

## Online Appendix

to accompany

**Complex Instruments Have Increased Risk and Reduced Performance at Mutual Funds**

# Appendix Figure 1

## N-SAR Question 70

70. ☒ Investment practices.  
Answer "Y" (Yes) or "N" (No) to the following:

| Activity  | Permitted by<br>Investment<br>Policies?<br>Y/N | If permitted by investment<br>policies, engaged in<br>during the<br>reporting period?<br>Y/N |
|---|--|--|
| A. Writing or investing in repurchase agreements _____          | _____  | _____  |
| B. Writing or investing in options on equities _____            | _____  | _____  |
| C. Writing or investing in options on debt securities _____     | _____  | _____  |
| D. Writing or investing in options on stock indices _____       | _____  | _____  |
| E. Writing or investing in interest rate futures _____          | _____  | _____  |
| F. Writing or investing in stock index futures _____            | _____  | _____  |
| G. Writing or investing in options on futures _____             | _____  | _____  |
| H. Writing or investing in options on stock index futures _____ | _____  | _____  |
| I. Writing or investing in other commodity futures _____        | _____  | _____  |
| J. Investments in restricted securities _____                   | _____  | _____  |
| K. Investments in shares of other investment companies _____    | _____  | _____  |
| L. Investments in securities of foreign issuers _____           | _____  | _____  |
| M. Currency exchange transactions _____                         | _____  | _____  |
| N. Lending portfolio securities _____                           | _____  | _____  |
| O. Borrowing of money _____                                     | _____  | _____  |
| P. Purchases/sales by certain exempted affiliated persons _____ | _____  | _____  |
| Q. Margin purchases _____                                       | _____  | _____  |
| R. Short selling _____  | _____  | _____  |

**Appendix Table 1**  
**Allowance of Complex Instruments by Inception Date**

**Description:** This table reports statistics on the frequency of complex instrument allowance in funds by year based on the fund's inception date in a sample that spans the period from 2000 to 2015. Specifically, the four panels present data on funds with inception dates before 1980 (Panel A), between 1980 and 1989 (Panel B), between 1990 and 1999, (Panel C), and after 1999 (Panel D). The table presents data on the allowance for each of the six individual complex instruments and for the ABCC Score.

**Interpretation:** The trend of higher allowance over time is present across funds with different inception dates.

Panel A: Inception before 1980

| Year  | N     | Borrow | Margin | Short Sales | Options | Futures | Restricted | ABCC Score |
|-------|-------|--------|--------|-------------|---------|---------|------------|------------|
| 2000  | 176   | 0.830  | 0.080  | 0.318       | 0.750   | 0.665   | 0.830      | 0.704      |
| 2001  | 179   | 0.827  | 0.101  | 0.369       | 0.771   | 0.704   | 0.860      | 0.719      |
| 2002  | 179   | 0.804  | 0.089  | 0.397       | 0.821   | 0.721   | 0.866      | 0.728      |
| 2003  | 186   | 0.742  | 0.108  | 0.478       | 0.801   | 0.737   | 0.844      | 0.733      |
| 2004  | 177   | 0.746  | 0.119  | 0.469       | 0.819   | 0.763   | 0.870      | 0.752      |
| 2005  | 174   | 0.695  | 0.115  | 0.511       | 0.845   | 0.805   | 0.874      | 0.773      |
| 2006  | 188   | 0.718  | 0.165  | 0.532       | 0.846   | 0.819   | 0.915      | 0.791      |
| 2007  | 175   | 0.754  | 0.189  | 0.566       | 0.851   | 0.823   | 0.909      | 0.795      |
| 2008  | 164   | 0.787  | 0.189  | 0.604       | 0.884   | 0.835   | 0.927      | 0.807      |
| 2009  | 166   | 0.777  | 0.181  | 0.590       | 0.880   | 0.843   | 0.934      | 0.818      |
| 2010  | 156   | 0.808  | 0.167  | 0.583       | 0.891   | 0.853   | 0.923      | 0.820      |
| 2011  | 136   | 0.831  | 0.191  | 0.566       | 0.897   | 0.860   | 0.912      | 0.824      |
| 2012  | 134   | 0.843  | 0.254  | 0.575       | 0.910   | 0.881   | 0.881      | 0.831      |
| 2013  | 122   | 0.844  | 0.279  | 0.631       | 0.926   | 0.877   | 0.902      | 0.844      |
| 2014  | 118   | 0.822  | 0.271  | 0.619       | 0.924   | 0.839   | 0.915      | 0.822      |
| 2015  | 89    | 0.831  | 0.247  | 0.607       | 0.933   | 0.843   | 0.944      | 0.835      |
| Total | 2,519 | 0.786  | 0.162  | 0.516       | 0.852   | 0.797   | 0.891      | 0.781      |

