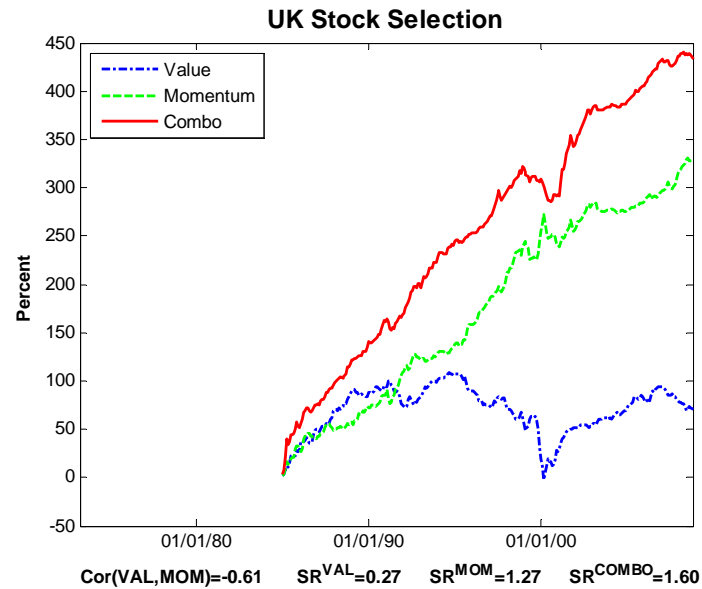
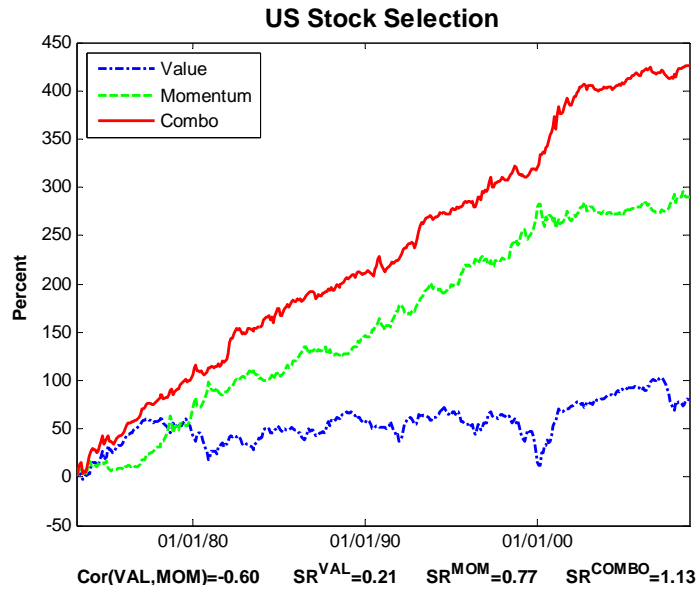
# Cumulative Returns to Combining Asset Classes: Recent Returns



