金融工程

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投资要点

- **前景理论与股票收益：一个实证研究** 前景理论是描述性范式的一个决策模型，它假设风险决策过程分为编辑和评价两个过程。在编辑阶段，个体凭借“框架”、参照点等采集和处理信息，在评价阶段依赖价值函数和主观概率的权重函数对信息予以判断。文章假设当投资者购买股票时，其投资心理代表股票过去收益分布，然后这种分布由前景理论描述。在一些模型和试验中，发现前景理论价值与股票收益有密不可分的关系，即具有高（低）前景理论价值的过去股票收益分布将得到低（高）后续回报。文章针对上述观点在美国股票市场进行实证研究，并对 46 个国际股票市场进行重复测试，发现这一观点得到印证。

- **时变的流动性与动量收益** 通常认为，当市场整体流动性水平高时，套利活动更为活跃，将导致基于异常定价的交易策略获利能力下降。然而，本文发现同样基于异常定价的动量策略却在市场流动性水平高时获得显著更高的收益。此现象不能由流动性风险、宏观环境变动、投资者情绪等因素所解释。而且，市场总体流动性水平对策略预测表现一致优于市场回报和市场波动性水平。本文探究了动量策略的收益与市场流动性水平呈现正相关现象的原因，并且证明了两者关系是稳健的。

- **趋势因子：投资时限的信息能获得收益?** 文章构造了一个能够包含短期、中期和长期股价趋势的趋势因子，并以移动平均法得到的股价为基础得到趋势因子的收益。文章的实证结果表明趋势因子的夏普比率为 0.47，是短期反转因子、动量因子和长期反转因子的两倍多，并且通过了稳健性检验。同时，文章实证检验表明：信息不确定性越高的企业，趋势因子预测的期望收益越高。

- **机构投资者对公司透明度和信息披露的影响** 本文解释了机构持股和公司信息环境的因果关系，文章采用了 Russell 1000 和 Russell 2000 指数，除了 Russell 2000 顶部附近的公司具有更高的机构[特别是准指数投资者(quasi-indexers)]持股比例，处于 Russell 1000 底部和 Russell 2000 指数顶部附近的公司特质相似。高比例的准指数投资者能够促进来自管理层和分析师的信息披露、提高股票流动性，降低信息不对称。总的来说，我们的研究表明，准指数投资者的信息需求会增强公司的透明度和信息的生产，从而加强监测和降低所有投资者的交易成本。

- **Beta 套利** 文献展示了一个有杠杆和资金约束的模型，这个模型在投资者和投资时间上会有差异。我们找到了能验证模型 5 个核心预测的证据：1.以美国股票和 20 只国际股票市场，国债，公司债券和期货为经验发现，投资者会追逐高 beta 值资产（高 beta 值伴随着低 alpha 值）因为投资者受到了约束；2.beta 套利因子是一个买入有杠杆的低 beta 值资产，而卖空高 beta 值资产，并且产生显著的正风险调整后收益的机制；3.当资金约束大的时候，beta 套利因子是低的；4.当资金流动风险变大时，beta 值会被压缩到 1；5.约束越大，投资者越会持有高 beta 值的风险更大的资产。

风险提示：本报告不构成投资建议。

内容目录

图表目录

前景理论与股票收益：一个实证研究

文献来源：Prospect Theory and Stock Returns: An Empirical Test. Review of Financial Studies , 2016 , 29

推荐理由：前景理论是描述性范式的一个决策模型，它假设风险决策过程分为编辑和评价两个过程。在编辑阶段，个体凭借“框架”、参照点等采集和处理信息，在评价阶段依赖价值函数和主观概率的权重函数对信息予以判断。文章假设当投资者购买股票时，其投资心理代表股票过去收益分布，然后这种分布由前景理论描述。在一些模型和试验中，发现前景理论价值与股票收益有密不可分的关系，即具有高（低）前景理论价值的过去股票收益分布将得到低（高）后续回报。文章针对上述观点在美国股票市场进行实证研究，并对 46 个国际股票市场进行重复测试，发现这一观点得到印证。

1. 简介

资产定价模型中的关键因素之一为投资者的风险评估假设，大多数模型根据预期效用框架对投资者的风险偏好做出假设，并基于此假设进行实证研究。但是大量实验表明，投资者对风险的态度可能远远超过预期效用的预测，而另一种理论“前景理论”则更准确的衡量投资者对风险的态度。根据前景理论评估的风险是否更好的帮助我们了解价格和收益?本文将就此问题展开讨论。

前景理论的风险决策过程分为编辑和评价两个过程。在编辑阶段，个体凭借“框架”、参照点等采集和处理信息，在评价阶段依赖价值函数和主观概率的权重函数对信息予以判断。前景理论价值函数由下式给出：

$$\mathrm{TK} \equiv \sum_{j=-m}^{-1} v(r_j)\left[w^-\left(\frac{j+m+1}{60}\right)-w^-\left(\frac{j+m}{60}\right)\right]+\sum_{j=1}^{n} v(r_j)\left[w^+\left(\frac{n-j+1}{60}\right)-w^+\left(\frac{n-j}{60}\right)\right].$$

其中，rj 为股票收益，v(·)为价值函数，$w^+(\cdot)$和$w^-(\cdot)$为概率权重函数，且

$$v(x)=\begin{cases} x^{\alpha} & \text{for } x \geq 0 \\ -\lambda(-x)^{\alpha} & x<0 \end{cases}$$

$$w^+(P)=\frac{P^{\gamma}}{(P^{\gamma}+(1-P)^{\gamma})^{1/\gamma}}, \quad w^-(P)=\frac{P^{\delta}}{(P^{\delta}+(1-P)^{\delta})^{1/\delta}}$$

这里α，γ，δ ∈ (0, 1) ，λ > 1

本文通过实证研究证明了前景理论价值与股票收益有密不可分的关系，即具有高（低）前景理论价值的过去股票收益分布将得到低（高）后续收益，该结论在小盘股中的表现尤为明显。

2. 数据

股票价格数据来源于标普数据库和 CRSP 数据库。数据样本区间为 1926 年至 2010 年，且满足具有至少 5 年的月收益数据。图 1 展示了本文所需数据的统计特征，其中 A 部分为均值和标准差，B 部分为相关系数。 图 1 表明在股票交易中，TK 与衡量过去收益的指标（REV，MOM，LT REV）正相关，与衡量波动性的指标（IVLO）负相关，与过去的偏态（Skew）正相关。

图 1：数据统计

The table presents summary statistics for our sample: the mean and standard deviation of each variable (Panel A), and the correlations between them (Panel B). We compute the means, standard deviations, and correlations from the cross-section month by month and report the time-series averages of the monthly cross-sectional statistics. TK is the prospect theory value of a stock's historical return distribution; the details of its construction are in Section 2.2 of the main text. Beta is calculated from monthly returns over the previous five years, following Fama and French (1992). Size is the log market capitalization at the end of the previous month. BM is the log book-to-market ratio. When the book value of equity is missing in Compustat, we use data from Davis, Fama, and French (2002); cases with negative book value are deleted. MOM is the cumulative return from the start of month t-12 to the end of month t-2. ILLIQ is the Amihud (2002) measure of illiquidity. REV is the return in month t-1. LT REV is the cumulative return from the start of month t-60 to the end of month t-13. IVOL is idiosyncratic return volatility, as in Ang et al. (2006). MAX and MIN are the maximum and the negative of the minimum daily return in month t-1, as in Bali, Cakici, and Whitelaw (2011). Skew is the skewness of monthly returns from month t-60 to month t-1. EISKEW is expected idiosyncratic skewness, as in Boyer, Mitton, and Vorkink (2010). Coskew is coskewness, computed as in Harvey and Siddique (2000) using five years of monthly returns. The sample period runs from July 1931 to December 2010, except in the case of EISKEW, where it starts in January 1988 due to data availability.

Panel A. Means and standard deviations

	TK	Beta	Size	BM	MOM	ILLIQ	REV	LT REV	IVOL	MAX	MIN	Skew	EISKEW	Coskew
Mean	**-0.05**	1.16	11.03	-0.16	0.15	0.58	0.01	0.80	0.02	0.06	0.05	0.66	0.47	-0.00
Standard deviation	**0.03**	0.57	1.82	0.86	0.44	2.518	0.12	1.58	0.02	0.06	0.04	0.80	0.47	0.24

Panel B: Correlations

	TK	Beta	Size	BM	MOM	ILLIQ	REV	LT REV	IVOL	MAX	MIN	Skew	EISKEW	Coskew
TK	1													
Beta	**-0.03**	1												
Size	**0.36**	-0.13	1											
BM	**-0.34**	0.05	-0.42	1										
MOM	**0.32**	-0.01	0.11	-0.14	1									
ILLIQ	**-0.25**	0.08	-0.44	0.25	-0.11	1								
REV	**0.11**	-0.01	0.04	0.01	0.00	0.02	1							
LT REV	**0.56**	0.04	0.19	-0.35	-0.02	-0.12	-0.01	1						
IVOL	**-0.31**	0.26	-0.49	0.21	-0.09	0.58	0.14	-0.13	1					
MAX	**-0.22**	0.24	-0.37	0.17	-0.07	0.50	0.32	-0.10	0.88	1				
MIN	**-0.29**	0.26	-0.42	0.18	-0.06	0.49	-0.18	-0.09	0.79	0.59	1			
Skew	**0.22**	0.22	-0.37	0.11	0.07	0.20	0.03	0.00	0.30	0.25	0.24	1		
EISKEW	**-0.21**	0.20	-0.61	0.24	-0.13	0.33	-0.03	-0.07	0.44	0.35	0.37	0.39	1	
Coskew	**0.04**	0.22	0.07	0.04	-0.02	-0.01	-0.00	-0.05	0.01	0.01	0.02	0.23	-0.04	1

资料来源：Review of Financial Studies，天风证券研究所

3. 实证分析

3.1. 时间序列检测

本文主要观点为股票过去收益分布，即股票的 TK 值可用来预测股票收益情况，且我们可获得正的股票收益。这一部分将运用等分法验证该观点。该方法将根据 TK 值把股票分为 10 等份，并分别计算加权和等权条件下每一份下个月的收益情况，从而得到每份月收益的时间序列。通过观察不同分组股票收益的情况，可以证明 TK 值与股票收益之间的关系。(该部分采用过去 5 年月收益数据)

图 2：等分法分析

The table reports excess returns and alphas, on both an equal-weight (EW) and value-weight (VW) basis, of portfolios of stocks sorted on TK, the prospect theory value of a stock's historical return distribution; the details of TK's construction are in Section 2.2 of the main text. Each month, all stocks are sorted into deciles based on TK. For each of the decile portfolios, P1 (low TK) through P10 (high TK), we report the average excess return, 4-factor alpha (following Carhart), 5-factor alpha (Carhart 4-factor model augmented by Pastor and Stambaugh's (2003) liquidity factor), and characteristics-adjusted return calculated as in Daniel et al. (1997) and denoted DGTW. The sample runs from July 1931 to December 2010, except in the case of the 5-factor alpha, where it starts in January 1968 due to constraints on the availability of the liquidity factor.

		P1 low TK	P2	P3	P4	P5	P6	P7	P8	P9	P10 high TK	TK low-high portfolio
Excess return	EW	**2.144**	**1.320**	**1.155**	**1.073**	**0.996**	**0.988**	**0.925**	**0.904**	**0.889**	**0.798**	**1.346**
		(5.39)	(4.51)	(4.28)	(4.28)	(4.31)	(4.48)	(4.59)	(4.50)	(4.43)	(3.50)	(5.05)
	VW	**1.216**	**0.969**	**0.909**	**0.903**	**0.752**	**0.703**	**0.679**	**0.667**	**0.695**	**0.537**	**0.679**
		(3.57)	(3.38)	(3.68)	(3.93)	(3.52)	(3.39)	(3.74)	(3.66)	(3.99)	(2.83)	(2.62)
4-factor alpha	EW	**1.025**	**0.343**	**0.204**	**0.167**	**0.112**	**0.112**	**0.081**	0.038	-0.018	**-0.210**	**1.236**
		(6.05)	(4.19)	(3.39)	(3.24)	(2.27)	(2.37)	(1.89)	(0.79)	(-0.34)	(-3.19)	(6.83)
	VW	**0.405**	**0.261**	**0.242**	**0.318**	**0.141**	**0.098**	**0.098**	0.005	0.040	**-0.218**	**0.622**
		(2.72)	(2.39)	(2.73)	(4.01)	(1.89)	(1.48)	(1.80)	(0.09)	(0.73)	(-3.66)	(3.67)
5-factor alpha (1968 onward)	EW	**1.242**	**0.330**	**0.181**	**0.170**	**0.169**	**0.177**	**0.135**	0.057	0.066	-0.057	**1.300**
		(4.98)	(2.82)	(2.19)	(2.63)	(3.03)	(3.46)	(2.61)	(1.03)	(1.06)	(-0.73)	(5.21)
	VW	**0.551**	0.115	**0.251**	**0.320**	**0.192**	0.132	**0.155**	0.011	0.010	**-0.155**	**0.706**
		(2.40)	(0.76)	(2.14)	(3.27)	(2.07)	(1.62)	(2.12)	(0.16)	(0.13)	(-2.17)	(2.88)
DGTW	EW	**0.720**	**0.156**	0.061	0.046	0.051	0.051	0.037	-0.012	-0.046	**-0.110**	**0.830**
		(6.56)	(2.70)	(1.42)	(1.23)	(1.51)	(1.50)	(1.08)	(-0.32)	(-1.19)	(-2.22)	(6.61)
	VW	**0.255**	0.077	**0.096**	**0.113**	0.009	0.066	0.038	-0.044	-0.025	**-0.096**	**0.351**
		(2.16)	(1.02)	(1.68)	(2.20)	(0.18)	(1.62)	(1.14)	(-1.31)	(-0.76)	(-2.46)	(2.65)

资料来源：Review of Financial Studies，天风证券研究所

图 2 的结果表明，等权条件下低 TK 值组的收益大于高 TK 值组的收益，即具有高(低) 前景理论价值的过去股票收益分布将得到低 (高) 后续收益，TK 值具有预测股票收益的能力。上表最右列为最高-最低 TK 值组合的股票平均收益，该结果表明该组合获得正超额收益，且在等权条件下获得的收益更为明显。

3.2. 时间序列结果的稳健性

这一部分将验证图 2 结果的稳健性。首先验证上一部分的结果不仅对所有样本有效，对子样本仍然有效。方法为将样本按时间划分为两等份，分别计算其在不同时间区域的 TK 值，具体结果见图 3。图 3 表明，在两种时间区域的子样本内，均可获得正超额收益，且等权条件下获得的收益更为明显。除了划分子样本，该部分还对采用不同时间区间、不同收益度量方法等进行实验，均得到了与上一部分相同的结果，从而验证了上一部分时间序列结果的稳健性。

图 3：稳健性

The table presents the results of several robustness checks. The right column reports the equal-weight (EW) and value-weight (VW) 4-factor alphas of a long-short portfolio that, each month, buys (shorts) stocks with TK values in the lowest (highest) decile. The first panel presents results for two subperiods. In the second panel, we use 3, 4, or 6 years of monthly returns to compute TK. In the third panel, we compute TK using raw returns, returns in excess of the risk-free rate, and returns in excess of the sample mean. In the fourth panel, we exclude stocks whose price falls below $5 in the month before portfolio construction. In the fifth panel, we skip a month between the moment of TK construction and the moment at which we start measuring returns. In the sixth panel, we use the probability weighting function proposed by Prelec (1998). The sample period runs from July 1931 to December 2010.