Panel B: Inception from 1980 to 1989

| Year  | N     | Borrow | Margin | Short Sales | Options | Futures | Restricted | ABCC Score |
|-------|-------|--------|--------|-------------|---------|---------|------------|------------|
| 2000  | 524   | 0.786  | 0.084  | 0.374       | 0.811   | 0.672   | 0.865      | 0.723      |
| 2001  | 535   | 0.784  | 0.090  | 0.387       | 0.834   | 0.698   | 0.881      | 0.728      |
| 2002  | 526   | 0.828  | 0.106  | 0.441       | 0.843   | 0.752   | 0.894      | 0.757      |
| 2003  | 526   | 0.829  | 0.112  | 0.487       | 0.850   | 0.780   | 0.922      | 0.788      |
| 2004  | 528   | 0.847  | 0.127  | 0.532       | 0.850   | 0.803   | 0.943      | 0.813      |
| 2005  | 539   | 0.826  | 0.135  | 0.532       | 0.865   | 0.816   | 0.935      | 0.825      |
| 2006  | 554   | 0.821  | 0.159  | 0.518       | 0.883   | 0.829   | 0.930      | 0.821      |
| 2007  | 534   | 0.830  | 0.167  | 0.549       | 0.890   | 0.837   | 0.931      | 0.823      |
| 2008  | 519   | 0.873  | 0.171  | 0.593       | 0.904   | 0.840   | 0.942      | 0.830      |
| 2009  | 612   | 0.873  | 0.188  | 0.621       | 0.904   | 0.835   | 0.946      | 0.843      |
| 2010  | 584   | 0.889  | 0.180  | 0.630       | 0.911   | 0.824   | 0.949      | 0.843      |
| 2011  | 546   | 0.886  | 0.187  | 0.647       | 0.907   | 0.824   | 0.945      | 0.844      |
| 2012  | 522   | 0.887  | 0.203  | 0.655       | 0.935   | 0.839   | 0.950      | 0.861      |
| 2013  | 509   | 0.900  | 0.222  | 0.654       | 0.941   | 0.835   | 0.949      | 0.859      |
| 2014  | 496   | 0.897  | 0.216  | 0.651       | 0.933   | 0.839   | 0.962      | 0.851      |
| 2015  | 377   | 0.910  | 0.196  | 0.653       | 0.936   | 0.854   | 0.966      | 0.862      |
| Total | 8,431 | 0.853  | 0.158  | 0.557       | 0.886   | 0.804   | 0.931      | 0.816      |