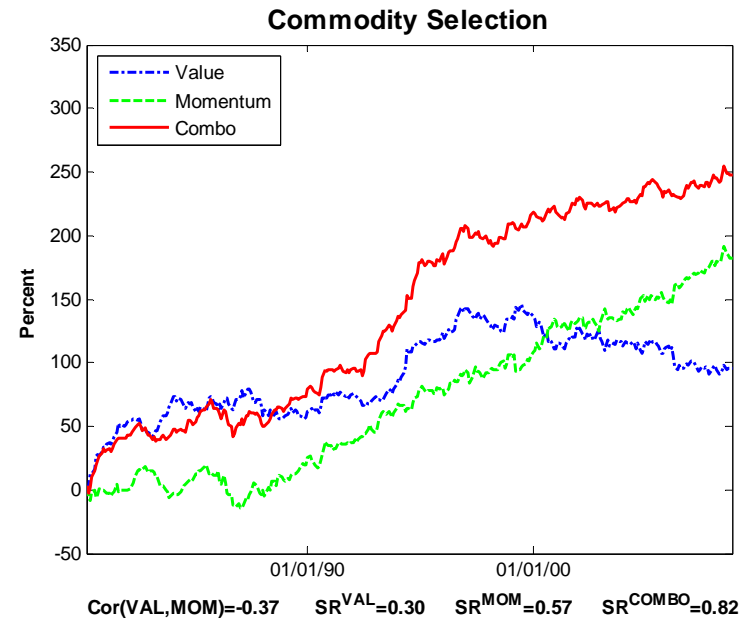
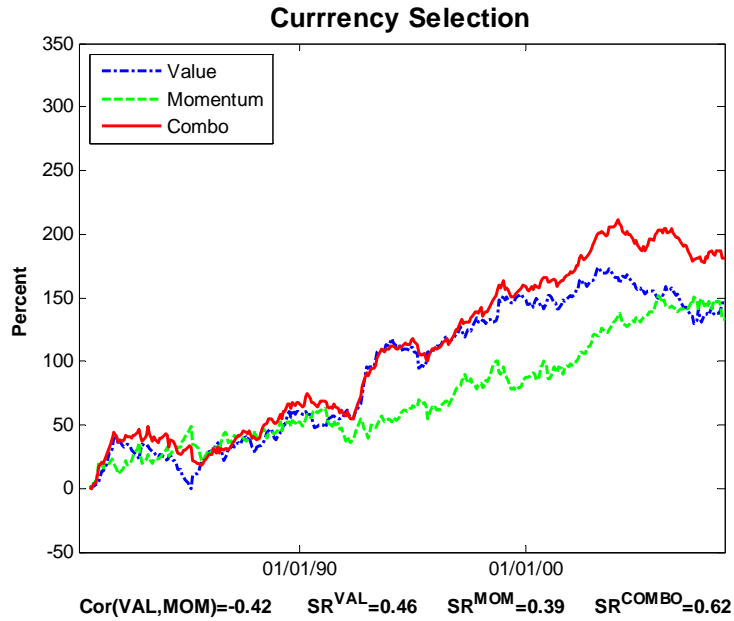
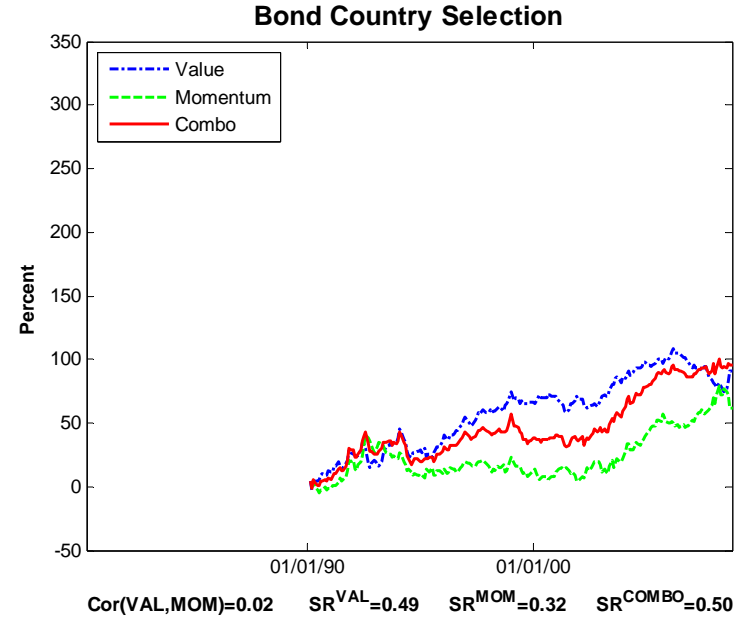
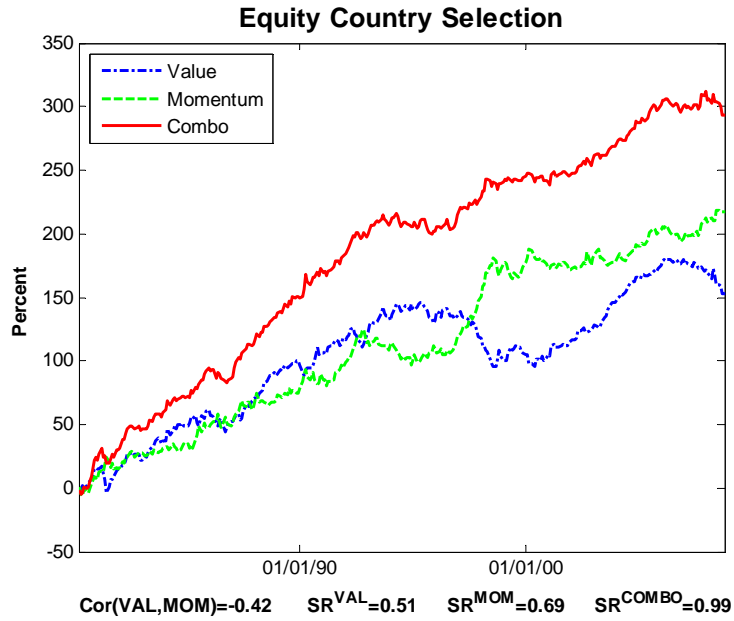
# Recent Performance: 2003-2008