		TK	
		EW	VW
Subperiods	1931/07-1963/06	**1.252**	**0.459**
		(4.35)	(1.89)
	1963/07-2010/12	**1.211**	**0.634**
		(5.34)	(2.81)
Window for constructing TK	Past 3 years	**1.283**	**0.674**
		(6.72)	(3.77)
	Past 4 years	**1.244**	**0.557**
		(6.79)	(3.24)
	Past 6 years	**1.193**	**0.643**
		(6.56)	(3.71)
Other return measures	Raw returns	**1.204**	**0.464**
		(5.48)	(2.17)
	Returns in excess of the risk-free rate	**1.049**	**0.282**
		(6.31)	(1.69)
	Returns in excess of the sample mean	**0.797**	**0.543**
		(4.07)	(2.94)
Exclude low priced stocks	price>=5$	**0.373**	**0.365**
		(3.71)	(2.85)
Skip a month		**0.779**	**0.299**
		(4.58)	(1.86)
Alternative weighting function	Prelec (1998)	**1.238**	**0.530**
		(6.89)	(3.26)

资料来源：Review of Financial Studies，天风证券研究所

3.3. Fama-MacBeth 检测

在这一部分中，我们将运用 Fama-MacBeth 方法验证本文观点。该方法的优势为在已知收益的预测指标时，可以度量 TK 值的预测能力。Fama-MacBeth 方法通过股票收益和已知各个指标变量的回归分析，来验证 TK 值的预测能力。

图 4：Fama-MacBeth 回归分析

The table reports the results of Fama-MacBeth regressions. TK is the prospect theory value of a stock's historical return distribution; the details of its construction are in Section 2.2 of the main text. Beta is calculated from monthly returns over the previous five years, following Fama and French (1992). Size is the log market capitalization at the end of the previous month. BM is the log book-to-market ratio. When the book value of equity is missing in Compustat, we use data from Davis, Fama, and French (2002); cases with negative book value are deleted. MOM is the cumulative return from the start of month t-12 to the end of month t-2. ILLIQ is the Amihud (2002) measure of illiquidity. REV is the return in month t-1. LT REV is the cumulative return from the start of month t-60 to the end of month t-13. IVOL is idiosyncratic return volatility, as in Ang et al. (2006). MAX and MIN are the maximum and the negative of the minimum daily returns in month t-1, as in Bali, Cakici, and Whitelaw (2011). Skew is the skewness of monthly returns from month t-60 to month t-1. EISKEW is expected idiosyncratic skewness, as in Boyer, Mitton, and Vorkink (2010). Coskew is coskewness, computed as in Harvey and Siddique (2000) using five years of monthly returns. The reported coefficients on Beta, Size, BM, ILLIQ, and LT REV are scaled up by 100. The sample period runs from July 1931 to December 2010, except in the case of EISKEW, where it starts in January 1988 due to data availability. The t-statistics are Newey-West adjusted with 12 lags.

	Controls					Skewness Controls			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
TK	**-0.107**	**-0.108**	**-0.059**	**-0.050**	**-0.043**	**-0.043**	**-0.046**	**-0.067**	**-0.043**
	(-3.77)	(-4.94)	(-3.07)	(-2.60)	(-2.16)	(-2.18)	(-1.92)	(-2.28)	(-2.16)
Beta		0.132	0.166	0.192	**0.240**	**0.243**	**0.249**	**0.480**	**0.243**
		(1.14)	(1.22)	(1.40)	(1.99)	(2.07)	(2.11)	(2.59)	(2.00)
Size		**-0.132**	**-0.125**	**-0.078**	**-0.097**	**-0.089**	**-0.092**	**-0.066**	**-0.092**
		(-4.07)	(-3.65)	(-2.44)	(-3.38)	(-3.24)	(-3.55)	(-1.94)	(-3.27)
BM		**0.151**	**0.203**	**0.177**	**0.126**	**0.127**	**0.112**	0.121	**0.124**
		(2.7)	(3.44)	(3.06)	(2.26)	(2.29)	(2.03)	(1.31)	(2.27)
MOM		**0.010**	**0.009**	**0.009**	**0.008**	**0.009**	**0.008**	**0.005**	**0.009**
		(7.99)	(6.47)	(6.73)	(6.39)	(6.47)	(6.30)	(3.44)	(6.55)
REV			**-0.079**	**-0.079**	**-0.078**	**-0.081**	**-0.082**	**-0.053**	**-0.092**
			(-16.39)	(-16.28)	(-15.20)	(-16.47)	(-16.02)	(-9.64)	(-15.85)
ILLIQ				**0.286**	**0.597**	**0.622**	**0.631**	**1.299**	**0.620**
				(2.37)	(4.90)	(5.08)	(5.20)	(6.88)	(5.11)
LT REV					-0.041	-0.039	**-0.035**	-0.000	-0.033
					(-1.40)	(-1.31)	(-1.70)	(-0.04)	(-1.13)
IVOL					**-0.138**	0.068	0.067	0.073	0.068
					(-4.27)	(1.43)	(1.43)	(1.03)	(1.44)
MAX						**-0.036**	**-0.036**	-0.022	**-0.036**
						(-3.45)	(-3.42)	(-1.36)	(-3.45)
MIN						**-0.059**	**-0.060**	**-0.093**	**-0.059**
						(-4.50)	(-4.61)	(-6.72)	(-4.56)
Skew							0.013		
							(0.30)		
EISKEW								-0.194	
								(-1.61)	
Coskew									-0.039
									(-0.41)
N	954	954	954	954	954	954	954	276	954

资料来源：Review of Financial Studies，天风证券研究所

图 4 的各列为包含不同数量控制变量的回归分析，表明即使包括主要已知预测指标，TK 值仍具有明显的预测股票收益能力。从图 4 还可以看出，过去月收益（REV）对 TK 值有明显的影响，其他指标变量对 TK 值的影响并不显著，从而说明不同指标的选取可影响 TK 值的预测能力，具有高（低）前景理论价值的过去股票收益分布将得到低（高）后续收益。

4. 结论

本文意在将前景理论与股票收益联系起来，证明前景理论具有预测股票收益的能力，并假设当投资者购买股票时，其投资心理代表股票过去收益分布，而这种分布由前景理论描述。本文通过时间序列检测、Fama-MacBeth 回归分析等实证研究，证实了前景理论价值与股票收益有密不可分的关系，即具有高（低）前景理论价值的过去股票收益分布将得到低（高）后续回报。

以上感谢实习生王晨的贡献。

时变的流动性与动量收益

文献来源：Time-Varying Liquidity and Momentum Profits, Doron Avramov, Si Cheng, and Allaudeen Hameed, Journal of Financial and Quantitative Analysis, VOL. 51, No.60

推荐理由：通常认为，当市场整体流动性水平高时，套利活动更为活跃，将导致基于异常定价的交易策略获利能力下降。然而，本文发现同样基于异常定价的动量策略却在市场流动性水平高时获得显著更高的收益。此现象不能由流动性风险、宏观环境变动、投资者情绪等因素所解释。而且，市场总体流动性水平对策略预测表现一致优于市场回报和市场波动性水平。本文探究了动量策略的收益与市场流动性水平呈现正相关现象的原因，并且证明了两者关系是稳健的。

1. 简介

有限套利理论表明，当市场流动性充足时，基于异常定价的交易策略盈利水平会降低。关于异常定价的许多证据证实了上述观点。为了更深入地研究流动性水平对套利的影响，本文系统研究了市场流动性变化与动量效应强弱之间的关系。之所以将研究目光锁定在动量效应这样一个定价异常，是因为它稳健、不能由风险溢价解释，并因此受制于套利活动。

如果动量策略收益反映了套利的限制，按照上述理论，动量策略收益和全市场非流动性水平应该是正相关关系。然而，本文发现恰恰相反，他们之间呈现显著的负相关关系。也就是说，当市场流动性水平相当高（低）时，动量策略的利润高（低）。

本文采用了 Amihud（2002）方法刻画市场非流动性，回归结果表明，全市场非流动性水平每增加 1 个标准差，动量策略每月的利润减少 0.87%。并且，动量策略与全市场非流动性水平之间的负相关关系十分稳健。比如，本文引入两个市场变量市场状态和市场波动性后，动量策略与流动性之间的关系依然是稳健的。当采用 Corwin 和 Schultz（2012）的方法测量市场非流动性水平时，得到类似的结果。当我们将样本限制在大公司时，非流动性水平的预测效果依然是显著地，这表明，这些发现不局限于仅占全市场小部分市值流动性不佳的股票。

文章还将流动性风险、不同组合之间的流动性水平的差异、宏观经济变量、情绪指数等变量引入模型，深入研究动量策略与全市场流动性水平之间的关系。最后，作者将样本扩大至欧洲、日本，得到了类似的结果。

2. 数据描述

2.1. 样本范围

样本包括了 NYSE、AMEX、NASDAQ 上市的所有股票，时间段为 1928.1-2011.12。

2.2. 投资组合

采用 Daniel 和 Moskowitz（2014）的方法构建投资组合，在月份 t 初，根据过去 11 个月的回报率排序，将所有的股票分为 10 个组合。股票收益参考的月份为 t-12 至 t-2，为避免短期反转效应的影响剔除了 t-1 月。股票分类的节点是纽交所上市股票的分位点。其中，回报率最高（低）10%的股票构成胜（败）者组合。组合的回报率是组合内股票收益率的市值加权平均值。

动量策略是买入胜者组合，卖出败者组合。

2.3. 描述统计量

为了评估动量策略，图 5 提供了各个组合相关的统计量。动量策略的收益为 WML，即组合 10 与组合 1 的收益之差。Amihud（2002）非流动性定义

$$ILLIQ_{i,t} = \left[\sum_{d=1}^{n} |R_{i,d}| / (P_{i,d} \times N_{i,d})\right] / n$$

其中n表示每月t的交易日总数，$|R_{i,d}|$是股票i在d天收益率的绝对值，$P_{i,d}$是股票i日收

盘价，$N_{i,d}$是股票i日成交量。给定成交量，股票价格变动越大，非流动性水平值越高。

图 5：动量组合与市场状态变量的描述性统计量

TABLE 1
Descriptive Statistics for Momentum Portfolios and Market States

Panel A of Table 1 presents characteristics of the monthly momentum portfolio in our sample during the period 1928–2011. At the beginning of each month t, all common stocks listed on the NYSE, AMEX, and NASDAQ are sorted into deciles based on their lagged 11-month returns (formation period is from $t-12$ to $t-2$, skipping month $t-1$). The portfolio breakpoints are based on NYSE firms only. We report the average monthly value-weighted holding period (month t) returns of each decile portfolio as well as the momentum profits (WML deciles). The returns are further adjusted by the CAPM and Fama–French 3-factor model to obtain CAPM and 3-factor alphas. We also report the CAPM beta, return autocorrelation (AR(1)), standard deviation of return, Sharpe ratio, information ratio, skewness, and Amihud illiquidity (ILLIQ). The Sharpe ratio (Information ratio) is computed as the average monthly excess portfolio return (CAPM alpha) divided by its standard deviation (portfolio tracking error) over the entire sample period. For all portfolios except WML, skewness refers to the realized skewness of the monthly log returns to the portfolios. For WML, skewness refers to the realized skewness of $\log(1+r_{WML}+r_f)$, following Daniel and Moskowitz (2014). Panel B reports the correlation of WML and market state variables, including the aggregate market illiquidity (MKTILLIQ), DOWN market dummy (for negative market returns over the previous 2 years), and market return volatility (MKTVOL). Panel C reports the autocorrelation of WML and market state variables. Newey–West (1987) adjusted t-statistics are reported below in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Panel A. Characteristics of Momentum Decile Portfolios

	1 (Loser)	2	3	4	5	6	7	8	9	10 (Winner)	WML
Raw Return (in %)	0.291	0.698***	0.701***	0.833***	0.821***	0.909***	0.987***	1.102***	1.168***	1.470***	1.179***
	(0.95)	(2.89)	(3.17)	(3.94)	(4.58)	(4.82)	(5.39)	(5.94)	(5.88)	(6.67)	(4.84)
CAPM Alpha (in %)	−0.926***	−0.388***	−0.290***	−0.113	−0.084	0.006	0.118*	0.254***	0.299***	0.572***	1.497***
	(−6.26)	(−3.73)	(−3.15)	(−1.45)	(−1.26)	(0.12)	(1.96)	(5.05)	(4.49)	(5.67)	(8.17)
CAPM Beta	1.550***	1.332***	1.171***	1.097***	1.027***	1.024***	0.966***	0.931***	0.966***	1.015***	−0.535***
	(16.77)	(14.23)	(15.14)	(19.12)	(19.71)	(26.99)	(39.99)	(38.10)	(24.76)	(11.67)	(−3.05)
3-Factor Alpha (in %)	−1.105***	−0.524***	−0.386***	−0.186***	−0.145**	−0.039	0.110*	0.259***	0.317***	0.624***	1.730***
	(−8.71)	(−5.09)	(−4.08)	(−2.58)	(−2.45)	(−0.83)	(1.90)	(5.13)	(4.37)	(6.65)	(9.29)
AR(1)	0.165	0.148	0.124	0.123	0.104	0.107	0.058	0.091	0.055	0.068	0.085
Std. Dev. (Raw Return)	9.883	8.217	7.098	6.502	6.021	5.879	5.584	5.423	5.735	6.562	7.952
Sharpe Ratio	0.000	0.049	0.057	0.083	0.087	0.104	0.124	0.149	0.152	0.179	0.148
Information Ratio	−0.183	−0.103	−0.096	−0.046	−0.039	0.003	0.066	0.138	0.136	0.164	0.203
Skewness	0.143	−0.018	−0.086	0.214	−0.106	−0.265	−0.580	−0.529	−0.760	−0.905	−6.252
ILLIQ	8.387	3.625	1.864	1.163	1.180	1.038	0.827	0.586	0.781	2.170	−6.217

Panel B. Correlation among Market States

	WML	MKTILLIQ	DOWN	MKTVOL
WML	1.000			
MKTILLIQ	−0.258	1.000		
DOWN	−0.129	0.327	1.000	
MKTVOL	−0.122	0.396	0.422	1.000

Panel C. Autocorrelation of Market States

	WML	MKTILLIQ	DOWN	MKTVOL
AR(1)	0.085	0.894***	0.875***	0.719***
	(1.01)	(22.05)	(28.80)	(14.82)

资料来源：Journal of Financial and Quantitative Analysis，天风证券研究所

我们发现不同投资组合的平均流动性水平值差异明显。尤其败者组合$ILLIQ$值为 8.4，相对其他组合明显过高。

本文还定义了市场非流动性水平，$MKTILLIQ_{i,t-1}$，是市场所有股票非流动性水平市值加权平均值；负市场回报哑变量，$DOWN_{t-1}$，仅当过去两年的市场回报率为负时取 1；全市场波动率，$MKTVOL_{t-1}$，它是 CRSP 市场指数在 t-1 月日均回报率的标准差。

3. 动量策略收益的时变特征

3.1. 基于价格动量的投资组合回报

本节检验在控制市场波动性和市场回报状态的情况下，市场非流动性对动量策略收益的解释效果。时序的回归方程如下：

$$WML_t = \alpha_0 + \beta_1 MKTILLIQ_{t-1} + \beta_2 DOWN_{t-1} + \beta_3 MKTVOL_{t-1} + c'F_t + e_t$$

