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## Finance Research Letters

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# Cross-sectional anomalies and volatility risk in different economic and market cycles <sup>☆</sup>

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## ARTICLE INFO

### Article history:

Received 2 May 2014

Accepted 9 December 2014

Available online xxxx

### JEL classifications:

F3

G1

G11

G12

### Keywords:

Momentum

Value premium

Volatility risk

Market cycles

## ABSTRACT

This study examines the exposures of cross-sectional anomalies to volatility risk in different economic and market cycles. The study shows that cross-sectional anomalies exposures can change dramatically. Most notably, the exposure of the value factor to volatility risk changed completely from positive to negative during the financial crisis of 2007–2009, while the returns to the momentum strategy are positively associated with the volatility risk only during crises and market rebound periods, otherwise negative. The findings imply that the value premium is partly in compensation for risk and that the momentum strategy may be a more defensive strategy during crisis.

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## 1. Introduction

Momentum, size, and value anomalies are well-known cross-sectional anomalies. The existence of these anomalies suggests that an investor will gain an additional return premium if she invests in stocks in the following three categories: stocks with small market capitalization, stocks with high book-to-market ratio, and stocks with good prior returns performance. A very prominent empirical

<sup>☆</sup> We thank Michael Graham for helpful comments. Jarkko Peltomäki is grateful to the Jan Wallander and Tom Hedelius foundation and the Tore Browaldh foundation for research support. Janne Äijö is grateful to the Finnish Science Foundation for Economics and Technology.

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research issue regarding these anomalies is their time-varying performance, which has been found to be due to economic and market conditions. For example, Antoniou et al. (2007) demonstrate that the momentum strategy may perform well in times of recession, while Bohl et al. (2014) report that the returns to the strategy reverse and become poor after prolonged crises when the market rebounds. Whereas Arshanapalli et al. (2006) document that the value strategy also performs well in times of recession, Kapadia (2011) documents that the returns on the size and value anomalies are poorer when future business failure rates increase.

Considering the determinants of the returns to the cross-sectional anomalies, Durand et al. (2011) have proposed that these factors are dependent on volatility risk, as measured by the VIX volatility index. They report that the momentum factor and the value factor have a positive association with the VIX, implying that when VIX increases investors seek for past winners and value stocks.<sup>1</sup> However, the study does not account for the potentially time-varying nature of the dependence on volatility risk, although the factor performance *ipso facto* has been shown to be dependent on the states of the market and the economy (see e.g., Arshanapalli et al., 2006; Antoniou et al., 2007; Kapadia, 2011; Bohl et al., 2014).

Motivated by the literature above, the purpose of this study is to extend Durand et al. (2011) by examining the relation between the returns to cross-sectional anomalies and volatility risk in different economic and market states, as measured by the changes in the VIX index. The financial crisis of 2007–2009 is considered in this study and offers an important opportunity to explore the nature of the value premium and its relationship to volatility risk. This is interesting as Kapadia (2011) shows that the value premium may exist due to distress risk and Cakici and Tan (2014) suggest that the returns to the value anomaly may be low when global funding liquidity is poor. Furthermore, Asness et al. (2013) demonstrate that the crisis was unique as it was characterized by extreme liquidity shocks. Finally, motivated by Bohl et al. (2014), this study also provides new evidence on the behavior of momentum strategy with volatility risk during crises and respective rebound periods.

## 2. Factor sensitivity to volatility risk

It is important to note that the existence of value premium has its risk-based (see e.g., Kapadia, 2011; Cakici and Tan, 2014) and mispricing-based (see e.g., Daniel and Titman, 1997) explanations. The former, in fact, has an important implication for our study, as it explains the value premium as a compensation for additional distress or funding liquidity risk. The assertion that the value premium may be compensation for distress risk can be demonstrated through earlier studies. For instance, Vassalou and Xing (2004) show that the value premium may originate in long positions in firms with high default risk and Kapadia (2011) finds that the value factor predicts future business failure rates.<sup>2</sup> Regarding the funding liquidity exposure, Adrian and Shin (2010) present evidence that changes in the VIX may be driven by the balance sheet adjustments of financial intermediaries. Their evidence implies that a volatility risk exposure is also indicative of funding liquidity risk exposure. In our study, a negative exposure of the value factor to volatility risk in a crisis period would support the risk-based explanation, i.e., value investors bear additional risk.<sup>3</sup>

Momentum strategy is a very comparable alternative to value strategy as the evidence by Avramov et al. (2013) suggests that the returns to the momentum anomaly originates from short positions in financially distressed companies. Thus the evidence implies that the value and momentum strategies may take the different long/short positions in the distressed companies. In addition, Cakici and Tan (2014) demonstrate that they have different loadings to on funding liquidity risk, while Asness et al. (2013) explicitly show that the returns to the two strategies have negative interdependence.

<sup>1</sup> In addition, they document that SMB and VIX seem not to be associated and that the market returns and VIX are negatively associated. The latter is well-known in the options market literature. Thus, to save space, we focus mainly on HML and MOM factors in our study.

<sup>2</sup> Campbell et al. (2008) also show that volatility risk can also be considered as a proxy for distress risk due to a negative relation between returns to distressed stocks and volatility risk.

<sup>3</sup> In the remaining part of this paper we do not attempt to distinguish between the two possible risks, the distress risk and the funding liquidity risk, as it would be beyond the scope of this letter.

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