Panel C: Inception from 1990 to 1999

| Year  | N      | Borrow | Margin | Short Sales | Options | Futures | Restricted | ABCC Score |
|-------|--------|--------|--------|-------------|---------|---------|------------|------------|
| 2000  | 2,209  | 0.833  | 0.117  | 0.373       | 0.830   | 0.755   | 0.900      | 0.766      |
| 2001  | 2,288  | 0.839  | 0.116  | 0.417       | 0.848   | 0.765   | 0.914      | 0.769      |
| 2002  | 2,255  | 0.863  | 0.132  | 0.466       | 0.869   | 0.808   | 0.927      | 0.794      |
| 2003  | 2,176  | 0.860  | 0.154  | 0.549       | 0.889   | 0.837   | 0.945      | 0.829      |
| 2004  | 2,134  | 0.859  | 0.182  | 0.568       | 0.894   | 0.842   | 0.941      | 0.836      |
| 2005  | 2,018  | 0.858  | 0.212  | 0.618       | 0.908   | 0.852   | 0.952      | 0.861      |
| 2006  | 1,990  | 0.855  | 0.225  | 0.611       | 0.914   | 0.855   | 0.955      | 0.857      |
| 2007  | 1,857  | 0.852  | 0.238  | 0.613       | 0.911   | 0.857   | 0.947      | 0.849      |
| 2008  | 1,770  | 0.857  | 0.244  | 0.628       | 0.919   | 0.872   | 0.947      | 0.844      |
| 2009  | 2,245  | 0.852  | 0.241  | 0.638       | 0.932   | 0.895   | 0.958      | 0.866      |
| 2010  | 2,132  | 0.852  | 0.239  | 0.640       | 0.932   | 0.888   | 0.961      | 0.862      |
| 2011  | 2,033  | 0.860  | 0.254  | 0.655       | 0.931   | 0.886   | 0.965      | 0.867      |
| 2012  | 1,899  | 0.864  | 0.268  | 0.655       | 0.936   | 0.882   | 0.964      | 0.873      |
| 2013  | 1,806  | 0.893  | 0.277  | 0.659       | 0.935   | 0.878   | 0.961      | 0.874      |
| 2014  | 1,739  | 0.902  | 0.263  | 0.679       | 0.933   | 0.877   | 0.961      | 0.866      |
| 2015  | 1,271  | 0.905  | 0.268  | 0.692       | 0.932   | 0.867   | 0.965      | 0.871      |
| Total | 31,822 | 0.861  | 0.210  | 0.584       | 0.905   | 0.849   | 0.946      | 0.840      |

Panel D: Inception after 1999

| Year  | N     | Borrow | Margin | Short Sales | Options | Futures | Restricted | ABCC Score |
|-------|-------|--------|--------|-------------|---------|---------|------------|------------|
| 2000  | 152   | 0.829  | 0.138  | 0.408       | 0.816   | 0.803   | 0.928      | 0.789      |
| 2001  | 473   | 0.821  | 0.150  | 0.497       | 0.880   | 0.844   | 0.924      | 0.806      |
| 2002  | 757   | 0.855  | 0.194  | 0.531       | 0.922   | 0.885   | 0.953      | 0.838      |
| 2003  | 882   | 0.873  | 0.215  | 0.568       | 0.913   | 0.893   | 0.964      | 0.857      |
| 2004  | 985   | 0.883  | 0.226  | 0.590       | 0.908   | 0.880   | 0.956      | 0.859      |
| 2005  | 1111  | 0.869  | 0.259  | 0.643       | 0.927   | 0.879   | 0.956      | 0.876      |
| 2006  | 1329  | 0.882  | 0.249  | 0.644       | 0.939   | 0.886   | 0.960      | 0.879      |
| 2007  | 1589  | 0.868  | 0.262  | 0.653       | 0.931   | 0.884   | 0.958      | 0.869      |
| 2008  | 1750  | 0.862  | 0.246  | 0.660       | 0.936   | 0.885   | 0.949      | 0.855      |
| 2009  | 2316  | 0.847  | 0.235  | 0.670       | 0.934   | 0.895   | 0.941      | 0.864      |
| 2010  | 2299  | 0.849  | 0.235  | 0.674       | 0.929   | 0.886   | 0.939      | 0.858      |
| 2011  | 2336  | 0.855  | 0.240  | 0.681       | 0.922   | 0.879   | 0.934      | 0.856      |
| 2012  | 2307  | 0.867  | 0.263  | 0.696       | 0.922   | 0.878   | 0.944      | 0.869      |
| 2013  | 2355  | 0.887  | 0.284  | 0.712       | 0.923   | 0.875   | 0.950      | 0.873      |
| 2014  | 2391  | 0.895  | 0.269  | 0.729       | 0.918   | 0.878   | 0.949      | 0.866      |
| 2015  | 1814  | 0.901  | 0.293  | 0.746       | 0.932   | 0.888   | 0.960      | 0.882      |
| Total | 24846 | 0.869  | 0.250  | 0.669       | 0.924   | 0.882   | 0.948      | 0.864      |