其中F代表 Fama-French 三因子，除去F得到类似结果（本文未列出）。回归分析的结果如图 6 所示。

图 6：动量策略利润和市场状态变量

TABLE 2

Momentum Profits and Market States

Panel A of Table 2 presents the results of the following monthly time-series regressions as well as their corresponding Newey–West (1987) adjusted t-statistics (reported below in parentheses):

$$WML_t = \alpha_0 + \beta_1 MKTILLIQ_{t-1} + \beta_2 DOWN_{t-1} + \beta_3 MKTVOL_{t-1} + c'F_t + e_t,$$

where WML_t is the value-weighted return on the WML momentum deciles in month t; $MKTILLIQ_{t-1}$ is the market illiquidity, proxied by the value-weighted average of stock-level Amihud (2002) illiquidity of all NYSE and AMEX firms; $DOWN_{t-1}$ is a dummy variable that takes the value of 1 if the return on the value-weighted CRSP market index during the past 24 months ($t-24$ to $t-1$) is negative, and 0 otherwise; and $MKTVOL_{t-1}$ is the standard deviation of daily CRSP value-weighted market return. The vector F stacks Fama–French three factors, including the market factor (RMRF), the size factor (SMB), and the book-to-market factor (HML). Panels B and C report similar regression parameters, where the dependent variables are the excess value-weighted portfolio return in loser and winner deciles, respectively. The sample period is 1928–2011. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Panel A. Momentum Profit (WML) Regressed on Lagged Market State Variables								
Intercept	1.730*** (9.29)	2.049*** (9.57)	2.169*** (10.50)	3.123*** (6.86)	2.284*** (11.44)	2.826*** (6.49)	3.035*** (6.97)	2.789*** (6.62)
MKTILLIQ		−0.350*** (−4.28)			−0.290*** (−3.05)	−0.280*** (−2.82)		−0.253** (−2.41)
DOWN			−2.405*** (−3.44)		−1.584** (−1.96)		−1.656*** (−2.94)	−1.240* (−1.87)
MKTVOL				−1.592*** (−3.23)		−0.961* (−1.65)	−1.146** (−2.55)	−0.688 (−1.38)
RMRF	−0.387*** (−3.42)	−0.373*** (−3.27)	−0.393*** (−3.37)	−0.391*** (−3.40)	−0.380*** (−3.27)	−0.378*** (−3.27)	−0.394*** (−3.38)	−0.382*** (−3.28)
SMB	−0.247* (−1.80)	−0.213 (−1.56)	−0.224* (−1.67)	−0.231* (−1.68)	−0.204 (−1.52)	−0.210 (−1.54)	−0.219 (−1.62)	−0.204 (−1.51)
HML	−0.665*** (−3.57)	−0.599*** (−3.68)	−0.659*** (−3.62)	−0.667*** (−3.66)	−0.606*** (−3.68)	−0.613*** (−3.71)	−0.662*** (−3.67)	−0.615*** (−3.70)
Adj. R^2	0.232	0.254	0.246	0.247	0.259	0.259	0.252	0.261
Panel B. Excess Loser Portfolio Return Regressed on Lagged Market State Variables								
Intercept	−1.105*** (−8.71)	−1.287*** (−8.98)	−1.402*** (−9.99)	−1.939*** (−6.26)	−1.462*** (−10.56)	−1.775*** (−5.68)	−1.875*** (−6.35)	−1.746*** (−5.81)
MKTILLIQ		0.199*** (4.08)			0.154** (2.51)	0.154** (2.45)		0.133* (1.93)
DOWN			1.621*** (3.14)		1.186** (1.99)		1.211*** (2.76)	0.993** (1.98)
MKTVOL				0.952*** (2.64)		0.605 (1.41)	0.626* (1.93)	0.386 (1.06)
RMRF	1.390*** (20.22)	1.383*** (20.02)	1.395*** (19.48)	1.393*** (19.69)	1.388*** (19.51)	1.386*** (19.58)	1.395*** (19.38)	1.389*** (19.36)
SMB	0.514*** (6.07)	0.495*** (5.73)	0.498*** (5.92)	0.504*** (5.88)	0.487*** (5.71)	0.493*** (5.70)	0.496*** (5.84)	0.487*** (5.69)
HML	0.373*** (3.02)	0.335*** (3.05)	0.369*** (3.05)	0.374*** (3.07)	0.341*** (3.04)	0.344*** (3.06)	0.371*** (3.07)	0.346*** (3.05)
Adj. R^2	0.783	0.787	0.787	0.786	0.789	0.788	0.788	0.790

(continued on next page)

TABLE 2 (continued)

Momentum Profits and Market States

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Panel C. Excess Winner Portfolio Return Regressed on Lagged Market State Variables								
Intercept	0.624*** (6.65)	0.763*** (7.39)	0.768*** (7.11)	1.184*** (5.90)	0.822*** (7.89)	1.051*** (6.05)	1.160*** (5.89)	1.043*** (6.06)
MKTILLIQ		−0.151*** (−3.27)			−0.136*** (−2.87)	−0.125*** (−2.61)		−0.120** (−2.48)
DOWN			−0.784*** (−2.78)		−0.398 (−1.31)		−0.445* (−1.68)	−0.247 (−0.85)
MKTVOL				−0.639*** (−3.19)		−0.356* (−1.75)	−0.520** (−2.53)	−0.302 (−1.53)
RMRF	1.004*** (19.56)	1.010*** (19.39)	1.002*** (19.17)	1.002*** (19.55)	1.008*** (19.32)	1.008*** (19.43)	1.001*** (19.39)	1.007*** (19.41)
SMB	0.267*** (4.05)	0.281*** (4.49)	0.274*** (4.29)	0.273*** (4.25)	0.284*** (4.56)	0.283*** (4.51)	0.276*** (4.34)	0.284*** (4.55)
HML	−0.292*** (−4.04)	−0.264*** (−4.17)	−0.290*** (−4.10)	−0.293*** (−4.17)	−0.265*** (−4.18)	−0.269*** (−4.22)	−0.292*** (−4.17)	−0.269*** (−4.21)
Adj. R^2	0.757	0.763	0.759	0.761	0.764	0.764	0.761	0.764

资料来源：Journal of Financial and Quantitative Analysis，天风证券研究所

Panel A 结果显示，全市场非流动性水平与动量策略收益之间负相关关系是一致的、显著的。而且变量$MKTILLIQ_{i,t-1}$削弱了变量$DOWN_{t-1}$与$MKTVOL_{t-1}$的解释能力。

本文将回归方程应用到败者组合与胜者组合，得到的结果如 Panel B 和 Panel C 所示。市场非流动性水平$MKTILLIQ_{i,t-1}$的系数在败者组合的变动范围是 0.133 至 0.199，而在胜者组合的变动范围是-0.12 至-0.151，并且均显著。而且，败者组对非流动性的反应更强。

3.2. 流动性风险的影响

相关研究表明，动量投资组合会系统性地受到流动性因子的影响。本文检验了动量策略与非流动性水平之间的联系能否由流动性风险解释。

本文首先构造流动性中性的动量组合，在进行回归分析，显示$MKTILLIQ_{i,t-1}$依然显著结果如图 7 所示。

图 7：流动性风险中立的动量策略收益

TABLE 3

Momentum Profits in Liquidity-Beta Neutral Portfolios

In Table 3, stocks are first sorted into quintiles according to their lagged liquidity beta. Within each liquidity-beta group, stocks are sorted into deciles according to their lagged 11-month accumulated returns to generate 50 (5 × 10) portfolios. Value-weighted portfolio returns are calculated after skipping one month following the formation period, and the loser (winner) portfolio return is the average return on the bottom (top) past the 11-month return decile portfolios across the five liquidity-beta groups. Table 3 presents the results of the following monthly time-series regressions as well as their corresponding Newey–West (1987) adjusted t-statistics (reported below in parentheses):

$$WML_t = \alpha_0 + \beta_1 MKTILLIQ_{t-1} + \beta_2 DOWN_{t-1} + \beta_3 MKTVOL_{t-1} + c'F_t + e_t,$$

where WML_t, $MKTILLIQ_{t-1}$, $DOWN_{t-1}$, $MKTVOL_{t-1}$, and vector F are defined as before. The liquidity betas of each stock are estimated as the exposures of the stock to the liquidity factor with a five-year estimation period. Specifically, excess stock returns are regressed on Fama–French three factors and the shock in Amihud (2002) market illiquidity, defined as the residual of the logarithm of market illiquidity in an AR(1) process. The sample period is 1931–2011. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Intercept	1.678*** (9.19)	1.904*** (8.92)	2.055*** (9.73)	2.793*** (6.15)	2.129*** (10.61)	2.561*** (4.43)	2.689*** (5.99)	2.503*** (4.46)
MKTILLIQ		−0.251*** (−3.04)			−0.196** (−2.05)	−0.191** (−2.22)		−0.168* (−1.91)
DOWN			−2.040*** (−3.20)		−1.486* (−1.78)		−1.467*** (−2.62)	−1.218** (−2.48)
MKTVOL				−1.294** (−2.45)		−0.825 (−0.95)	−0.859 (−1.62)	−0.520 (−0.64)
RMRF	−0.378*** (−3.33)	−0.368*** (−3.19)	−0.382*** (−3.27)	−0.378*** (−3.27)	−0.373*** (−3.18)	−0.370*** (−3.07)	−0.381*** (−3.25)	−0.374*** (−3.05)
SMB	−0.282** (−2.13)	−0.257** (−1.96)	−0.263** (−2.03)	−0.266** (−2.01)	−0.249* (−1.92)	−0.253** (−2.16)	−0.258** (−1.97)	−0.248** (−2.12)
HML	−0.721*** (−3.68)	−0.673*** (−3.76)	−0.715*** (−3.71)	−0.724*** (−3.76)	−0.679*** (−3.75)	−0.686*** (−4.18)	−0.719*** (−3.76)	−0.686*** (−4.15)
Adj. R^2	0.256	0.268	0.266	0.265	0.272	0.270	0.269	0.273

资料来源：Journal of Financial and Quantitative Analysis，天风证券研究所

3.3. 动量与非流动性差距

尽管败者组股票的非流动性水平高于胜者组，我们疑惑的是，两者之间的差异是否依赖于它们相对的非流动性水平。当败者组股票相对胜者组非流动性水平越高时，败者组股票有可能获得流动性上的补偿而获得更高的收益。因为动量策略买入胜者组，卖出败者组，当截面上胜者组与败者组之间非流动性水平差异大时，动量策略可能获得更低的收益。而且，当全市场流动性水平特别低时，截面上组合之间流动性差异作用更明显。

为了验证假设，引入非流动性差距的概念，定义如下：

$$ILLIQGAP_{t-1} = ILLIQ_{WINNER,t-1} - ILLIQ_{LOSER,t-1}$$

其中$ILLIQ_{WINNER,t-1}$（$ILLIQ_{LOSER,t-1}$）是胜（败）者组合内平均非流动性水平。回归结果如图 8 所示。

图 8：动量策略收益与截面非流动性差距

TABLE 5

Momentum Profits and the Cross-Sectional Illiquidity Gap

Table 5 presents the results of the following monthly time-series regressions as well as their corresponding Newey–West (1987) adjusted t-statistics (reported below in parentheses):

$$WML_t = \alpha_0 + \beta_1 ILLIQGAP_{t-1} + \beta_2 MKTILLIQ_{t-1} + \beta_3 DOWN_{t-1} + \beta_4 MKTVOL_{t-1} + c'F_t + e_t,$$

where WML_t, $MKTILLIQ_{t-1}$, $DOWN_{t-1}$, $MKTVOL_{t-1}$, and vector F are defined as before; $ILLIQGAP_{t-1}$ is the portfolio illiquidity gap between winner and loser momentum deciles; and the portfolio illiquidity is proxied by the average monthly equal-weighted stock-level Amihud (2002) illiquidity during the portfolio formation period ($t-12$ to $t-2$). The sample period is 1928–2011. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept	1.679*** (9.29)	1.708*** (13.87)	2.003*** (9.09)	2.993*** (7.31)	2.745*** (5.92)	2.743*** (5.98)
ILLIQGAP		0.184*** (4.45)	0.101** (2.24)	0.149*** (4.27)	0.098** (2.44)	0.030 (0.46)
MKTILLIQ			−0.338*** (−9.40)		−0.246*** (−3.52)	−0.220*** (−2.97)
DOWN				−1.390*** (−4.89)	−1.019** (−2.25)	−1.072** (−2.43)
MKTVOL				−1.185*** (−3.08)	−0.731 (−1.18)	−0.748 (−1.23)
ILLIQGAP × MKTILLIQ						0.009** (2.03)
RMRF	−0.403*** (−3.61)	−0.405*** (−3.63)	−0.391*** (−3.48)	−0.411*** (−3.53)	−0.399*** (−3.39)	−0.399*** (−3.39)
SMB	−0.238* (−1.82)	−0.237* (−1.93)	−0.204* (−1.76)	−0.211* (−1.66)	−0.196 (−1.60)	−0.202 (−1.62)
HML	−0.650*** (−3.60)	−0.646*** (−5.34)	−0.584*** (−5.81)	−0.645*** (−5.56)	−0.600*** (−5.85)	−0.598*** (−5.85)
Adj. R^2	0.227	0.229	0.249	0.247	0.255	0.255

资料来源：Journal of Financial and Quantitative Analysis，天风证券研究所

图 8 结果表明，当全市场流动性水平非常低时，败者组与胜者组之间的流动性差距影响最大。当全市场流动性充足时，归属于败者组合的收益减少，但胜者组合的收益不减，因此动量策略的收益增加；当全市场流动性不足时，有两种增强效应：第一，市场流动性不足降低了股票价格动量；第二，当胜者组合与败者组合之间流动性差距扩大，败者组合将获得更高的收益，导致卖空败者组合的动量策略盈利减少甚至亏损。

3.4. 大公司的动量策略

在这部分，检验了当样本限定在大公司时，非流动性水平是否能够解释。研究结果表明，非流动性水平 MKTILLIQ 与动量策略收益之间的关系依然是显著的。证明了变量非流动性水平的稳健性。

图 9：大公司动量策略与市场状态变量

TABLE 6

Momentum in Big Firms and Market States

Table 6 presents the results of the following monthly time-series regressions as well as their corresponding Newey–West (1987) adjusted t-statistics (reported below in parentheses):

$$WML_t = \alpha_0 + \beta_1 MKTILLIQ_{t-1} + \beta_2 DOWN_{t-1} + \beta_3 MKTVOL_{t-1} + c'F_t + e_t,$$

where WML_t, $MKTILLIQ_{t-1}$, $DOWN_{t-1}$, $MKTVOL_{t-1}$, and vector F are defined as before. At the beginning of each month t, all common stocks listed on the NYSE, AMEX, and NASDAQ are sorted into deciles based on their lagged 11-month returns (formation period is from $t-12$ to $t-2$, skipping month $t-1$). For each momentum decile, big stocks are above the NYSE median based on market capitalization at the end of month $t-1$. The sample period is 1928–2011, and all portfolio breakpoints are based on NYSE firms only. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Intercept	1.569*** (8.38)	1.856*** (8.96)	1.923*** (8.71)	2.628*** (5.97)	2.030*** (9.64)	2.340*** (5.33)	2.555*** (5.98)	2.311*** (5.37)
MKTILLIQ		−0.315*** (−3.45)			−0.271*** (−2.79)	−0.271*** (−2.62)		−0.250** (−2.37)
DOWN			−1.938*** (−3.43)		−1.171* (−1.86)		−1.391*** (−2.75)	−0.980* (−1.79)
MKTVOL				−1.211*** (−2.77)		−0.599 (−1.09)	−0.836* (−1.94)	−0.384 (−0.75)
RMRF	−0.364*** (−3.09)	−0.352*** (−2.93)	−0.370*** (−3.06)	−0.367*** (−3.07)	−0.357*** (−2.94)	−0.355*** (−2.93)	−0.370*** (−3.06)	−0.358*** (−2.94)
SMB	−0.022 (−0.16)	0.008 (0.06)	−0.004 (−0.03)	−0.010 (−0.07)	0.015 (0.11)	0.010 (0.07)	−0.000 (−0.00)	0.015 (0.11)
HML	−0.630*** (−3.17)	−0.571*** (−3.29)	−0.625*** (−3.21)	−0.632*** (−3.25)	−0.576*** (−3.29)	−0.580*** (−3.31)	−0.628*** (−3.25)	−0.581*** (−3.30)
Adj. R^2	0.201	0.221	0.211	0.211	0.224	0.223	0.215	0.225

资料来源：Journal of Financial and Quantitative Analysis，天风证券研究所

4. 其他

本文还将宏观经济变量、情绪指数等变量引入模型，结果显示，市场非流动性水平与动量策略收益负相关关系显著。最后，作者将样本扩大至欧洲、日本，得到了类似的结果。

5. 总结

本文研究了市场流动性与动量策略收益之间的联系，提供了一种研究流动性与套利活动的方式。按照以往理论，动量策略收益和全市场非流动性水平应该是正相关关系。然而，本文发现当市场流动性水平相当高（低）时，动量策略的利润高（低）。并且这种关系是十分稳健的。

以上感谢实习生王杰辉的贡献。

趋势因子：投资时限的信息能获得收益?

