C Online Appendix to “Understanding Systematic Risk: A High-Frequency Approach”

C.1 Componentwise Leverage Effect

The following plots depict the sorted correlations between total, systematic and idiosyncratic log-prices with total, systematic and idiosyncratic implied volatility. I use 4 asset factors and 1 volatility factor.

Figure C.15: Componentwise leverage effect in 2012

Figure C.16: Componentwise leverage effect in 2011
Figure C.17: Componentwise leverage effect in 2010

Figure C.18: Componentwise leverage effect in 2009

Figure C.19: Componentwise leverage effect in 2008

Figure C.20: Componentwise leverage effect in 2007
Figure C.21: Componentwise leverage effect in 2006

Figure C.22: Componentwise leverage effect in 2005

Figure C.23: Componentwise leverage effect in 2004

Figure C.24: Componentwise leverage effect in 2003
C.2 Comparison of Componentwise Leverage Effect based on Implied Volatilities and High-Frequency Volatilities

The following plots compare the componentwise leverage effect based on implied volatilities and high-frequency volatilities. I use the four continuous factors for separating the return into a systematic and idiosyncratic component.

Figure C.25: Componentwise leverage effect in 2012 based on implied and high-frequency volatilities.

Figure C.26: Componentwise leverage effect in 2011 based on implied and high-frequency volatilities.
Figure C.27: Componentwise leverage effect in 2010 based on implied and high-frequency volatilities.

Figure C.28: Componentwise leverage effect in 2009 based on implied and high-frequency volatilities.

Figure C.29: Componentwise leverage effect in 2008 based on implied and high-frequency volatilities.

Figure C.30: Componentwise leverage effect in 2007 based on implied and high-frequency volatilities.
Figure C.31: Componentwise leverage effect in 2006 based on implied and high-frequency volatilities.

Figure C.32: Componentwise leverage effect in 2005 based on implied and high-frequency volatilities.

Figure C.33: Componentwise leverage effect in 2004 based on implied and high-frequency volatilities.

Figure C.34: Componentwise leverage effect in 2003 based on implied and high-frequency volatilities.
C.3 Decomposition of the Leverage Effect

The following figures show the decomposition of the leverage effect into a systematic and idiosyncratic part based on implied volatilities and high-frequency volatilities. I use 4 continuous asset factors.

Figure C.35: Decomposition of LEV in 2012

Figure C.36: Decomposition of LEV in 2011

Figure C.37: Decomposition of LEV in 2010

Figure C.38: Decomposition of LEV in 2009
Figure C.39: Decomposition of LEV in 2008

Figure C.40: Decomposition of LEV in 2007

Figure C.41: Decomposition of LEV in 2006

Figure C.42: Decomposition of LEV in 2005
Figure C.43: Decomposition of LEV in 2004

Figure C.44: Decomposition of LEV in 2003
C.4 Componentwise Leverage Effect Using Daily Return Data

The following figures compare the componentwise leverage based on implied volatilities calculated either with the daily accumulated continuous log price increments or with daily CRSP returns. I use 4 continuous factors for separating the systematic from the idiosyncratic part.

Figure C.45: Componentwise leverage effect in 2012 with daily continuous log price increments and daily returns.

Figure C.46: Componentwise leverage effect in 2011 with daily continuous log price increments and daily returns.
Figure C.47: Componentwise leverage effect in 2010 with daily continuous log price increments and daily returns.

Figure C.48: Componentwise leverage effect in 2009 with daily continuous log price increments and daily returns.

Figure C.49: Componentwise leverage effect in 2008 with daily continuous log price increments and daily returns.

Figure C.50: Componentwise leverage effect in 2007 with daily continuous log price increments and daily returns.
Figure C.51: Componentwise leverage effect in 2006 with daily continuous log price increments and daily returns.

Figure C.52: Componentwise leverage effect in 2006 with daily continuous log price increments and daily returns.

Figure C.53: Componentwise leverage effect in 2004 with daily continuous log price increments and daily returns.

Figure C.54: Componentwise leverage effect in 2003 with daily continuous log price increments and daily returns.
C.5 Componentwise Leverage Effect with Systematic Risk Based on Fama-French-Carhart Factors

The following figures show the componentwise leverage effect based on implied volatilities and daily CRSP returns. The systematic part is either calculated with the 4 continuous factors or with the 4 Fama-French-Carhart factors (market, size, value and momentum).

Figure C.55: Componentwise leverage effect in 2012 with 4 continuous or 4 Fama-French-Carhart factors.

Figure C.56: Componentwise leverage effect in 2011 with 4 continuous or 4 Fama-French-Carhart factors.
Figure C.57: Componentwise leverage effect in 2010 with 4 continuous or 4 Fama-French-Carhart factors.

Figure C.58: Componentwise leverage effect in 2009 with 4 continuous or 4 Fama-French-Carhart factors.

Figure C.59: Componentwise leverage effect in 2008 with 4 continuous or 4 Fama-French-Carhart factors.

Figure C.60: Componentwise leverage effect in 2007 with 4 continuous or 4 Fama-French-Carhart factors.
Figure C.61: Componentwise leverage effect in 2006 with 4 continuous or 4 Fama-French-Carhart factors.

Figure C.63: Componentwise leverage effect in 2004 with 4 continuous or 4 Fama-French-Carhart factors.

Figure C.62: Componentwise leverage effect in 2005 with 4 continuous or 4 Fama-French-Carhart factors.

Figure C.64: Componentwise leverage effect in 2003 with 4 continuous or 4 Fama-French-Carhart factors.