

EventStream™

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Support for Eventus® Event Studies Using the Datastream Database

<http://www.eventstudy.com/>

Reference Guide

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Chapter 1

Introduction

EventStream helps you obtain and use Datastream equity data, particularly for conducting event studies using **Eventus** software. **EventStream** saves you most of the work of preparing to download Datastream data and interpreting or manipulating the downloaded files.

To use **EventStream**, prepare **EventStream** statements in the SAS editor and run them. In SAS terminology, running statements is also called *submitting* them; one does this from the SAS editor by clicking the runner icon or selecting the menu sequence Run, Submit. A single usage of **EventStream** involves running two statements, one at a time, with a visit to the Datastream DSWindows program in between. The **EventStream** statement **DSMacroMaker** creates a DSWindows macro to download Datastream equity data for use with **EventStream**. After downloading, run either **DSUserstok** or **DSMiniDatabase** to prepare the data for **Eventus**.

No specific knowledge of SAS is required to use **EventStream** except for the elements described in this guide. Learning more about SAS can enable you to take better advantage of **EventStream** and **Eventus**, however.

Chapter 2

DSMacroMaker Statement

2.1 Format

The `DSMacroMaker` statement consists of the word `DSMacroMaker`, followed by zero or more option keywords separated by blanks, followed by a semicolon.

2.2 Selecting Mini-Database Mode or Legacy Mode

In mini-database mode, `EventStream` writes a `DSWindows` macro to download a continuous time series of data for each selected security, then prepares the data as a mini-database for use in the `SASNONCRSP` mode of `Eventus`. Mini-database mode allows the user to alter many specifications of the event study within `Eventus` without returning to `EventStream` and `DSWindows`. We recommend that you use mini-database mode as it provides maximum convenience and flexibility. For compatibility with older versions, however, mini-database mode is not the default. To select mini-database mode, specify the option `sasnoncrsp` on the `DSMacroMaker` statement.

In legacy mode, the `DSWindows` macro that `EventStream` creates downloads only the data required for the exact specifications of the event study, such as the estimation period length, the timing of the estimation period relative to the event period, and the length of the event period. `EventStream` also processes the downloaded data and writes `Eventus` statements for the

precise specifications. While legacy mode is not recommended, it currently is the default, for compatibility with older versions.

2.3 Request File

`EventStream` reads the researcher's *request file* to find the `Datastream` codes and event dates to use. The default format of the request file is a plain ASCII text file. When the default ASCII text format is used, a `filename` statement or the Explorer window in SAS should be used to link the SAS file shortcut `request` to the physical name of the request file.

Each line of the request file should contain the following three variables.

```
Datastream  start  end
DSCD Code  date   date
```

In mini-database mode, only the `Datastream` code and the start and end dates of the desired time series to include in the mini-database need appear on each line. (A more elaborate request file can be used later with `Eventus` if desired.) Make sure to set the start and dates well away from the event date to be studied so that the time series includes plenty of observations for an estimation period (to estimate standard deviations for test statistics, market model parameters if applicable, and so on) and event period. If multiple lines with the same `Datastream` code appear in the request file, in mini-database mode, they will be consolidated into a single request using the earliest beginning date and latest ending date.

Optionally, the request file can be a SAS data set, in which case the items are defined by variables names instead of physical order. The variable names are `dscd`, `EventDa1` and `EventDa2`. Please see the `INSAS` option in the following section for further details.

If you decide to use legacy mode (selected by not specifying `sasnoncrsp` on the `DSMacroMaker` statement), use the following request file format, where brackets indicate optional items, that is, items that are needed in some runs but not others. Whether an optional item should appear is determined by the options specified on the `DSMacroMaker` statement.

```
Datastream event [event [specific [identify- [grouping [group [Firm [S or [Datastream
DSCD C0de  date  date estimation ing number  vari-  weight] Name] L]  Index
                2]    date]    or string]  able]  Mnemonic]
```

Each request file item must be separated by at least one blank, but the exact

character position of the items on the line is unimportant, as long as they appear in the order shown, with unused optional items omitted. The file need not be sorted. The SAS data set form of the request file also can be used with legacy format. Please see the `INSAS` option in the following section for variable names and other details.

2.4 Options

The `DSMacroMaker` statement accepts the following option keywords. The order in which options are specified does not matter, as long as they follow the word `DSMacroMaker` and come before the semicolon that marks the end of the statement.

ANNUAL Indicates that Datastream data for a yearly event study, instead of the default daily, should be downloaded.