	Value SR (t-stat)	Momentum SR (t-stat)	Combo SR (t-stat)	Cor(val,mom)	Avg. # securities
<b>Panel A: Stock Selection</b>					
U.S. <i>01/03-09/08</i>	0.05 (0.12)	0.24 (0.57)	0.56 (1.34)	-0.76	1,367
U.K. <i>01/03-09/08</i>	0.48 (1.15)	1.13 (2.72)	1.57 (3.77)	-0.59	486
Japan <i>01/03-09/08</i>	1.14 (2.74)	0.53 (1.28)	1.69 (4.06)	-0.36	947
Continental Europe <i>01/03-09/08</i>	0.53 (1.28)	1.33 (3.19)	2.32 (5.56)	-0.74	1,096
<b>Global stock selection</b> <i>01/03-09/08</i>	<b>0.86</b> <b>(2.06)</b>	<b>1.18</b> <b>(2.83)</b>	<b>2.51</b> <b>(6.03)</b>	<b>-0.69</b>	
<b>Panel B: Non-Stock Selection</b>					
Equity country selection <i>01/03-09/08</i>	0.51 (1.23)	0.68 (1.64)	0.61 (1.45)	-0.06	18
Bond country selection <i>01/03-09/08</i>	0.45 (1.07)	0.66 (1.59)	0.83 (1.99)	-0.14	10
Currency selection <i>01/03-09/08</i>	-0.27 (-0.64)	0.18 (0.44)	-0.19 (-0.45)	-0.72	10
Commodity selection <i>01/03-09/08</i>	-0.37 (-0.88)	0.80 (1.91)	0.45 (1.07)	-0.55	27
<b>All non-stock selection</b> <i>01/03-09/08</i>	<b>0.08</b> <b>(0.20)</b>	<b>0.91</b> <b>(2.19)</b>	<b>0.75</b> <b>(1.81)</b>	<b>-0.40</b>	
<b>All asset selection</b> <i>01/03-09/08</i>	<b>0.53</b> <b>(1.27)</b>	<b>1.18</b> <b>(2.84)</b>	<b>1.76</b> <b>(4.23)</b>	<b>-0.60</b>	

# Cumulative Returns to Stock Selection: Updated Through Mid 10/2008



# Cumulative Returns to Non-Stock Selection: Updated Through 9/30/2008



# Common Components

- First principal component for value and momentum strategies

