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Macroeconomic risk and seasonality in momentum profits

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ABSTRACT

We contribute to the growing debate on the relation between macroeconomic risk and stock price momentum. Not only is momentum seasonal, so is its net factor exposure. We show that winners and losers only differ in macroeconomic factor loadings in January, the one month when losers overwhelmingly outperform winners. In the remainder of the year, when momentum does exist, winner and loser factor loadings offset nearly completely. Furthermore, the magnitude of macroeconomic risk premia appears to seasonally vary contra momentum. In contrast, the relatively new profitability factor does a much better job of capturing the described seasonality.

1. Introduction

A momentum strategy, buying recent winners and selling recent losers, generates considerable profits (Jegadeesh and Titman, 1993). This finding has prevailed in further studies both geographically and temporally. Among others, Rouwenhorst (1998), Griffin et al. (2003), and Asness et al. (2013) document the continuing prevalence of momentum in the United States and the United Kingdom, as well as many European and Asian equity markets.

Neither the capital asset pricing model nor the Fama–French three-factor model can account for momentum profits (Jegadeesh and Titman, 1993; Fama and French, 1996; Grundy and Martin, 2001). Recently, some researchers have examined the link between macroeconomic risk and the cross section of returns (Cooper and Priestley, 2011; Savor and Wilson, 2013; Bali et al., 2014; Moller and Rangvid, 2015), and thereby the momentum effect. Chordia and Shivakumar (2002) argue that a conditional macroeconomic risk-factor model can capture the momentum phenomenon. In contrast, Griffin et al. (2003) suggest that neither the unconditional nor the conditional application of the five-factor model of Chen et al. (1986) can explain momentum profits. Similarly, Liew and Vassalou (2000) show that, although the size and value effects can be linked to macroeconomic growth, little evidence is found to support such an explanation for the momentum effect. Liu and Zhang (2008) respond with a finding that the growth rate of industrial production is particularly useful in explaining momentum profits. More recently Hou et al. (2015, 2016) claim that the q-theory, which is based on a multi-factor asset pricing model

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consisting of a market factor, a size factor, an investment factor, and a profitability factor, can account for the momentum effects.

To get further traction on these issues, we go back to some basic empirical patterns that began the whole debate. A much neglected characteristic of price momentum is its strong seasonality: momentum strategies produce only substantial losses in January, more than triple the monthly magnitude of the overall momentum profits (Jegadeesh and Titman, 1993; Grundy and Martin, 2001; Asness et al., 2013). Grundy and Martin (2001) argue that the losses are attributable to betting against the January size effect by selling losers that tend to be extremely small firms. Grinblatt and Moskowitz (2004) add that tax minimization contributes to these patterns.

Recent studies further highlight the importance of seasonality in understanding market anomalies (Bogousslavsky, 2015, 2016; Keloharju et al., 2016). Since so much of the mean and variance in momentum returns is seasonal, we argue that it is important to exercise greater caution in employing the usual metrics for empirical success. In this paper, we construct a sample from 1947 to 2014 for the United States and demonstrate that, although the five-factor macroeconomic model of Liu and Zhang (2008) does capture about half of momentum returns unconditionally, the explanatory power is concentrated in January, the month when there are no momentum profits to explain, only massive losses.

Factor loadings too are significant mainly in January. Outside of January, for instance, the production factor loadings for the winner and loser portfolios are almost identical. Those findings are consistent with prior studies (e.g., Kramer, 1994) that show significant seasonality in the macroeconomic risk of small stocks. Both winners and losers are small firms (Jegadeesh and Titman, 1993; Grundy and Martin, 2001). Thus, winner-minus-loser portfolios have essentially a net zero loading outside of January.

We also examine the role of January seasonality in understanding the ability of the *ROE* factor in explaining momentum effects. In a marked contrast with the *MP* factor, winners have higher loadings on *ROE* than losers do in both January and non-January months. The loading difference persists, and this difference is not consistent with the well-documented momentum reversal (Jegadeesh and Titman, 1993), which casts some doubt on its sole responsibility for driving momentum.

The remainder of the article proceeds as follows. In Section 2, we describe data and analyze the seasonal patterns of momentum trading strategies. In Section 3, we examine the exposures of momentum portfolios to macroeconomic risk, and investigate the role of macroeconomic variables in explaining momentum profits. In Section 4, we address the development of investment and profitability factor models. Concluding remarks are given in Section 5.

2. Data and definitions

2.1. Macroeconomic variables

For macroeconomic variables, the Chen et al. (1986) five factors (hereafter CRR5)—unexpected inflation (*UI*), change in expected inflation (*DEI*), term spread (*UTS*), default spread (*UPR*), and changes in industrial production (*MP*)—are constructed monthly in the sample period. Unexpected inflation is defined as $UI_t \equiv I_t - E[I_t|t-1]$ and change of expected inflation as $DEI_t \equiv E\left[I_{t+1}|t\right] - E\left[I_t|t-1\right]$ following Fama and Gibbons (1984). Term spread (*UTS*) is defined as the yield difference between 20- and 1-year Treasury bonds, and default spread (*UPR*) is the yield difference between BAA- and AAA-rated corporate bonds

Table 1
Descriptive summary statistics of the five Chen et al. (1986) factors.

The table reports the summary statistics and correlation coefficients of the key variables, the five Chen et al. (1986) factors, used in the analysis. Those five factors refer to changes in industrial production (*MP*), unexpected inflation (*UI*), change in expected inflation (*DEI*), term spread (*UTS*), and default spread (*UPR*), which are constructed monthly. The growth rate of industrial production for month t is defined as $MP_t \equiv \log IP_t - \log IP_{t-1}$, where IP_t is the industry production index (INDPRO series) in month t from the FRED database. Note that *MP* is led by one month since INDPRO is recorded at the beginning of a month, whereas stock returns are recorded as of the end of a month. Unexpected inflation is defined as $UI_t \equiv I_t - E[I_t|t-1]$ and change of expected inflation as $DEI_t \equiv E\left[I_{t+1}|t\right] - E\left[I_t|t-1\right]$ following Fama and Gibbons (1984). Term spread (*UTS*) is defined as the yield difference between 20- and 1-year Treasury bonds, and default spread (*UPR*) is the yield difference between BAA- and AAA-rated corporate bonds in the FRED database at the Federal Reserve Bank of St. Louis. All of the numbers in Panel A are in percentage. The sample period is from March 1947 to December 2014.

Panel A: Variables	Mean	Median	Standard Deviation	
MP	0.25	0.30	0.97	
UI	0.00	0.01	0.28	
DEI	0.00	0.00	0.10	
UTS	1.22	1.10	1.36	
UPR	0.95	0.80	0.44	
Panel B: Correlation	*MP*	*UI*	*DEI*	*UTS*
UI	0.10			
DEI	0.13	0.71		
UTS	0.04	0.05	−0.03	
UPR	−0.22	−0.03	−0.09	0.18