**Appendix Table 2**

**Fund Performance and Complex Instrument Allowance and Extreme Market Conditions**

**Description:** This table reports results from panel regressions of fund performance on complex instrument allowance score and a set of controls in a sample that spans the period from 2000 to 2015. Our variable of interest is the ABCC Score or the interaction of the ABCC Score with dummy variables that indicate if the market is in an up or down state. Panel A replicates the specification presented in Table 5 after excluding observations in 2008. Panel B defines four market periods, semesters with annualized excess returns greater (less) than 25% (−25%), and semesters with annualized excess returns less (greater) than 25% (−25%) but greater (less) than 0%. All the control variables are observed six months before the dependent variable. Fund performance is measured using excess returns, four-factor alphas, and the manipulation-proof performance measure (MPPM) derived by Goetzmann et al. (2007). All measures are computed from daily fund net return data observed during a six-month period, reported on an annualized basis and expressed in percentages. Our controls (unreported in the table) include the log of the fund’s AUM, the log of the fund family’s AUM, the log of the fund’s age, the proportion of AUM in the institutional share classes, and fund flows. Additionally, we include time × fund-style fixed effects, with fund style measured using the fund’s CRSP objective code. Standard errors are clustered at the fund level and *p-values* are reported below the coefficient estimates in parentheses.

**Interpretation:** This table shows that the negative relation between complex instrument allowance and fund performance is robust to excluding the down market period associated with the financial crisis. It also shows that the negative relation between allowance and fund performance is present in both moderate and extreme down markets.

Panel A: Without 2008

|                | Excess Return    | Four-Factor Alpha | MPPM             |
|----------------|------------------|-------------------|------------------|
|                | (1)              | (2)               | (3)              |
| ABCC Score     | −1.27<br>(0.005) | −0.84<br>(0.010)  | −1.89<br>(0.000) |
| N              | 46,503           | 46,503            | 46,503           |
| R <sup>2</sup> | 0.776            | 0.372             | 0.782            |

Panel B: Moderate and extreme market events

|   | Excess Return     | Four-Factor Alpha | MPPM              |
|---|-------------------|-------------------|-------------------|
|   | (1)               | (2)               | (3)               |
| Up market $> 25\% \times$ ABCC Score (a)    | 1.62<br>(0.004)   | -0.74<br>(0.049)  | 1.19<br>(0.017)   |
| Up market $< 25\% \times$ ABCC Score (b)    | 1.14<br>(0.000)   | 0.82<br>(0.002)   | 0.85<br>(0.009)   |
| Down market $> -25\% \times$ ABCC Score (c) | -3.05<br>(0.000)  | -2.08<br>(0.001)  | -3.90<br>(0.000)  |
| Down market $< -25\% \times$ ABCC Score (d) | -11.59<br>(0.000) | -4.66<br>(0.000)  | -13.18<br>(0.000) |
| N   | 50,097            | 50,097            | 50,097            |
| R <sup>2</sup>                              | 0.814             | 0.411             | 0.830             |
| p-value for difference between (a) and (d)  | 0.000             | 0.000             | 0.000             |
| p-value for difference between (b) and (c)  | 0.000             | 0.000             | 0.000             |

**Appendix Table 3**  
**Nearest-Neighbor Approach**

**Description:** This table reports results from a nearest-neighbor matched sample technique that estimates average treatment effects to return and risk following increases to a fund’s complex instrument allowance in a sample that spans the period from 2000 to 2013. The treatment (control) group is identified as funds that (do not) experience an increase in their allowance in a given semester. The technique finds a match for each fund in each group using a two-step approach. First, it identifies a set of potential matches based on funds in the same style and semester. Among those potential matches it selects one “nearest neighbor” based on our set of control variables (the log of the fund’s AUM, the log of the fund family’s AUM, the log of the fund’s age, the proportion of AUM in the institutional share classes, and fund flows), lagged allowance, and the one- and two-semester lags of the dependent variable. It then estimates the average treatment effect by comparing the difference in the dependent variable over the subsequent four quarters between the matched pairs in the two groups. *p-values* are reported below the average treatment estimates in parentheses.