文献来源：Yufeng Han, Guofu Zhou, Yingzi Zhu. A trend factor: any economic gains from using information over investment horizons. Journal of Financial Economics 122 (2016) 352-375

推荐理由：文章构造了一个能够包含短期、中期和长期股价趋势的趋势因子，并以移动平均法得到的股价为基础得到趋势因子的收益。文章的实证结果表明趋势因子的夏普比率为 0.47，是短期反转因子、动量因子和长期反转因子的两倍多，并且通过了稳健性检验。同时，文章实证检验表明：信息不确定性越高的企业，趋势因子预测的期望收益越高。

1. 引言

目前，有三种股票价格模式很难由经典因子模型解释，它们是短期反转效应、动量效应和长期反转效应。目前的研究主要集中于在一个投资时期内分别分析三种价格模式中的一种效应。那么，是否可以横跨三个投资时期结合所有的价格信息获得经济成果呢?

为此，文章提供一个能够结合股市短期、中期和长期价格信号的趋势因子。不同于大多数研究的因子构建方法，我们将结合多重价格信号的截面回归构造我们的趋势因子。这个信号是基于过去 3 天到多达 1000 天的移动平均股价（MAs），并以此获得预期收益。为什么过去价格的移动平均能够预测股票收益? 主要有三个理由。第一，由于接受信息期间的差异或不同投资者对信息的反应不同或行为偏好或反馈机制导致过去的股价可以预测未来价格；第二，许多顶尖投资者和基金经理使用移动平均股价了解市场趋势并作出投资决定；第三，许多实证结果表明移动平均股价能够预测未来股票收益。

2. 趋势因子

2.1. 数据

我们选用 1926 年 1 月 2 日至 2014 年 12 月 31 日的日股票价格计算每月月末的移动平均股价信号。样本选取除限额基金、房地产投资信托基金、单位信托基金、美国存托凭证以及外国股票以外，在纽约证券交易所、美国证券交易所和纳斯达克上市的所有国内股票。此外，我们也剔除了股价在 5 美元以下的股票和纳斯达克市场中市值最小的 1/10 的股票。

2.2. 方法论

本文用三种方式来衡量收益异常：标准化的非预期盈余（SUE）、利用分析师预测的标准化非预期盈余（SUEAF）和累计非正常收益（CAR）。SUE 为每股收益同比变化值与上一年同季度末的股价之比。SUEAF 为每股收益与分析师预测的差值与上一年同季度末的股价之比。CAR 是公告日前后股票的收益率与同期市场收益率的差值。

需要注意，SUE 和 SUEAF 主要与公司的基本面信息相关，而 CAR 还会受流动性、风险和关注度等因素的影响。为了构造趋势因子，我们首先计算每月最后交易日的移动平均股价，其定义为：

$$A_{jt,L} = \frac{P^{t}_{j,d-L+1} + P^{t}_{j,d-L+2} + \cdots + P^{t}_{j,d}}{L}$$

其中，$P^{t}_{j,d}$ 表示股票 j 在 t 月的最后一个交易日 d 的收盘价，L 是滞后阶数。然后我们将移动平均股价进行标准化，

$$\tilde{A}_{jt,L} = \frac{A_{jt,L}}{P^{t}_{j,d}}$$

接下来，我们将分两个步骤预测每月期望股票收益。第一，我们将采用以下方程得到移动平均股价信号的系数：

$$r_{j,t} = \beta_{0,t} + \sum_{i} \beta_{i,t} \tilde{A}_{jt-1,L_i} + \varepsilon_{j,t}, \qquad j = 1, \cdots, n$$

其中，$r_{j,t}$ 表示股票 j 在 t 月的收益率，$\beta_{i,t}$ 表示滞后 L_i 的趋势信号在 t 月的系数，$\beta_{0,t}$ 表示 t 月的截距，n 为股票数。第二，我们将采用以下方法估计 $t+1$ 的期望收益：

$$E_t[r_{j,t+1}] = \sum_{t} E_t[\beta_{i,t+1}] \tilde{A}_{jt,L_i}$$

其中，$E_t[r_{j,t+1}]$ 表示股票 j 在 $t+1$ 月预测的预期收益，$E_t[\beta_{i,t+1}]$ 表示滞后 L_i 的趋势信号估计的期望系数，其计算公式为

$$E_t[\beta_{i,t+1}] = \frac{1}{12}\sum_{i=1}^{12} \beta_{i,t+1-m}$$

现在，我们来构造趋势因子。根据股票的期望收益我们将所有的股票分为五个组合。这些组合是等权重分配并且每月重新构造。进而最高期望收益组合与最低期望收益的收益率之差定义为趋势因子的收益。此外，我们将买入期望收益最高的组合并卖出期望收益最低的组合。

2.3. 统计描述

为计算趋势信号和估计期望系数，我们必须跳过开始的 1000 天和后面的 12 个月。因而我们的有效样本时期为 1930 年 6 月开始的 1015 个观测值。趋势因子和其他因子的描述统计的结果如图 10 所示。

图 10：趋势因子和其他因子的统计描述

The trend factor and other factors: Summary statistics.
This table reports the summary statistics for the trend factor (*Trend*), the short-term reversal factor (*SREV*), the momentum factor (*MOM*), the long-term reversal factor (*LREV*), and the Fama-French three factors including the market portfolio (*Market*), *SMB*, and *HML* factors. For each factor, we report sample mean in percentage, sample standard deviation in percentage, Sharpe ratio, skewness, and excess kurtosis. The *t*-statistics are in parentheses and significance at the 1% level is given by ***. The sample period is from June 1930 through December 2014.

Factor	Mean (%)	Std dev (%)	Sharpe ratio	Skewness	Excess kurtosis
Trend	1.63*** (15.0)	3.45	0.47	1.47	11.3
SREV	0.79*** (7.21)	3.49	0.23	0.99	8.22
MOM	0.79*** (3.29)	7.69	0.10	−4.43	40.7
LREV	0.34*** (3.09)	3.50	0.10	2.93	24.8
Market	0.62*** (3.69)	5.40	0.12	0.27	8.03
SMB	0.27*** (2.63)	3.24	0.08	2.04	19.9
HML	0.41*** (3.64)	3.58	0.11	2.15	18.9

资料来源：Journal of Finance，天风证券研究所

从图 10 可以看出，趋势因子的平均收益为 1.63%，几乎是其他因子的两倍（除短期反转因子和动量因子）；趋势因子的标准差为 3.45%，其值低于除市值因子以外的其他所有因子；此外，趋势因子的夏普比率为 0.47，远高于其他因子。

另外，文章还检验了在经济表现较差的情况下，趋势因子和其他因子的描述统计的情况，结果如图 11 所示。

图 11：回归期和经济危机时期趋势因子和其他因子的描述统计

The trend factor and other factors: Recession periods.
This table reports the summary statistics for the trend factor (*Trend*), the short-term reversal factor (*SREV*), the momentum factor (*MOM*), the long-term reversal factor (*LREV*), and the Fama-French three factors including the market portfolio (*Market*), *SMB*, and *HML* factors. For each factor, we report sample mean in percentage, sample standard deviation in percentage, Sharpe ratio, skewness, and excess kurtosis for the recession periods in Panel A, and for the most recent financial crisis period identified by the NBER in Panel B. The *t*-statistics are in parentheses and significance at the 1% level is given by ***. The sample period is from June 1930 through December 2014.

Factor	Mean (%)	Std dev (%)	Sharpe ratio	Skewness	Excess kurtosis
	Panel A: Recession periods				
Trend	2.34*** (6.38)	5.05	0.46	1.02	5.73
SREV	1.20*** (3.05)	5.40	0.22	0.85	3.35
MOM	0.20 (0.25)	11.5	0.02	−3.20	17.6
LREV	0.49 (1.59)	4.15	0.12	1.25	6.22
Market	−0.67 (−1.13)	8.24	−0.08	0.50	3.90
SMB	0.02 (0.08)	3.32	0.01	0.54	2.01
HML	0.18 (0.48)	5.11	0.03	2.99	19.9
	Panel B: Financial crisis (12/2007 - 06/2009)				
Trend	0.75 (0.65)	5.06	0.15	0.83	0.28
SREV	−0.82 (−0.63)	5.66	−0.14	−0.11	−1.11
MOM	−3.88 (−1.26)	13.4	−0.29	−1.42	1.77
LREV	0.03 (0.03)	3.73	0.01	0.19	−0.12
Market	−2.03 (−1.25)	7.07	−0.29	−0.21	−0.24
SMB	0.63 (1.10)	2.50	0.25	0.25	−0.79
HML	−0.44 (−0.50)	3.83	−0.11	−0.83	0.87

资料来源：Journal of Finance，天风证券研究所

从图 11 可以看出，回归期的趋势因子的平均收益和波动率均比全样本时期要高，而夏普比率基本不变；经济危机期间，虽然趋势因子的平均收益和夏普比率分别降至 0.75% 和 0.15，但其表现仍远好于其他因子。

2.4. 趋势因子与动量因子的比较

图 12 报告了趋势因子和动量因子的多空组合的描述统计结果。

图 12：趋势因子和动量因子的比较

Comparison of trend and momentum.
This table compares the long and short portfolios of the trend factor and momentum factor, respectively. The summary statistics are reported for each of the long and short portfolios over the whole sample period (Panel A), the recession periods (Panel B), and the expansion periods (Panel C) identified by the NBER. A one-sided test of equal mean between the long (short) portfolios of the trend factor and momentum factor is reported in the table labeled as *Differ*. For the long portfolio, the test is $H_0 : \mu^l_{trd} = \mu^l_{mom}$; $H_1 : \mu^l_{trd} > \mu^l_{mom}$; for the short portfolio, the test is $H_0 : \mu^s_{trd} = \mu^s_{mom}$; $H_1 : \mu^s_{trd} < \mu^s_{mom}$, where the subscripts *trd* and *mom* denote the trend and momentum factors, respectively; superscripts *l* and *s* denote the long and short portfolios, respectively. The last column (*Corr*) reports the correlation between the long (short) portfolios of the trend factor and momentum factor. Significance at the 1%, 5%, and 10% levels is given by ***, **, and *, respectively. The sample period is from June 1930 through December 2014.

Portfolio	Mean (%)	Std dev (%)	Skewness	Excess Kurtosis	Differ (%)	Corr
	Panel A: Whole sample period					
Trend long	1.93	7.52	0.58	10.3	0.12	0.88
Momentum long	1.81	7.37	0.18	8.87		
Trend short	0.31	6.86	0.56	13.8	−0.71***	0.84
Momentum short	1.02	11.2	2.92	25.9		
	Panel B: Recession periods					
Trend long	0.75	11.3	0.52	5.78	0.80**	0.87
Momentum long	−0.05	8.53	−0.33	3.87		
Trend short	−1.59	10.2	1.14	11.3	−1.33**	0.91
Momentum short	−0.26	16.6	2.31	15.3		
	Panel C: Expansion periods					
Trend long	2.21	6.30	0.81	12.2	−0.04	0.91
Momentum long	2.24	7.01	0.48	11.0		
Trend short	0.74	5.74	0.22	10.3	−0.57***	0.80
Momentum short	1.32	9.52	3.24	29.8		

资料来源：Journal of Finance，天风证券研究所

图 12 展示了趋势因子能够更好的捕捉到未来趋势，因而趋势因子的平均收益大于动量因子的平均收益，而且根据表中结果，我们可以得出趋势因子的多空组合比动量因子的多空组合表现更好。还有，表中最后一列的结果表明趋势因子与动量因子的组合高度相关。

2.5. 趋势因子的 alphas

图 13 分别报告了根据 CAPM 模型和 Fama-French 三因子模型得到的詹森值和风险系数值。结果表明由趋势因子构造的高-低组合（high-low spread portfolio）的詹森值最大。

图 13：CAPM 模型和 Fama-French 三因子模型的 alphas

CAPM and Fama-French alphas.
This table reports Jensen's alpha and risk loadings with respect to the CAPM and Fama-French three-factor model, respectively, for the five trend quintile portfolios, the trend factor, and the MOM factor. The alphas are reported in percentage. Newey and West (1987) robust *t*-statistics are in parentheses and significance at the 1%, 5%, and 10% levels is given by ***, **, and *, respectively. The sample period is from June 1930 through December 2014.

Rank	*Panel A: CAPM*		*Panel B: Fama-French*			
	α(%)	β_{mkt}	α(%)	β_{mkt}	β_{smb}	β_{hml}
Low	−0.71***	1.17***	−0.84***	1.02***	0.60***	0.16***
	(−8.19)	(41.2)	(−12.1)	(40.8)	(11.6)	(4.22)
2	−0.08	1.07***	−0.19***	0.96***	0.42***	0.17***
	(−1.31)	(55.7)	(−4.65)	(69.3)	(8.63)	(4.30)
3	0.17***	1.06***	0.07	0.96***	0.37***	0.19***
	(2.61)	(43.9)	(1.58)	(49.6)	(10.4)	(3.65)
4	0.42***	1.12***	0.31***	1.01***	0.37***	0.19***
	(6.18)	(38.9)	(7.04)	(42.2)	(8.02)	(3.50)
High	0.84***	1.30***	0.71***	1.15***	0.60***	0.17***
	(8.93)	(51.7)	(10.9)	(62.4)	(12.9)	(4.45)
Trend	1.55***	0.13***	1.54***	0.13***	−0.00	0.01
(High–Low)	(13.6)	(3.28)	(12.9)	(3.47)	(−0.03)	(0.16)
MOM	1.07***	−0.45***	1.37***	−0.23***	−0.49***	−0.75***
	(6.04)	(−3.23)	(7.59)	(−2.93)	(−3.31)	(−3.68)

资料来源：Journal of Finance，天风证券研究所

3. 趋势和信息不确定性

我们将检验不同程度的信息不确定对趋势预测的不同表现。当股票的信息是不确定的，或者说噪信比（noise-to-signal ratio）很高时，基本信号（如收益和经济前景）将变得不精确，因而投资者将更依赖于技术信号。因此，信息不确定程度高的股票将可能更容易获利。我们采用一系列的变量作为信息不对称的代理变量，包括市值大小、特质波动率，交易周转率，分析师覆盖率以及企业年龄。具体结果如图 14 所示。

图 14：信息不确定下趋势因子的表现

Performance under information uncertainty.
This table reports the performance of the trend quintile portfolios and the trend factor (High–Low) under information uncertainty proxied by idiosyncratic volatility (*IVol*) (Panel A), share turnover rate (Panel B), analyst coverage (Panel C), and firm age (Panel D). Stocks are first sorted by one of the information-uncertainty proxies into three tercile groups, and then in each tercile stocks are further sorted to construct five trend quintile portfolios. For each of the information-uncertainty proxies, the sorted terciles are arranged in the order of increasing information uncertainty. We report the Fama-French alphas for the resulting 3 × 5 trend quintile portfolios and the average across the three terciles of the information-uncertainty proxy. The alphas are reported in percentage. Newey and West (1987) robust *t*-statistics are in parentheses and significance at the 1%, 5%, and 10% levels is given by ***, **, and *, respectively. The sample period is from June 1930 through December 2014.

