

## Description of Sample SAS Program for Estimating High-Low Spreads

This sample SAS program calculates daily and monthly high-low spread estimates based on the methodology in Corwin and Schultz (forthcoming *Journal of Finance*, 2011). The specific estimates here are from the closed-form solution for the high-low spread estimator presented in equations (14) and (18).

Firms are identified by CRSP Perm number. The necessary input data are the date (yyyymmdd) and month (yyyymm), and the daily split-adjusted high price (HIPRC), low price (LOPRC), and closing price (PRC). If available, volume can be used to identify non-trading days.

The program proceeds in four steps:

1. Read in daily high, low, and closing prices. Set bad high and low prices to missing (i.e.,  $LOPRC < 0$ ,  $HIPRC < 0$ , or  $LOPRC \geq HIPRC$ ). Replace missing high and low prices with the most recent good high and low prices from prior trading days, as described in Section II of Corwin and Schultz (2011).
2. Adjust for overnight returns as described in Section II of Corwin and Schultz (2011).
3. Calculate daily high-low spread estimates for each stock based on equations (14) and (18) of Corwin and Schultz (2011). Negative daily spread estimates are set to zero.
4. Calculate monthly high-low spread estimates for each stock-month with at least 12 observations.

Reference:

Corwin, Shane A., and Paul Schultz, 2011, "A Simple Way to Estimate Bid-Ask Spreads from Daily High and Low Prices," forthcoming, *Journal of Finance*.