**Interpretation:** This table provides some evidence that funds experience worse performance and higher risk after allowance increases, compared to a matched sample that does not experience an allowance increase.

|                     | Excess<br>Return | Four-Factor<br>Alpha | MPPM             | Standard<br>Deviation | Beta<br>Exposure | Idiosyncratic<br>Volatility |
|---------------------|------------------|----------------------|------------------|-----------------------|------------------|-----------------------------|
|                     | (1)              | (2)                  | (3)              | (4)                   | (5)              | (6)                         |
| ABCC Score Increase | −0.30<br>(0.264) | −0.36<br>(0.089)     | −0.45<br>(0.126) | 0.27<br>(0.015)       | 0.013<br>(0.018) | 0.02<br>(0.753)             |
| N                   | 30,700           | 30,700               | 30,700           | 30,700                | 30,700           | 30,700                      |



### Appendix Table 4 Use of the Individual Complex Instruments

**Description:** This table reports statistics on the frequency of complex instrument use by funds by year (Panel A) and by the fund's style (Panel B) in a sample that spans the period from 2000 to 2015. The table presents data on the use of six individual complex instruments and for the Use Score.

**Interpretation:** Complex instrument use has been relatively stable over our sample period.

Panel A: Use by year

| Year  | N      | Borrow<br>Use | Margin<br>Use | Short Sales<br>Use | Options<br>Use | Futures<br>Use | Restricted<br>Use | Use<br>Score |
|-------|--------|---------------|---------------|--------------------|----------------|----------------|-------------------|--------------|
| 2000  | 2,988  | 0.096         | 0.001         | 0.026              | 0.069          | 0.115          | 0.154             | 0.077        |
| 2001  | 3,233  | 0.090         | 0.001         | 0.038              | 0.080          | 0.125          | 0.159             | 0.082        |
| 2002  | 3,489  | 0.086         | 0.002         | 0.040              | 0.084          | 0.122          | 0.148             | 0.080        |
| 2003  | 3,554  | 0.080         | 0.002         | 0.042              | 0.102          | 0.109          | 0.154             | 0.081        |
| 2004  | 3,622  | 0.073         | 0.002         | 0.038              | 0.084          | 0.098          | 0.157             | 0.075        |
| 2005  | 3,641  | 0.081         | 0.002         | 0.030              | 0.078          | 0.095          | 0.160             | 0.074        |
| 2006  | 3,879  | 0.090         | 0.002         | 0.038              | 0.075          | 0.097          | 0.163             | 0.078        |
| 2007  | 3,997  | 0.099         | 0.003         | 0.041              | 0.085          | 0.109          | 0.160             | 0.083        |
| 2008  | 4,071  | 0.099         | 0.006         | 0.048              | 0.090          | 0.116          | 0.170             | 0.088        |
| 2009  | 5,139  | 0.086         | 0.004         | 0.039              | 0.085          | 0.126          | 0.160             | 0.083        |
| 2010  | 4,974  | 0.090         | 0.005         | 0.039              | 0.081          | 0.126          | 0.166             | 0.085        |
| 2011  | 4,859  | 0.081         | 0.005         | 0.040              | 0.079          | 0.125          | 0.170             | 0.083        |
| 2012  | 4,682  | 0.082         | 0.004         | 0.040              | 0.076          | 0.125          | 0.171             | 0.083        |
| 2013  | 4,636  | 0.079         | 0.003         | 0.045              | 0.071          | 0.128          | 0.159             | 0.081        |
| 2014  | 4,605  | 0.077         | 0.006         | 0.048              | 0.066          | 0.126          | 0.163             | 0.081        |
| 2015  | 3,448  | 0.082         | 0.005         | 0.047              | 0.062          | 0.122          | 0.158             | 0.079        |
| Total | 64,817 | 0.086         | 0.003         | 0.040              | 0.079          | 0.117          | 0.161             | 0.081        |