	Trend forecasts					
	Low	2	3	4	High	High–Low
IVol	*Panel A: Idiosyncratic volatility*					
Low	−0.24***	0.09	0.15***	0.33***	0.63***	0.87***
	(−3.79)	(1.56)	(2.90)	(5.95)	(9.64)	(9.57)
2	−0.53***	−0.17***	0.18***	0.40***	0.87***	1.40***
	(−7.99)	(−3.38)	(3.38)	(7.33)	(12.6)	(13.4)
High	−1.45***	−0.74***	−0.31***	0.13**	0.80***	2.25***
	(−12.1)	(−12.3)	(−5.60)	(2.43)	(6.57)	(10.3)
Average over IVol	−0.74***	−0.27***	0.01	0.29***	0.77***	1.51***
	(−11.1)	(−7.15)	(0.20)	(7.55)	(11.6)	(12.7)
Turnover	*Panel B: Turnover rate*					
High	−0.80***	−0.31***	−0.02	0.19***	0.38***	1.18***
	(−9.83)	(−4.75)	(−0.39)	(2.92)	(4.33)	(10.3)
2	−0.68***	−0.11**	0.08	0.37***	0.72***	1.40***
	(−10.7)	(−2.21)	(1.46)	(7.65)	(11.7)	(14.9)
Low	−0.95***	−0.12*	0.06	0.34***	0.95***	1.90***
	(−8.41)	(−1.71)	(0.93)	(5.75)	(10.4)	(10.9)
Average over turnover	−0.81***	−0.18***	0.04	0.30***	0.68***	1.49***
	(−12.5)	(−4.69)	(1.00)	(7.56)	(11.9)	(14.3)
Analyst coverage	*Panel C: Analyst coverage*					
High	−0.54***	−0.13	0.03	0.22***	0.39***	0.93***
	(−5.08)	(−1.64)	(0.47)	(2.63)	(3.69)	(6.06)
2	−0.73***	−0.16**	0.16**	0.39***	0.63***	1.36***
	(−7.94)	(−2.28)	(2.10)	(5.10)	(7.14)	(10.2)
Low	−0.89***	−0.20***	0.05	0.30***	0.72***	1.61***
	(−11.6)	(−4.21)	(0.94)	(6.09)	(10.5)	(12.8)
Average over analyst coverage	−0.83***	−0.18***	0.07*	0.30***	0.70***	1.53***
	(−12.1)	(−4.51)	(1.68)	(6.86)	(10.8)	(12.9)
Firm age	*Panel D: Firm age*					
Old	−0.68***	−0.19***	0.02	0.21***	0.44***	1.11***
	(−10.2)	(−3.36)	(0.29)	(3.60)	(6.20)	(11.1)
2	−0.75***	−0.18***	0.03	0.29***	0.75***	1.50***
	(−11.0)	(−4.02)	(0.60)	(6.28)	(10.4)	(12.9)
Young	−0.91***	−0.23***	0.11**	0.32***	0.77***	1.68***
	(−11.4)	(−4.21)	(2.12)	(6.52)	(11.1)	(13.5)
Average over age	−0.84***	−0.19***	0.07*	0.31***	0.74***	1.57***
	(−12.2)	(−4.56)	(1.65)	(7.07)	(11.3)	(13.3)

资料来源：Journal of Finance，天风证券研究所

图 14 中 5 个代理变量构造的组合表现均表明信息不确定越高的企业，趋势因子预测的期望收益越高。

4. 结论

我们构造了一个能够结合短期反转效应、动量效应和长期反转效应的趋势因子，并用移动平均股价计算得到了趋势因子的收益。我们通过一系列的实证结果证实了趋势因子的表现比短期反转因子、动量因子和长期反转因子更好。此外，文章的最后，我们的实证结果表明：信息不确定越高的企业，趋势因子预测的期望收益越高。

以上感谢实习生李争的贡献。

机构投资者对公司透明度和信息披露的影响

文献来源：The effect of institutional ownership on firm transparency and information production, ,Boone, Audra L., Joshua T. White, 2015, Journal of Financial Economics

推荐理由：本文解释了机构持股和公司信息环境的因果关系，文章采用了 Russell 1000

和 Russell 2000 指数，除了 Russell 2000 顶部附近的公司具有更高的机构[特别是准指数投资者(quasi-indexers)]持股比例，处于 Russell 1000 底部和 Russell 2000 指数顶部附近的公司特质相似。高比例的准指数投资者能够促进来自管理层和分析师的信息披露、提高股票流动性，降低信息不对称。总的来说，我们的研究表明，准指数投资者的信息需求会增强公司的透明度和信息的生产，从而加强监测和降低所有投资者的交易成本。

1. 机构的类型

本文基于过去投资组合的换手率、多样性和投资期限将机构投资者分为三类：准指数型(quasi-indexers)、短期投资型(transient)、长期投资型(dedicated)。准指数型特点是低换手率、多元化投资组合、长期投资；短期投资型特点是高换手率、多元化投资组合、短期投资；长期投资型特点是低换手率、单一的投资组合、长期投资。

2. 公司信息环境

2.1. 管理层披露

管理层自愿发布的盈利预测，强制性和自愿性的 8-K 文件的频率。

2.2. 分析师预测

分析师跟进，分析师预测性质。

2.3. 交易环境

包括信息不对称，流动性和股票收益率波动的影响。

3. 数据

文章采用的基础数据是 Russell 1000 和 Russell 2000 指数。该指数是由 Russell Investment 每年根据 5 月份最后一个交易日市值从大到小 3000 只股票通过加权产生的两个指数，其中 Russell 1000 是市值最大的前 1000 只股票加权得到的指数，Russell2000 是市值较小的 2000 只股票加权得到的指数。

选取 1996－2006 年所有 Russell 1000 和 Russell 2000 指数 6472 家公司。

4. 实证

排名处于 Russell 1000 指数底部的股票与处在 Russell 2000 指数顶部的股票具有相同的特质，可以排除内生性。处于顶部的股票会因为高权重、高流动性等原因而得到更多机构投资者的偏好，而处在底部的股票机构持有相对较少。机构需要频繁的赎回和申购，所以会利用其股东地位促使公司减少信息不对称从而增强流动性，降低交易成本。

文章验证 Russell 2000 指数顶部的股票是否比 Russell 1000 指数底部的股票具有更高的信息透明度、更低的信息不对称以及更好的流动性。首先，使用断点回归方法对排名处于 Russell 1000 底部与处在 Russell 2000 顶部的股票进行比较，发现 Russell 2000 顶部公司确实具有更高的机构持股比例。

图 15：Russell 1000 底部与 Russell 2000 顶部的机构投资者

Table 1 (continued)

Panel A. Univariate analysis of institutional ownership

	Bandwidth ±50		Bandwidth ±100		Bandwidth ±200	
	Russell 1000	Russell 2000	Russell 1000	Russell 2000	Russell 1000	Russell 2000
Institutional ownership $_{q+1}$						
Total	43.5	72.4[a]	51.9	71.1[a]	58.6	70.3[a]
Quasi-indexer	21.5	42.6[a]	28.2	42.2[a]	33.8	42.4[a]
Dedicated	10.1	9.2	9.9	9.2	9.7	9.2
Transient	11.3	20.3[a]	13.1	19.4[a]	14.6	18.4[a]
Institutional ownership $_{q+2}$						
Total	45.9	72.0[a]	53.1	70.8[a]	59.5	70.1[a]
Quasi-indexer	22.1	41.5[a]	28.3	41.2[a]	33.6	41.7[a]
Dedicated	10.5	9.0[c]	9.9	9.0[c]	9.7	9.0[b]
Transient	11.8	20.0[a]	13.3	19.1[a]	14.7	18.0[a]
Institutional ownership $_{q+3}$						
Total	46.7	71.6[a]	53.5	70.4[a]	59.5	70.1[a]
Quasi-indexer	23.8	42.7[a]	29.6	42.3[a]	34.5	42.9[a]
Dedicated	10.8	9.2[c]	10.2	9.1[b]	9.9	9.1[a]
Transient	11.6	19.4[a]	13.1	18.6[a]	14.5	17.7[a]
Institutional ownership $_{q+4}$						
Total	48.1	72.4[a]	55.4	71.2[a]	61.1	71.2[a]
Quasi-indexer	24.6	43.3[a]	30.5	42.9[a]	35.6	43.6[a]
Dedicated	11.1	9.4[c]	10.7	9.2[a]	10.2	9.1[a]
Transient	12.0	19.4[a]	13.5	18.7[a]	14.7	18.0[a]

Table 1 (continued)

Panel B. Regression discontinuity analysis of institutional ownership

	Rule of Thumb Bandwidth			Fixed Bandwidth	
	Treatment τ	z-stat	Bandwidth	(Bandwidth ±100) Treatment τ	(Bandwidth ±200) Treatment τ
Institutional ownership $_{q+1}$					
Total	0.392[a]	11.434	−110, +144	0.407[a]	0.400[a]
Quasi-indexer	0.261[a]	11.967	−100, +144	0.264[a]	0.282[a]
Dedicated	−0.008	−0.558	−170, +215	0.016	−0.007
Transient	0.126[a]	8.959	−148, +196	0.131[a]	0.128[a]
Institutional ownership $_{q+2}$					
Total	0.348[a]	9.749	−116, +150	0.363[a]	0.352[a]
Quasi-indexer	0.242[a]	11.044	−101, +146	0.249[a]	0.264[a]
Dedicated	−0.022	−1.408	−171, +214	0.007	−0.020
Transient	0.109[a]	6.821	−138, +178	0.107[a]	0.109[a]
Institutional ownership $_{q+3}$					
Total	0.291[a]	7.708	−103, +141	0.305[a]	0.316[a]
Quasi-indexer	0.217[a]	9.088	−100, +148	0.220[a]	0.241[a]
Dedicated	−0.026	−1.550	−155, +195	−0.006	−0.026[c]
Transient	0.098[a]	5.943	−109, +142	0.090[a]	0.096[a]
Institutional ownership $_{q+4}$					
Total	0.286[a]	7.146	−102, +140	0.309[a]	0.316[a]
Quasi-indexer	0.216[a]	8.725	−98, +143	0.222[a]	0.241[a]
Dedicated	−0.022	−1.320	−163, +204	−0.001	−0.022[a]
Transient	0.092[a]	5.555	−117, +152	0.085[a]	0.092[a]

资料来源：Journal of Financial Economics，天风证券研究所

然后，通过检验公司管理层主动盈利预测以及披露 8-K 的频率来判断机构持股对透明度的影响。通过断点回归，发现持股比例更高的公司具有更强的披露倾向，披露频率更高，披露的范围更大、金额更准确。

图 16：Russell 1000 底部与 Russell 2000 顶部的管理者披露

Panel A. Univariate analysis of management disclosure

	Bandwidth ±50		Bandwidth ±100		Bandwidth ±200	
	Russell 1000	Russell 2000	Russell 1000	Russell 2000	Russell 1000	Russell 2000
All management forecasts						
Forecasting firm (%)	40.36	52.73[a]	44.09	50.27[a]	47.09	50.91[b]
Forecast frequency	1.13	1.81[a]	1.33	1.62[a]	1.49	1.58
Management earnings forecasts						
Quarterly forecast precision	2.04	2.08	2.01	2.06	2.02	2.05[c]
Annual forecast precision	2.04	2.12[b]	2.04	2.09[b]	2.04	2.08[b]
Quarterly forecast horizon (%)	50.72	63.73[b]	54.67	57.29	59.23	54.80[c]
Annual forecast horizon (%)	58.18	64.30[b]	59.71	62.51	59.79	61.56
Form 8-K filings						
Total 8-K frequency	23.57	36.47[a]	27.10	35.54[a]	31.36	34.11[a]
Voluntary 8-K frequency	9.29	14.55[a]	10.39	14.50[a]	12.53	13.47[c]

Panel B. Regression discontinuity analysis of management disclosure					
	Rule of Thumb Bandwidth			Fixed Bandwidth	
				(Bandwidth ±100)	(Bandwidth ±200)
	Treatment τ	z-stat	Bandwidth	Treatment τ	Treatment τ
All management forecasts					
Forecasting firm	0.139^{b}	2.082	−106, +150	0.191^{a}	0.185^{a}
Forecast frequency	0.504^{c}	1.706	−93, +147	0.668^{b}	0.893^{a}
Management earnings forecasts					
Quarterly forecast precision	0.349^{a}	3.113	−104, +149	0.309^{a}	0.291^{a}
Annual forecast precision	0.262^{a}	2.876	−135, +185	0.317^{a}	0.268^{a}
Quarterly forecast horizon	0.329^{a}	2.740	−144, +179	0.383^{a}	0.357^{a}
Annual forecast horizon	0.172^{a}	3.146	−142, +187	0.119^{c}	0.166^{a}
Form 8-K filings					
Total 8-K frequency	15.141^{a}	4.662	−115, +158	16.755^{a}	15.899^{a}
Voluntary 8-K frequency	5.089^{a}	2.712	−118, +159	7.237^{a}	5.021^{a}

资料来源：Journal of Financial Economics，天风证券研究所

图 17：Russell 1000 底部与 Russell 2000 顶部的分析师预测

Panel A. Univariate analysis of analyst forecasts						
	Bandwidth ±50		Bandwidth ±100		Bandwidth ±200	
	Russell 1000	Russell 2000	Russell 1000	Russell 2000	Russell 1000	Russell 2000
Analyst following						
6 months after reconstitution	7.34	8.25^{a}	7.81	8.05	8.67	7.76^{a}
12 months after reconstitution	7.63	8.27^{b}	7.86	8.06	8.64	7.72^{a}
1-year average after reconstitution	7.26	8.25^{a}	7.80	8.02	8.61	7.70^{a}
Analyst forecast dispersion (%)						
6 months after reconstitution	1.02	0.40	0.63	0.39	0.48	0.41
12 months after reconstitution	1.41	0.55^{a}	1.67	0.74	1.74	0.62^{c}
1-year average after reconstitution	1.38	0.66^{a}	1.07	0.78	1.24	0.68^{c}

Panel B. Regression discontinuity analysis of analyst forecasts					
	Rule of Thumb Bandwidth			Fixed Bandwidth	
				(Bandwidth ±100)	(Bandw
	Treatment τ	z-stat	Bandwidth	Treatment τ	Trea
Analyst following					
6 months after reconstitution	2.925^{a}	4.653	−128, +180	3.350^{a}	
12 months after reconstitution	2.452^{a}	3.901	−147, +204	3.092^{a}	
1-year average after reconstitution	2.662^{a}	4.983	−148, +206	2.926^{a}	
Analyst forecast dispersion					
6 months after reconstitution	−0.032	−1.555	−126, +143	−0.038^{c}	−(
12 months after reconstitution	−0.022^{c}	−1.773	−81, +126	−0.021^{b}	−(
1-year average after reconstitution	−0.024^{a}	−2.821	−133, +176	−0.027^{a}	−(

资料来源：Journal of Financial Economics，天风证券研究所

图 18：Russell 1000 底部与 Russell 2000 顶部的交易环境

Panel A. Univariate analysis of the trading environment						
	Bandwidth ±50		Bandwidth ±100		Bandwidth ±200	
	Russell 1000	Russell 2000	Russell 1000	Russell 2000	Russell 1000	Russell 2000
PIN	0.17	0.13^{a}	0.16	0.14^{a}	0.15	0.14^{a}
Bid-ask spread	0.93	0.76^{a}	0.85	0.79	0.82	0.82
Turnover	6.93	10.79^{a}	7.65	10.36^{a}	7.95	9.43^{a}
Dollar volume ($mil.)	13.32	17.80^{b}	14.93	16.01	15.47	13.22^{a}
Abnormal return volatility (%)	2.92	2.68^{b}	2.73	2.63	2.57	2.54

Panel B. Regression discontinuity analysis of the trading environment					
	Rule of Thumb Bandwidth			Fixed Bandwidth	
				(Bandwidth ±100)	(Bandwidth ±200)
	Treatment τ	z-stat	Bandwidth	Treatment τ	Treatment τ
PIN	−0.049^{a}	−5.623	−93, +128	−0.050^{a}	−0.056^{a}
Bid-ask spread	−0.531^{a}	−4.094	−114, +162	−0.511^{a}	−0.493^{a}
Turnover	5.072^{a}	3.225	−105, +135	5.638^{a}	4.953^{a}
Dollar volume	12.265^{a}	3.572	−147, +197	17.328^{a}	12.335^{a}
Abnormal return volatility	−0.003	−1.264	−141, +178	0.001	−0.003

资料来源：Journal of Financial Economics，天风证券研究所

接着，选取 Thomson Financial Institutional Brokers Estimate System 数据库，用断点回归方法对分析师的跟进数量进行分析，发现机构持股比例较高会导致更多的分析师跟进。而后，进一步用 Stephen Brown 网站统计的知情投资者比例、买卖价差来验证持股比例对交易环境的影响；用换手率来验证其对流动性的影响。通过断点回归发现较高的机构持股

比例能够降低信息不对称、提高流动性。

图 19：Russell 1000 底部与 Russell 2000 顶部的工具变量

Panel A. Instrumental variables (2SLS) analysis of management disclosure						
	Forecasting firm	Forecast frequency	Forecast precision	Forecast horizon	Total 8-K frequency	Voluntary 8-K frequency
Instrumented institutional ownership	0.182[c]	0.469	0.395[b]	0.497[c]	0.421	0.601[b]
	(0.082)	(0.435)	(0.041)	(0.083)	(0.118)	(0.046)
Russell weight	0.114	0.359	−0.054	−0.018	0.013	−0.275
	(0.117)	(0.120)	(0.180)	(0.906)	(0.992)	(0.693)
Russell 2000	−0.155	−0.500	0.032	−0.015	−1.286	−0.892
	(0.118)	(0.110)	(0.465)	(0.943)	(0.390)	(0.321)
Lagged dependent variable	0.557[a]	0.766[a]	0.279[a]	0.629[a]	1.112[a]	1.045[a]
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	2,128	2,128	473	473	2,128	2,128
R^2	0.361	0.572	0.174	0.529	0.946	0.921

Panel B. Instrumental variables (2SLS) analysis of analyst forecasts		
	Analyst following	Analyst forecast dispersion
Instrumented institutional ownership	1.727[c]	−0.039[c]
	(0.097)	(0.086)
Russell weight	1.168[b]	−0.001
	(0.028)	(0.846)
Russell 2000	−1.888[a]	0.005
	(0.008)	(0.539)
Lagged dependent variable	0.897[a]	0.131[a]
	(0.000)	(0.000)
Observations	2,074	1,446
R^2	0.801	0.137

Panel C. Instrumental variables (2SLS) analysis of the trading environment					
	PIN	Bid-ask Spread	Ln(Turnover)	Ln(Dollar Volume)	Abnormal return volatility
Instrumented institutional ownership	−0.100[a]	−0.390[c]	0.411	0.792[b]	−0.002
	(0.000)	(0.091)	(0.156)	(0.030)	(0.691)
Russell weight	−0.018[b]	−0.101	0.076	0.430[a]	0.003
	(0.016)	(0.217)	(0.213)	(0.000)	(0.227)
Russell 2000	0.025[b]	0.113	−0.047	−0.465[a]	−0.003
	(0.019)	(0.331)	(0.596)	(0.005)	(0.292)
Lagged dependent variable	0.497[a]	0.585[a]	0.880[a]	0.757[a]	0.775[a]
	(0.000)	(0.003)	(0.000)	(0.000)	(0.000)
Observations	2,088	1,874	1,874	1,874	1,874
R^2	0.649	0.382	0.865	0.710	0.720

资料来源：Journal of Financial Economics，天风证券研究所

图 20：Russell 1000 底部与 Russell 2000 顶部的切换指标

	Bandwidth ±50		Bandwidth ±100		Bandwidth ±200	
	Up to Russell 1000	Down to Russell 2000	Up to Russell 1000	Down to Russell 2000	Up to Russell 1000	Down to Russell 2000
Change in institutional ownership						
Total (%)	1.76	2.96[c]	2.45	4.06[c]	1.32	3.98[a]
Quasi-indexer (%)	0.22	4.32[b]	1.47	4.05[a]	0.72	3.85[a]
Dedicated (%)	1.10	0.02[c]	0.27	0.25	0.38	0.51
Transient (%)	1.70	−0.57	0.11	0.41	0.45	0.13
Change in management disclosure						
Forecasting firm (%)	−11.11	4.92[c]	−1.52	5.34[c]	−4.01	4.98[a]
Forecast frequency	−0.55	0.36[b]	−0.15	0.27[a]	−0.17	0.30[a]
Forecast precision	−0.04	0.28[b]	−0.02	0.19[a]	0.02	0.17[a]
Forecast horizon (%)	−0.02	0.21[c]	0.02	0.19[a]	0.04	0.14[b]
Total 8-K frequency	7.72	6.56	6.74	7.50	6.44	7.53[c]
Voluntary 8-K frequency	1.67	1.98	0.80	1.66[c]	1.20	1.81[c]
Change in analyst forecasts						
Analyst following	0.22	0.32	−0.25	0.50[a]	−0.48	0.44[a]
Analyst forecast dispersion (%)	−0.12	−0.26	−0.11	−0.21	−0.17	−0.74
Change in trading environment						
PIN (%)	0.33	−1.57[c]	0.01	−1.44[a]	−0.21	−0.95[a]
Bid-ask spread	−0.29	−0.19	−0.11	−0.22[c]	−0.10	−0.25[a]
Trading volume	−1.88	3.69[b]	0.92	3.28[b]	1.64	3.05[b]
Turnover	−1.11	0.66[c]	0.70	1.14[c]	0.74	1.18[c]
Abnormal return volatility (%)	−0.18	−0.16	−0.06	−0.13	−0.02	−0.04

资料来源：Journal of Financial Economics，天风证券研究所

图 21：管理预测决策的断点回归分析

	Forecasting firm		Non-forecasting firm		Full Sample	
	Treatment τ	z-stat	Treatment τ	z-stat	Treatment τ	z-stat
Analyst forecasts						
Analyst following	2.150^{b}	2.225	3.308^{a}	4.576	2.662^{a}	4.983
Analyst forecast dispersion	−0.009	−1.315	-0.043^{a}	−2.715	-0.024^{a}	−2.821
Trading environment						
PIN	-0.041^{a}	−4.386	-0.057^{a}	−5.004	-0.049^{a}	−5.623
Bid-ask spread	-0.600^{a}	−3.599	-0.314^{c}	−1.669	-0.531^{a}	−4.094
Turnover	2.149	0.851	6.092^{a}	3.224	5.072^{a}	3.225
Dollar volume	11.492^{b}	2.256	13.665^{b}	2.330	12.265^{a}	3.572
Abnormal return volatility	-0.015^{a}	−3.708	0.010^{b}	2.224	−0.003	−1.264

资料来源：Journal of Financial Economics，天风证券研究所

图 22：Russell 1000 底部与 Russell 2000 顶部在 Regulation Fair Disclosur 前后的断点回归分析

	Pre-Reg FD		Post-Reg FD		Full Sample	
	Treatment τ	z-stat	Treatment τ	z-stat	Treatment τ	z-stat
Institutional ownership						
Total	0.428^{a}	8.254	0.368^{a}	8.979	0.392^{a}	11.434
Quasi-indexer	0.211^{a}	6.294	0.312^{a}	12.563	0.261^{a}	11.967
Dedicated	0.063^{a}	3.197	−0.037	−1.452	−0.008	−0.558
Transient	0.138^{a}	5.397	0.099^{a}	5.655	0.126^{a}	8.959
Management disclosure						
Forecasting firm	0.068	0.790	0.308^{a}	3.665	0.139^{b}	2.082
Forecast frequency	0.177	1.045	0.897^{c}	1.813	0.504^{c}	1.706
Forecast precision	2.491^{a}	4.177	0.187^{b}	2.002	0.349^{a}	3.113
Forecast horizon	0.079	0.427	0.506^{a}	3.706	0.329^{a}	2.740
Total 8-K frequency	10.175^{c}	1.864	20.078^{a}	5.271	15.141^{a}	4.662
Voluntary 8-K frequency	5.765	1.605	5.086^{b}	2.321	5.089^{a}	2.712
Analyst forecasts						
Analyst following	3.648^{a}	4.359	1.927^{a}	2.562	2.662^{a}	4.983
Analyst forecast dispersion	-0.035^{b}	−2.045	-0.018^{c}	−1.798	-0.024^{a}	−2.821
Trading environment						
PIN	-0.063^{a}	−4.282	-0.040^{a}	−4.369	-0.049^{a}	−5.623
Bid-ask spread	-1.053^{a}	−4.420	−0.088	−1.302	-0.531^{a}	−4.094
Turnover	4.585	1.626	2.887^{c}	1.679	5.072^{a}	3.225
Dollar volume	5.949	0.685	13.777^{a}	3.634	12.265^{a}	3.572
Abnormal return volatility	−0.002	−0.510	-0.007^{a}	−2.695	−0.003	−1.264

资料来源：Journal of Financial Economics，天风证券研究所

5. 结论

高的机构持股能够促进管理层披露，提高股票流动性并降低信息不对称，从而生成更多信息，加强监管并降低交易成本。本文揭示了机构投资者对于信息环境的作用。一些机构投资者（特别是准指数投资者）能够对所有投资者产生正的外部性——通过提高公司透明度和信息披露，从而加强了内部和外部监管。与先前研究一般认为被动型投资者没有起到多少监管作用不同，本文研究发现被动型投资者对信息透明度的偏好使得公司更加透明，改善了交易环境。

以上感谢实习生蒋菲的贡献。

Beta 套利

文献来源：Journal of Financial Economics,Volume 111,Issue 1,January 2014,Pages 1-25,Andrea Frazzini,Lasse Heje Pedersen

推荐理由：文献展示了一个有杠杆和资金约束的模型，这个模型在投资者和投资时间上会有差异。我们找到了能验证模型 5 个核心预测的证据：1.以美国股票和 20 只国际股票市场，国债，公司债券和期货为经验发现，投资者会追逐高 beta 值资产（高 beta 值伴随着低 alpha 值）因为投资者受到了约束；2.beta 套利因子是一个买入有杠杆的低 beta 值资产，而卖空高 beta 值资产，并且产生显著的正的风险调整后收益的机制；3.当资金约束大的时候，beta 套利因子是低的；4.当资金流动风险变大时，beta 值会被压缩到 1；5.约束越大，投资者越会持有高 beta 值的风险更大的资产。

1. 简介

资本资产定价模型（CAPM）的一个基本前提是，所有的代理投资人的投资组合具有最高预期的超额收益/单位风险（夏普比率），然后通过对这个组合加杠杆或减杠杆，来满足他们的风险偏好。然而，许多投资者，如个人、养老基金和共同基金，他们可以使用的杠杆是受约束的。所以他们会过度持有风险资产，而不是使用杠杆。例如，许多共同基金的家庭提供平衡基金，其中“正常”基金投资 40%的长期债券和 60%的股票，而“激进”基金投资 10%债券和 90%的股票。如果“正常”基金是有效的，那么“正常”基金投资者通过加杠杆比“激进”基金投资者通过向股票投资倾斜，能获得更好的风险和预期回报。有嵌入式杠杆的交易型开放式指数基金（ETF）的需求进一步的证据表明，许多投资者不能直接使用杠杆。

这种倾向于高 beta 值资产的行为表明，有风险的高 beta 值资产需要较低的风险调整后的回报，而低 beta 值资产需要杠杆。事实上，美国的股票证券市场线相对于 CAPM 过于平坦；而有借贷约束的 CAPM 则能给出更好的解释。

几个问题就出现了：不受约束的套利者如何利用这种效应去做 beta 套利？相对于大小、价值和动量效应，这个异常收益有多大？对其他国家和资产类别 beta 套利是否同样有效？在时间序列和横截面上这种回报溢价如何变化？谁做 beta 套利？

模型从 20 个国际股市、国债市场、信贷市场和期货市场的经验证据，并且考虑杠杆约束的动态模型，以解决这些问题。

模型考虑了几种代理人：一些代理人不使用杠杆，因此过度持有高 beta 值资产，导致这些资产收益低；另一些代理人使用杠杆，但是面临资金约束；不受约束的代理人减持（或卖空）高 beta 值的资产，并杠杆买入低 beta 值资产。该模型推导的证券市场线较为平缓，其斜率依赖代理人的平均资金约束程度（命题 1）。

要解释资金摩擦的资产定价效应，可以考虑一个市场中性的 beta 套利因子。这个 beta 套利因子是一个投资组合——持有低 beta 值资产，增加杠杆使 beta 值为 1；同时卖空高 beta 资产，减少杠杆使 beta 值为 1。例如，持有\$1.4 低 beta 值股票、卖空\$0.7 高 beta 值股票，再利用无风险资产的对冲头寸（相抵持仓）以实现自融资。美国股票市场的 beta 套利因子可实现零 beta。模型推断，beta 套利因子可获得正的平均收益，且约束程度越高、高低 beta 资产间 beta 值差异越大，该收益越高（命题 2）。

当使用杠杆的代理人达到其资金约束时，必须减少杠杆。所以模型预测，在资金流动性约束强的时期，beta 套利因子收益为负，未来期望收益增加（命题 3）。

此外，模型还预测当资金流动性风险高时，证券横截面 beta 值将被压缩趋近于 1（命题 4）。

最后，模型指出受约束程度高的投资者会过度持有高 beta 资产，约束程度低的投资者则会过度持有低 beta 值资产，并且可能利用杠杆（命题 5）。

2. 理论

考虑这样的效用函数：

$$\max\ x'(E_t(P_{t+1}+\delta_{t+1})-(1+r^f)P_t)-\gamma^i x'\Omega_t x/2$$

服从于组合限制：

$$m_t^i\sum_s x^s P_t^s \le W_t^i$$

W_t^i代表代理人$\mathrm{i}=1,\dots,\mathrm{I}$可以存在两个时间段的资产。代理人交易的股票为$\mathrm{s}=1,\dots,\mathrm{S}$，股票有$\delta_{t+1}$的红利和$x^{*s}$的流通在外股票。在每个时间段 t 年轻的代理人选择份额为$\mathrm{x}=(x^1,\dots,x^S)$。无风险资产回报率为$r^f$。$P_t$代表时刻 t 的价格向量。$\Omega_t$是$P_{t+1}+\delta_{t+1}$的方

差协方差矩阵。γ^i是代理人i的风险厌恶系数。m^i是代理人i的关于杠杆的变量，如果$m^i = 1 \div (1 - 0.20) = 1.25$代表代理人必须保持 20%的现金。如果$m^i = 0.5$代表代理人可以使用杠杆，但保证金标准是 50%。

命题 1（高 beta 意味着低 alpha）模型可以推导出公式：$E_t(r^s_{t+1}) = r^f + \Psi_t + \beta^s_t \lambda_t$，其中风险溢价是$\lambda_t = E_t(r^M_{t+1}) - r^f - \Psi_t$，$\Psi_t$是拉格朗日乘子度量资金约束的紧密程度。模型推导出公式：$\alpha^s_t = \Psi_t(1 - \beta^s_t)$，alpha 随 beta 的增加而减少。当组合约束越紧时（Ψ_t越大），证券市场线的截距就越大，斜率越小。因此，当 beta 为零时，就有比无风险资产更大的收益率。市场组合比切线组合有更高的风险和期望收益率，但是夏普比率低。当斜率低的时候，代理人因为有约束，且需要更高的非杠杆的收益所以接受更低的风险补偿。

命题 2（BAB 的期望收益时正值）建立一个 beta 套利参数（BAB）：

$$r^{BAB}_{t+1} = 1 \div \beta^L_t \times (r^L_{t+1} - r^f) - 1 \div \beta^H_t \times (r^H_{t+1} - r^f)$$

其中$r^L_{t+1} = W'_L r_{t+1}$，r^H_{t+1}类推。两个组合的 beta 值分别为β^L_t和β^H_t，其中$\beta^L_t < \beta^H_t$。可以推出$E_t(r^{BAB}_{t+1}) = \Psi_t(\beta^H_t - \beta^L_t) \div (\beta^L_t \beta^H_t) \geq 0$，BAB 期望为正且 beta 的差值越大期望越大。

命题 3（资金冲击和 BAB 收益）$\partial r^{BAB}_t / \partial m^k_t \leq 0$，$\partial E_t(r^{BAB}_t) / \partial m^k_t \geq 0$。

命题 4（beta 压缩）

命题 5（约束的投资者持有高 beta 值资产）

3. 数据及方法

数据来源：

图 23：股票数据摘要

This table shows summary statistics as of June of each year. The sample includes all commons stocks on the Center for Research in Security Prices daily stock files (shrcd equal to 10 or 11) and Xpressfeed Global security files (tcpi equal to zero). Mean ME is the average market value of equity, in billions of US dollars. Means are pooled averages as of June of each year.