Panel B: Use by fund style

| Fund Style        | N      | Borrow | Margin | Short<br>Sales | Options | Futures | Restricted | ABCC<br>Score |
|-------------------|--------|--------|--------|----------------|---------|---------|------------|---------------|
| Large and Mid Cap | 7,729  | 0.082  | 0.001  | 0.010          | 0.056   | 0.102   | 0.161      | 0.069         |
| Small Cap         | 11,788 | 0.072  | 0.001  | 0.012          | 0.042   | 0.138   | 0.160      | 0.071         |
| Micro Cap         | 990    | 0.137  | 0.000  | 0.036          | 0.067   | 0.025   | 0.284      | 0.092         |
| Growth            | 24,501 | 0.087  | 0.003  | 0.036          | 0.084   | 0.116   | 0.141      | 0.078         |
| Income            | 2,785  | 0.054  | 0.008  | 0.011          | 0.109   | 0.095   | 0.181      | 0.076         |
| Growth and Income | 10,262 | 0.078  | 0.001  | 0.023          | 0.081   | 0.166   | 0.130      | 0.080         |
| Sector            | 5,633  | 0.116  | 0.002  | 0.044          | 0.122   | 0.022   | 0.285      | 0.099         |
| Hedged and Short  | 1,129  | 0.174  | 0.075  | 0.863          | 0.221   | 0.205   | 0.121      | 0.277         |
| Total             | 64,817 | 0.086  | 0.003  | 0.040          | 0.079   | 0.117   | 0.161      | 0.081         |

**Appendix Table 5**  
**Hedged and Unhedged Option Strategies**

**Description:** This table reports results from panel regressions of fund performance and risk for funds that use various option strategies in a sample that spans the period from 2008 to 2015. We use dummy variables to categorize option positions into three strategies: hedged strategies are defined as long option positions with an offsetting position in the underlying security; unhedged strategies are defined as option positions (long or written) with no offsetting position in the underlying security; and income strategies are defined as a covered call or put, which is a written option position with an offsetting position in the underlying security. Fund performance is measured using excess returns, four-factor alphas, and the manipulation-proof performance measure (MPPM) derived by Goetzmann et al. (2007). Risk is measured using the standard deviation of returns, CAPM beta, and idiosyncratic volatility as computed from the four-factor model. All measures are computed from daily fund net return data observed during a six-month period, reported on an annualized basis and expressed in percentages. Our controls (unreported in the table) include the log of the fund's AUM, the log of the fund family's AUM, the log of the fund's age, the proportion of AUM in the institutional share classes, and fund flows. The sample period is from 2009 to 2015. Additionally, we include time  $\times$  fund-style fixed effects, with fund style measured using the fund's CRSP objective code. Standard errors are clustered at the fund level and *p-values* are reported below the coefficient estimates in parentheses.

**Interpretation:** This table shows that complex instruments that reduce risk are associated with negative returns. It also provides evidence that income strategies are detrimental to fund performance.

|                     | Excess<br>Return | Four-Factor<br>Alpha | MPPM             | Standard<br>Deviation | Beta<br>Exposure | Idiosyncratic<br>Volatility |
|---------------------|------------------|----------------------|------------------|-----------------------|------------------|-----------------------------|
|                     | (1)              | (2)                  | (3)              | (4)                   | (5)              | (6)                         |
| Hedged Strategies   | -2.67<br>(0.006) | -0.43<br>(0.486)     | -1.70<br>(0.046) | -2.23<br>(0.005)      | -0.10<br>(0.055) | -0.95<br>(0.000)            |
| Unhedged Strategies | 0.01<br>(0.985)  | -0.30<br>(0.377)     | 0.18<br>(0.650)  | -0.37<br>(0.086)      | -0.04<br>(0.009) | 0.39<br>(0.004)             |
| Income Strategies   | -1.65<br>(0.001) | 0.30<br>(0.447)      | -1.44<br>(0.004) | -0.70<br>(0.018)      | -0.06<br>(0.004) | 0.09<br>(0.535)             |
| N                   | 23,355           | 23,355               | 23,355           | 23,355                | 23,355           | 23,355                      |
| R <sup>2</sup>      | 0.894            | 0.446                | 0.916            | 0.917                 | 0.586            | 0.794                       |