Country	Local market index	Number of stocks, total	Number of stocks, mean	Mean ME (firm, billion of US dollars)	Mean ME (market, billion of US dollars)	Start year	End year
Australia	MSCI Australia	3,047	894	0.57	501	1989	2012
Austria	MSCI Austria	211	81	0.75	59	1989	2012
Belgium	MSCI Belgium	425	138	1.79	240	1989	2012
Canada	MSCI Canada	5,703	1,180	0.89	520	1984	2012
Denmark	MSCI Denmark	413	146	0.83	119	1989	2012
Finland	MSCI Finland	293	109	1.39	143	1989	2012
France	MSCI France	1,815	589	2.12	1,222	1989	2012
Germany	MSCI Germany	2,165	724	2.48	1,785	1989	2012
Hong Kong	MSCI Hong Kong	1,793	674	1.22	799	1989	2012
Italy	MSCI Italy	610	224	2.12	470	1989	2012
Japan	MSCI Japan	5,009	2,907	1.19	3,488	1989	2012
Netherlands	MSCI Netherlands	413	168	3.33	557	1989	2012
New Zealand	MSCI New Zealand	318	97	0.87	81	1989	2012
Norway	MSCI Norway	661	164	0.76	121	1989	2012
Singapore	MSCI Singapore	1,058	375	0.63	240	1989	2012
Spain	MSCI Spain	376	138	3.00	398	1989	2012
Sweden	MSCI Sweden	1,060	264	1.30	334	1989	2012
Switzerland	MSCI Switzerland	566	210	3.06	633	1989	2012
United Kingdom	MSCI UK	6,126	1,766	1.22	2,243	1989	2012
United States	CRSP value-weighted index	23,538	3,182	0.99	3,215	1926	2012

资料来源：Journal of Financial Economics，天风证券研究所

图 24：其他种类资产数据摘要

Asset class	Instrument	Frequency	Start year	End year
Equity indices	Australia	Daily	1977	2012
	Germany	Daily	1975	2012
	Canada	Daily	1975	2012
	Spain	Daily	1980	2012
	France	Daily	1975	2012
	Hong Kong	Daily	1980	2012
	Italy	Daily	1978	2012
	Japan	Daily	1976	2012
	Netherlands	Daily	1975	2012
	Sweden	Daily	1980	2012
	Switzerland	Daily	1975	2012
	United Kingdom	Daily	1975	2012
	United States	Daily	1965	2012
Country bonds	Australia	Daily	1986	2012
	Germany	Daily	1980	2012
	Canada	Daily	1985	2012
	Japan	Daily	1982	2012
	Norway	Daily	1989	2012
	Sweden	Daily	1987	2012
	Switzerland	Daily	1981	2012
	United Kingdom	Daily	1980	2012
	United States	Daily	1965	2012
Foreign exchange	Australia	Daily	1977	2012
	Germany	Daily	1975	2012
	Canada	Daily	1975	2012
	Japan	Daily	1976	2012
	Norway	Daily	1989	2012
	New Zealand	Daily	1986	2012
	Sweden	Daily	1987	2012
	Switzerland	Daily	1975	2012
	United Kingdom	Daily	1975	2012
US Treasury bonds	Zero to one year	Monthly	1952	2012
	One to two years	Monthly	1952	2012
	Two to three years	Monthly	1952	2012
	Three to four years	Monthly	1952	2012
	Four to five years	Monthly	1952	2012
	Four to ten years	Monthly	1952	2012
	More than ten years	Monthly	1952	2012
Credit indices	One to three years	Monthly	1976	2012
	Three to five year	Monthly	1976	2012
	Five to ten years	Monthly	1991	2012
	Seven to ten years	Monthly	1988	2012
Corporate bonds	Aaa	Monthly	1973	2012
	Aa	Monthly	1973	2012
	A	Monthly	1973	2012
	Baa	Monthly	1973	2012
	Ba	Monthly	1983	2012
	B	Monthly	1983	2012
	Caa	Monthly	1983	2012
	Ca-D	Monthly	1993	2012
	Distressed	Monthly	1986	2012
Commodities	Aluminum	Daily	1989	2012
	Brent oil	Daily	1989	2012
	Cattle	Daily	1989	2012
	Cocoa	Daily	1984	2012
	Coffee	Daily	1989	2012
	Copper	Daily	1989	2012
	Corn	Daily	1989	2012
	Cotton	Daily	1989	2012
	Crude	Daily	1989	2012
	Gasoil	Daily	1989	2012
	Gold	Daily	1989	2012
	Heat oil	Daily	1989	2012
	Hogs	Daily	1989	2012
	Lead	Daily	1989	2012
	Nat gas	Daily	1989	2012
	Nickel	Daily	1984	2012
	Platinum	Daily	1989	2012
	Silver	Daily	1989	2012
	Soymeal	Daily	1989	2012
	Soy oil	Daily	1989	2012
	Sugar	Daily	1989	2012
	Tin	Daily	1989	2012
	Unleaded	Daily	1989	2012
	Wheat	Daily	1989	2012
	Zinc	Daily	1989	2012

资料来源：Journal of Financial Economics，天风证券研究所

3.1. 各种资产中的 beta 套利

图 25 横轴代表不同种类资产的 beta 值，且由低到高排列。纵轴代表 alpha 值，可以看出 alpha 随 beta 的增加而减少。（命题 1）

图 25：beta 升序对应 alpha 图

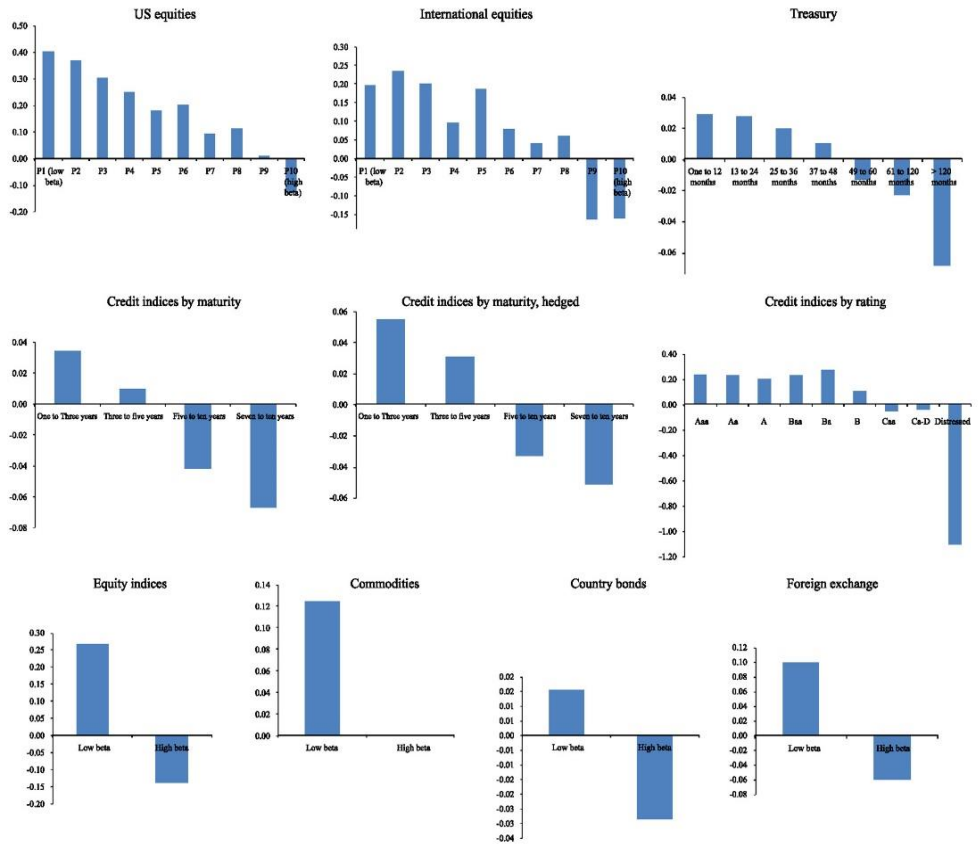

Fig. 1. Alphas of beta-sorted portfolios. This figure shows monthly alphas. The test assets are beta-sorted portfolios. At the beginning of each calendar month, securities are ranked in ascending order on the basis of their estimated beta at the end of the previous month. The ranked securities are assigned to beta-sorted portfolios. This figure plots alphas from low beta (left) to high beta (right). Alpha is the intercept in a regression of monthly excess return. For equity portfolios, the explanatory variables are the monthly returns from Fama and French (1993), Asness and Frazzini (2013), and Carhart (1997) portfolios. For all other portfolios, the explanatory variables are the monthly returns of the market factor. Alphas are in monthly percent.

资料来源：Journal of Financial Economics，天风证券研究所

图 26 不同国家股票夏普比率除了奥地利都为正值。（命题 1）

图 26：不同种类资产的夏普比率

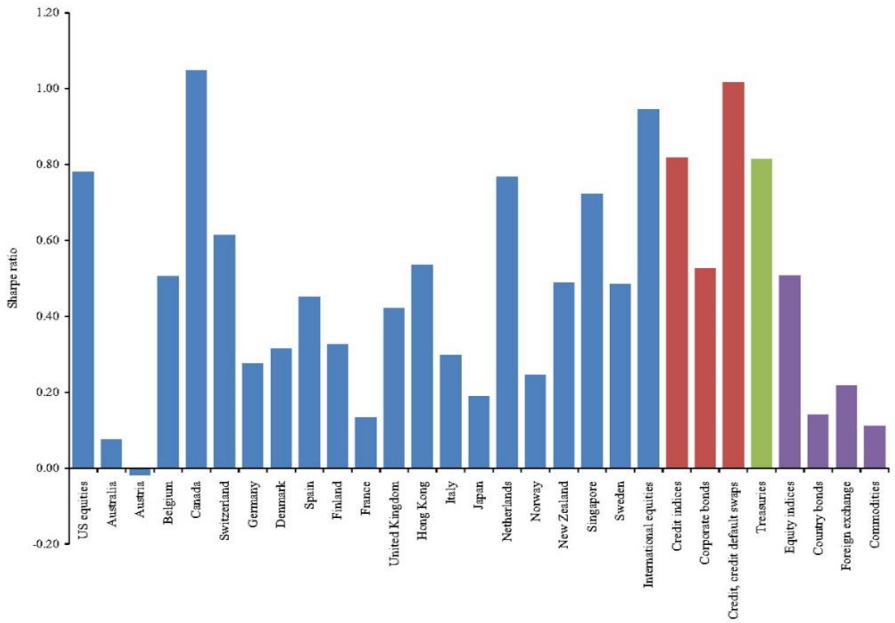

Fig. 2. Betting against beta (BAB) Sharpe ratios by asset class. This figures shows annualized Sharpe ratios of BAB factors across asset classes. To construct the BAB factor, all securities are assigned to one of two portfolios: low beta and high beta. Securities are weighted by the ranked betas and the portfolios are rebalanced every calendar month. Both portfolios are rescaled to have a beta of one at portfolio formation. The BAB factor is a self-financing portfolio that is long the low-beta portfolio and shorts the high-beta portfolio. Sharpe ratios are annualized.

资料来源：Journal of Financial Economics，天风证券研究所

图 27 美股夏普比率随 beta 的增加而减少，alpha 随 beta 增加而减少。（命题 1）

图 27：美股 beta 升序收益

US equities: returns, 1926–2012.

This table shows beta-sorted calendar-time portfolio returns. At the beginning of each calendar month, stocks are ranked in ascending order on the basis of their estimated beta at the end of the previous month. The ranked stocks are assigned to one of ten deciles portfolios based on NYSE breakpoints. All stocks are equally weighted within a given portfolio, and the portfolios are rebalanced every month to maintain equal weights. The right-most column reports returns of the zero-beta betting against beta (BAB) factor. To construct the BAB factor, all stocks are assigned to one of two portfolios: low beta and high beta. Stocks are weighted by the ranked betas (lower beta security have larger weight in the low-beta portfolio and higher beta securities have larger weights in the high-beta portfolio), and the portfolios are rebalanced every calendar month. Both portfolios are rescaled to have a beta of one at portfolio formation. The betting against beta factor is a self-financing portfolio that is long the low-beta portfolio and short the high-beta portfolio. This table includes all available common stocks on the Center for Research in Security Prices database between January 1926 and March 2012. Alpha is the intercept in a regression of monthly excess return. The explanatory variables are the monthly returns from Fama and French (1993) mimicking portfolios, Carhart (1997) momentum factor and Pastor and Stambaugh (2003) liquidity factor. CAPM=Capital Asset Pricing Model. Regarding the five-factor alphas the Pastor and Stambaugh (2003) liquidity factor is available only between 1968 and 2011. Returns and alphas are in monthly percent, *t*-statistics are shown below the coefficient estimates, and 5% statistical significance is indicated in bold. Beta (ex ante) is the average estimated beta at portfolio formation. Beta (realized) is the realized loading on the market portfolio. Volatilities and Sharpe ratios are annualized.

Portfolio	P1 (low beta)	P2	P3	P4	P5	P6	P7	P8	P9	P10 (high beta)	BAB
Excess return	**0.91**	**0.98**	**1.00**	**1.03**	**1.05**	**1.10**	**1.05**	**1.08**	**1.06**	**0.97**	**0.70**
	(6.37)	(5.73)	(5.16)	(4.88)	(4.49)	(4.37)	(3.84)	(3.74)	(3.27)	(2.55)	(7.12)
CAPM alpha	**0.52**	**0.48**	**0.42**	**0.39**	**0.34**	**0.34**	0.22	0.21	0.10	−0.10	**0.73**
	(6.30)	(5.99)	(4.91)	(4.43)	(3.51)	(3.20)	(1.94)	(1.72)	(0.67)	(−0.48)	(7.44)
Three-factor alpha	**0.40**	**0.35**	**0.26**	**0.21**	**0.13**	0.11	−0.03	−0.06	**−0.22**	**−0.49**	**0.73**
	(6.25)	(5.95)	(4.76)	(4.13)	(2.49)	(1.94)	(−0.59)	(−1.02)	(−2.81)	(−3.68)	(7.39)
Four-factor alpha	**0.40**	**0.37**	**0.30**	**0.25**	**0.18**	**0.20**	0.09	0.11	0.01	−0.13	**0.55**
	(6.05)	(6.13)	(5.36)	(4.92)	(3.27)	(3.63)	(1.63)	(1.94)	(0.12)	(−1.01)	(5.59)
Five-factor alpha	**0.37**	**0.37**	**0.33**	**0.30**	**0.17**	**0.20**	0.11	0.14	0.02	0.00	**0.55**
	(4.54)	(4.66)	(4.50)	(4.40)	(2.44)	(2.71)	(1.40)	(1.65)	(0.21)	(−0.01)	(4.09)
Beta (ex ante)	0.64	0.79	0.88	0.97	1.05	1.12	1.21	1.31	1.44	1.70	0.00
Beta (realized)	0.67	0.87	1.00	1.10	1.22	1.32	1.42	1.51	1.66	1.85	−0.06
Volatility	15.70	18.70	21.11	23.10	25.56	27.58	29.81	31.58	35.52	41.68	10.75
Sharpe ratio	0.70	0.63	0.57	0.54	0.49	0.48	0.42	0.41	0.36	0.28	0.78

资料来源：Journal of Financial Economics，天风证券研究所

图 28 国际股票夏普比率随 beta 的增加而减少，alpha 随 beta 增加而减少。（命题 1）

图 28：国际股票 beta 升序收益

International equities: returns, 1984–2012.