**Appendix Table 6**

**Fund Performance and Complex Instrument Allowance in Up and Down Markets**

**Description:** This table reports results from panel regressions of fund performance on complex instrument allowance score conditional on the market environment, and a set of controls at the month-fund level. We consider two different samples. The ABCC Sample period includes fund-months that appeared in ABCC's original sample (1994 to 2001), whereas the combined sample includes fund-months in both our and ABCC's sample (1994 to 2015). In Panel A, an up (down) market is defined as a month in which excess return of the market portfolio is positive (negative). Panel B defines four market conditions, semesters with monthly excess returns greater (less) than 5% (−5%), and semesters with monthly excess returns less (greater) than 5% (−5%) but greater (less) than 0%. The variable of interest is the ABCC Score interacted with the up and down market dummies. All the control variables are observed in the most recent December or June before the dependent variable is realized. Fund performance is measured using monthly excess returns and monthly four-factor alphas computed using factor loadings from the previous 36 months. Our controls include the log of the fund's AUM, the log of the fund family's AUM, the log of the fund's age, and fund flows. Additionally, we include time × fund-style fixed effects, with fund style measured using the fund's CRSP objective code. Standard errors are clustered at the fund level and *p-values* are reported below the coefficient estimates in parentheses.

**Interpretation:** The negative relation between complex instrument allowance and fund performance during down market periods is present in both the ABCC and combined samples.

Panel A: Up and down markets

|  | ABCC Sample             |                             | Combined Sample         |                             |
|--|-------------------------|-----------------------------|-------------------------|-----------------------------|
|  | Excess<br>Return<br>(1) | Four-Factor<br>Alpha<br>(2) | Excess<br>Return<br>(3) | Four-Factor<br>Alpha<br>(4) |
| Up market × ABCC Score (a)                 | 12.82<br>(0.000)        | 1.74<br>(0.313)             | 3.62<br>(0.000)         | 0.10<br>(0.780)             |
| Down market × ABCC Score (b)               | −16.41<br>(0.000)       | −1.57<br>(0.283)            | −8.07<br>(0.000)        | −1.84<br>(0.000)            |
| N  | 24,232                  | 24,232                      | 270,242                 | 270,242                     |
| R <sup>2</sup>                             | 0.609                   | 0.181                       | 0.824                   | 0.290                       |
| p-value for difference between (a) and (b) | 0.0000                  | 0.0942                      | 0.0000                  | 0.0007                      |

Panel B: Moderate and extreme up/down markets

|  | ABCC Sample             |                             | Combined Sample         |                             |
|--|-------------------------|-----------------------------|-------------------------|-----------------------------|
|  | Excess<br>Return<br>(1) | Four-Factor<br>Alpha<br>(2) | Excess<br>Return<br>(3) | Four-Factor<br>Alpha<br>(4) |
| Up market $> 5\% \times$ ABCC Score (a)    | 5.16<br>(0.147)         | 0.15<br>(0.963)             | 4.52<br>(0.008)         | -0.79<br>(0.429)            |
| Up market $< 5\% \times$ ABCC Score (b)    | 15.81<br>(0.000)        | 2.36<br>(0.166)             | 3.36<br>(0.000)         | 0.35<br>(0.309)             |
| Down market $> -5\% \times$ ABCC Score (c) | -10.21<br>(0.000)       | -1.69<br>(0.211)            | -4.46<br>(0.000)        | -1.26<br>(0.006)            |
| Down market $< -5\% \times$ ABCC Score (d) | -30.78<br>(0.000)       | -1.29<br>(0.650)            | -15.30<br>(0.000)       | -3.00<br>(0.001)            |
| N  | 24,232                  | 24,232                      | 270,242                 | 270,242                     |
| R <sup>2</sup>                             | 0.609                   | 0.181                       | 0.824                   | 0.290                       |
| p-value for difference between (a) and (d) | 0.000                   | 0.719                       | 0.000                   | 0.143                       |
| p-value for difference between (b) and (c) | 0.000                   | 0.038                       | 0.000                   | 0.001                       |