This table shows beta-sorted calendar-time portfolio returns. At the beginning of each calendar month, stocks are ranked in ascending order on the basis of their estimated beta at the end of the previous month. The ranked stocks are assigned to one of ten deciles portfolios. All stocks are equally weighted within a given portfolio, and the portfolios are rebalanced every month to maintain equal weights. The rightmost column reports returns of the zero-beta betting against beta (BAB) factor. To construct the BAB factor, all stocks are assigned to one of two portfolios: low beta and high beta. The low- (high-) beta portfolio is composed of all stocks with a beta below (above) its country median. Stocks are weighted by the ranked betas (lower beta security have larger weight in the low-beta portfolio and higher beta securities have larger weights in the high-beta portfolio), and the portfolios are rebalanced every calendar month. Both portfolios are rescaled to have a beta of one at portfolio formation. The betting against beta factor is a self-financing portfolio that is long the low-beta portfolio and short the high-beta portfolio. This table includes all available common stocks on the Xpressfeed Global database for the 19 markets listed in Table 1. The sample period runs from January 1984 to March 2012. Alpha is the intercept in a regression of monthly excess return. The explanatory variables are the monthly returns of Asness and Frazzini (2013) mimicking portfolios and Pastor and Stambaugh (2003) liquidity factor. CAPM=Capital Asset Pricing Model. Regarding the five-factor alphas the Pastor and Stambaugh (2003) liquidity factor is available only between 1968 and 2011. Returns are in US dollars and do not include any currency hedging. Returns and alphas are in monthly percent, *t*-statistics are shown below the coefficient estimates, and 5% statistical significance is indicated in bold. Beta (ex-ante) is the average estimated beta at portfolio formation. Beta (realized) is the realized loading on the market portfolio. Volatilities and Sharpe ratios are annualized.

Portfolio	P1 (low beta)	P2	P3	P4	P5	P6	P7	P8	P9	P10 (high beta)	BAB
Excess return	**0.63**	**0.67**	**0.69**	**0.58**	**0.67**	0.63	0.54	0.59	0.44	0.30	**0.64**
	(2.48)	(2.44)	(2.39)	(1.96)	(2.19)	(1.93)	(1.57)	(1.58)	(1.10)	(0.66)	(4.66)
CAPM alpha	**0.45**	**0.47**	**0.48**	**0.36**	**0.44**	**0.39**	0.28	0.32	0.15	0.00	**0.64**
	(2.91)	(3.03)	(2.96)	(2.38)	(2.86)	(2.26)	(1.60)	(1.55)	(0.67)	(−0.01)	(4.68)
Three-factor alpha	**0.28**	**0.30**	**0.29**	0.16	0.22	0.11	0.01	−0.03	−0.23	−0.50	**0.65**
	(2.19)	(2.22)	(2.15)	(1.29)	(1.71)	(0.78)	(0.06)	(−0.17)	(−1.20)	(−1.94)	(4.81)
Four-factor alpha	0.20	0.24	0.20	0.10	0.19	0.08	0.04	0.06	−0.16	−0.16	**0.30**
	(1.42)	(1.64)	(1.39)	(0.74)	(1.36)	(0.53)	(0.27)	(0.35)	(−0.79)	(−0.59)	(2.20)
Five-factor alpha	0.19	0.23	0.19	0.09	0.20	0.07	0.05	0.05	−0.19	−0.18	**0.28**
	(1.38)	(1.59)	(1.30)	(0.65)	(1.40)	(0.42)	(0.33)	(0.30)	(−0.92)	(−0.65)	(2.09)
Beta (ex ante)	0.61	0.70	0.77	0.83	0.88	0.93	0.99	1.06	1.15	1.35	0.00
Beta (realized)	0.66	0.75	0.78	0.85	0.87	0.92	0.98	1.03	1.09	1.16	−0.02
Volatility	14.97	16.27	17.04	17.57	18.08	19.42	20.42	22.05	23.91	27.12	8.07
Sharpe ratio	0.50	0.50	0.48	0.40	0.44	0.39	0.32	0.32	0.22	0.13	0.95

资料来源：Journal of Financial Economics，天风证券研究所

3.2. 时间序列检验

文章用加权的高 beta 值和低 beta 值计算美股、国际股票和所有资产的 BAB 收益，BAB 的期望收益时正值。（命题 2）

图 29：回归结果

Regression results.

This table shows results from (pooled) time series regressions. The left-hand side is the month t return of the betting against beta (BAB) factors. To construct the BAB portfolios, all securities are assigned to one of two portfolios: low beta and high beta. Securities are weighted by the ranked betas (lower beta security have larger weight in the low-beta portfolio and higher beta securities have larger weights in the high-beta portfolio), and the portfolios are rebalanced every calendar month. Both portfolios are rescaled to have a beta of one at portfolio formation. The BAB factor is a self-financing portfolio that is long the low-beta portfolio and short the high-beta portfolio. The explanatory variables include the TED spread and a series of controls. Lagged TED spread is the TED spread at the end of month $t-1$. Change in TED spread is equal to TED spread at the end of month t minus Ted spread at the end of month $t-1$. Short volatility return is the month t return on a portfolio that shorts at-the-money straddles on the S&P 500 index. To construct the short volatility portfolio, on index options expiration dates we write the next-to-expire closest-to-maturity straddle on the S&P 500 index and hold it to maturity. Beta spread is defined as (HBeta − LBeta)/(HBeta* LBeta) where HBeta (LBeta) are the betas of the short (long) leg of the BAB portfolio at portfolio formation. Market return is the monthly return of the relevant market portfolio. Lagged inflation is equal to the one-year US Consumer Price Index inflation rate, lagged one month. The data run from December 1984 (first available date for the TED spread) to March 2012. Columns 1 and 2 report results for US equities. Columns 3 and 4 report results for international equities. In these regressions we use each individual country BAB factors as well as an international equity BAB factor. Columns 5 and 6 report results for all assets in our data. Asset fixed effects are included where indicated, t-statistics are shown below the coefficient estimates and all standard errors are adjusted for heteroskedasticity (White, 1980). When multiple assets are included in the regression, standard errors are clustered by date and 5% statistical significance is indicated in bold.

	US equities		International equities, pooled		All assets, pooled	
Left-hand side: BAB return	(1)	(2)	(3)	(4)	(5)	(6)
Lagged TED spread	**−0.025**	**−0.038**	**−0.009**	**−0.015**	**−0.013**	**−0.018**
	(−5.24)	(−4.78)	(−3.87)	(−4.07)	(−4.87)	(−4.65)
Change in TED spread	**−0.019**	**−0.035**	**−0.006**	**−0.010**	**−0.007**	**−0.011**
	(−2.58)	(−4.28)	(−2.24)	(−2.73)	(−2.42)	(−2.64)
Beta spread		0.011		0.001		0.001
		(0.76)		(0.40)		(0.69)
Lagged BAB return		0.011		0.035		0.044
		(0.13)		(1.10)		(1.40)
Lagged inflation		−0.177		0.003		−0.062
		(−0.87)		(0.03)		(−0.58)
Short volatility return		**−0.238**		0.021		0.027
		(−2.27)		(0.44)		(0.48)
Market return		**−0.372**		**−0.104**		**−0.097**
		(−4.40)		(−2.27)		(−2.18)
Asset fixed effects	No	No	Yes	Yes	Yes	Yes
Number of observations	328	328	5,725	5,725	8,120	8,120
Adjusted R^2	0.070	0.214	0.007	0.027	0.014	0.036

资料来源：Journal of Financial Economics，天风证券研究所

3.3. beta 压缩

选用 TED 利差的波动作为资金流动性风险的代理变量。发现，当资金流动性风险高时，beta 值的离差显著降低，这与模型对 beta 压缩的推断一致。（命题 4）

图 30：beta 压缩

Beta compression.

This table reports results of cross-sectional and time-series tests of beta compression. Panels A, B and C report cross-sectional dispersion of betas in US equities, international equities, and all asset classes in our sample. The data run from December 1984 (first available date for the TED spread) to March 2012. Each calendar month we compute cross sectional standard deviation, mean absolute deviation, and inter quintile range of betas. In Panel C we compute each dispersions measure for each asset class and average across asset classes. The row denoted all reports times series means of the dispersion measures. P1 to P3 report coefficients on a regression of the dispersion measure on a series of TED spread volatility dummies. TED spread volatility is defined as the standard deviation of daily changes in the TED spread in the prior calendar month. We assign the TED spread volatility into three groups (low, neutral, and high) based on full sample breakpoints (top and bottom one third) and regress the times series of the cross-sectional dispersion measure on the full set of dummies (without intercept). t-Statistics are shown below the coefficient estimates, and 5% statistical significance is indicated in bold. Panels D, E and F report conditional market betas of the betting against beta (BAB) portfolio based on TED spread volatility as of the prior month. The dependent variable is the monthly return of the BAB portfolios. The explanatory variables are the monthly returns of the market portfolio, Fama and French (1993), Asness and Frazzini (2013), and Carhart (1997) mimicking portfolios, but only the alpha and the market betas are reported. CAPM indicates the Capital Asset Pricing Model. Market betas are allowed to vary across TED spread volatility regimes (low, neutral, and high) using the full set of dummies. Panels D, E and F report loading on the market factor corresponding to different TED spread volatility regimes. All assets report results for the aggregate BAB portfolio of Table 9, Panel B. All standard errors are adjusted for heteroskedasticity and autocorrelation using a Bartlett kernel (Newey and West, 1987) with a lag length of sixty months.

Cross-sectional dispersion	Standard deviation	Mean absolute deviation	Interquintile range
Panel A: US equities			
All	0.32	0.25	0.43
P1 (low TED volatility)	0.34	0.27	0.45
P2	0.33	0.26	0.44
P3 (high TED volatility)	0.29	0.23	0.40
P3 minus P1	**−0.05**	**−0.04**	−0.05
t-Statistics	(−2.71)	(−2.43)	(−1.66)
Panel B: International equities			
All	0.22	0.17	0.29
P1 (low TED volatility)	0.23	0.18	0.30
P2	0.22	0.17	0.29
P3 (high TED volatility)	0.20	0.16	0.27
P3 minus P1	**−0.04**	**−0.03**	−0.03
t-Statistics	(−2.50)	(−2.10)	(−1.46)
Panel C: All assets			
All	0.45	0.35	0.61
P1 (low TED volatility)	0.47	0.37	0.63
P2	0.45	0.36	0.62
P3 (high TED volatility)	0.43	0.33	0.58
P3 minus P1	**−0.04**	**−0.03**	**−0.06**
t-Statistics	(−3.18)	(−3.77)	(−2.66)

		Conditional market beta			
	Alpha	P1 (low TED volatility)	P2	P3 (high TED volatility)	P3 − P1
Panel D: US equities					
CAPM	**1.06**	**−0.46**	−0.19	−0.01	**0.45**
	(3.61)	(−2.65)	(−1.29)	(−0.11)	(3.01)
Control for three factors	**0.86**	**−0.40**	−0.02	0.08	**0.49**
	(4.13)	(−3.95)	(−0.19)	(0.69)	(3.06)
Control for four factors	**0.66**	**−0.28**	0.00	0.13	**0.40**
	(3.14)	(−5.95)	(0.02)	(1.46)	(4.56)
Panel E: International equities					
CAPM	**0.60**	−0.09	0.02	0.06	0.16
	(2.84)	(−1.30)	(0.64)	(1.28)	(1.87)
Control for three factors	**0.59**	−0.09	0.02	0.05	0.14
	(3.23)	(−1.22)	(0.74)	(1.09)	(1.70)
Control for four factors	**0.35**	−0.04	0.05	**0.07**	**0.11**
	(2.16)	(−1.16)	(1.51)	(2.03)	(2.24)
Panel F: All assets					
CAPM	**0.54**	**−0.13**	−0.07	0.01	**0.14**
	(4.96)	(−2.64)	(−1.82)	(0.21)	(2.34)

资料来源：Journal of Financial Economics，天风证券研究所

3.4. 模型组合预测检验

高约束的投资者比低约束投资者持有更高 beta 证券，与模型一致。共同基金和个人投资者（两者的约束更强）的股票投资组合，平均 beta 值超过 1。杠杆收购(LBO)基金会选择 beta 值低于 1 的公司，利用杠杆进行收购。文章还发现巴菲特的 Berkshire Hathaway 公司杠杆买入低 beta 股票来进行 beta 套利。

图 31：模型组合预测

Testing the model's portfolio predictions, 1963–2012.

This table shows average ex ante and realized portfolio betas for different groups of investors. Panel A reports results for our sample of open-end actively-managed domestic equity mutual funds as well as results a sample of individual retail investors. Panel B reports results for a sample of leveraged buyouts (private equity) and for Berkshire Hathaway. We compute both the ex ante beta of their holdings and the realized beta of the time series of their returns. To compute the ex-ante beta, we aggregate all quarterly (monthly) holdings in the mutual fund (individual investor) sample and compute their ex-ante betas (equally weighted and value weighted based on the value of their holdings). We report the time series averages of the portfolio betas. To compute the realized betas, we compute monthly returns of an aggregate portfolio mimicking the holdings, under the assumption of constant weight between reporting dates (quarterly for mutual funds, monthly for individual investors). We compute equally weighted and value-weighted returns based on the value of their holdings. The realized betas are the regression coefficients in a time series regression of these excess returns on the excess returns of the Center for Research in Security Prices value-weighted index. In Panel B we compute ex ante betas as of the month-end prior to the initial takeover announcements date. *t*-Statistics are shown to right of the betas estimates and test the null hypothesis of beta = 1. All standard errors are adjusted for heteroskedasticity and autocorrelation using a Bartlett kernel (Newey and West, 1987) with a lag length of 60 months. A 5% statistical significance is indicated in bold.

		Ex ante beta of positions		Realized beta of positions	
Investor, method	Sample period	Beta	*t*-Statistics (H0: beta=1)	Beta	*t*-Statistics (H0: beta=1)
Panel A: Investors likely to be constrained					
Mutual funds, value weighted	1980–2012	**1.08**	2.16	**1.08**	6.44
Mutual funds, equal weighted	1980–2012	1.06	1.84	**1.12**	3.29
Individual investors, value weighted	1991–1996	**1.25**	8.16	**1.09**	3.70
Individual investors, equal weighted	1991–1996	**1.25**	7.22	**1.08**	2.13
Panel B: Investors who use leverage					
Private equity (all)	1963–2012	0.96	−1.50		
Private equity (all), equal weighted	1963–2012	**0.94**	−2.30		
Private equity (LBO, MBO), value weighted	1963–2012	**0.83**	−3.15		
Private equity (LBO, MBO), equal weighted	1963–2012	**0.82**	−3.47		
Berkshire Hathaway, value weighted	1980–2012	**0.91**	−2.42	**0.77**	−3.65
Berkshire Hathaway, equal weighted	1980–2012	**0.90**	−3.81	**0.83**	−2.44

资料来源：Journal of Financial Economics，天风证券研究所

4. 结论

本文为风险和预期收益关系的研究提供了新观点。这一金融经济学的核心问题一直备受关注。标准的 CAPM 模型不能解释股票横截面的无条件和条件收益；已有研究揭示高 beta 值股票会产生低风险调整后收益；因此，有借贷约束的 CAPM 解释性更强；高特质波动的股票收益更低。本文发现即使控制了股票的特质性风险，beta 效应仍然存在。本文补充了现有文献，提出了一个包含杠杆和保证金约束的简单动态模型，得出了新的横截面和时间序列预测结果，并对主要资产市场的证券进行了检验。Asness, Frazzini and Pedersen (2012)发现不同资产类别有低 beta 效应的结果也与本文的理论相一致。

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类别	说明	评级	体系
股票投资评级	自报告日后的 6 个月内，相对同期沪深 300 指数的涨跌幅	买入	预期股价相对收益 20%以上
		增持	预期股价相对收益 10%-20%
		持有	预期股价相对收益-10%-10%
		卖出	预期股价相对收益-10%以下
行业投资评级	自报告日后的 6 个月内，相对同期沪深 300 指数的涨跌幅	强于大市	预期行业指数涨幅 5%以上
		中性	预期行业指数涨幅-5%-5%
		弱于大市	预期行业指数涨幅-5%以下

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