AUTODATE=0|BACK The default setting, `AUTODATE`, specifies that any calendar date in the request file that is not a trading day should be converted to the following trading day. To suppress this default behavior, specify `AUTODATE=0`. To convert to the previous trading day instead of the next, specify `AUTODATE=BACK`. Note that the default differs from `Eventus`, where the `AUTODATE` option is off by default.

AUTONAME Causes `EventStream` to retrieve the firm name associated with the security from the Datastream database and pass it through for use with the `Eventus NAME` option. Do not specify both `AUTONAME` and `NAME` (see below) on the `DSMacroMaker` statement.

DATEFMT=*format* Specifies the input format of the dates being read from the request file. The specification must be a valid SAS date informat, with or without its ending dot. The default, `DATEFMT=Y4MMDD8`, accommodates both two digit and four digit years automatically.

EST=*periods* and POOL This option is ignored in mini-database mode because it can be selected later in `Eventus`. In legacy mode, the `EST` option lets you choose the estimation period for which `EventStream` constructs a macro to download data, and which `Eventus` subsequently uses to estimate the benchmark return parameters of the event study. If you specify a negative value, `EventStream` constructs an estimation period

ending that number of trading days (months) *before* the event date. If you give a positive number (with or without the plus sign), the estimation period follows the event date and begins that number of trading days (months) *after* day (month) zero. For example, `EST=+61` means that the estimation period will begin 61 trading days after the event date, while `EST=-80` tells `EventStream` to end the estimation period on event-time date `-80`. For a `TWIN` event study, `EventStream` evaluates negative values relative to the first event date, positive values relative to the second.

- If you specify `POOL`, `EventStream` constructs the estimation period using equal numbers of returns from two periods: one ending 61 days before the (first) event date, and one beginning 61 days after the (second) event date. You can control the length of the combined period with the `ESTLEN` parameter (described below.) For example, `ESTLEN=200` with `POOL` produces an estimation period consisting of days `-160` through `-61` and `+61` through `+160`. Do not specify `POOL` with `EST= SPECIFIC`.
- If you specify `EST=SPECIFIC`, `EventStream` looks for a second date in the request file (or a third date in a `TWIN` event study), and *ends* the estimation period on the date specified for each firm. This allows you to choose estimation periods that fall a varying number of days from the event date, according to the circumstances of each case. When using `EST=SPECIFIC` with external request files, make sure that the estimation date is the next item after the event date on each line. If the request file is a SAS data set (specified by `INSAS=`), the specific estimation date must be a variable named `ESTEND`. Do not specify `POOL` with `EST=SPECIFIC`.
- The default is `EST=-46` for daily event studies, `EST=-10` for weekly event studies and `EST=-13` for monthly event studies.

ESTINTER=*interval* This option is not available in mini-database mode. In legacy mode, the return interval of the estimation period returns, if different from the return interval of event period returns. Valid values of *interval* are `YEAR`, `QUARTER`, `MONTH`, `WEEK`, and `DAY`.

ESTLEN=*n* This option is ignored in mini-database mode because it can be selected later in `Eventus`. In legacy mode, it specifies the length

of the estimation period in trading days, weeks, months, quarters or years, depending on the return interval being used for estimation in the current run. The maximum permitted is 999. The default is 255 days (about one year) for daily returns, 60 months for monthly returns, 52 weeks for weekly returns, 20 quarters for quarterly returns, or 10 years for annual returns. Odd values of **ESTLEN** will be reduced by one day when **POOL** is specified. The number of usable returns in the estimation period may be lower than **ESTLEN** in individual cases if there are missing returns on the Datastream database.

GROUP=variable This option is ignored in mini-database mode because it can be selected later in **Eventus**. In legacy mode, it names a grouping variable to be used in an event study to combine multiple observations into a single equally weighted portfolio. The value of the grouping variable for each observation is listed on the appropriate line of the request file after the dates and **ID** variable (if any.) The grouping variable must be an integer between 0 and 9999 inclusive; leading zeros in the request file are optional and ignored. The grouping variable is included in the generated request file.

GRWEIGHT Valid only if the **GROUP** option is specified. Denotes that the request file contains a group weight variable. This variable, expressed as a decimal, specifies the weight to be given the individual stock within its group portfolio. All the weights for a single group should sum to 1. This option is included on the **DSMacroMaker** statement for compatibility with the **REQUEST** statement; weights are copied to the generated request file.

ID=variable Names a variable to be used as an observation (event) identifier. The identifying variable may be of any data type. If you also specify **INSAS**, the identifying variable must exist on the SAS data set used as the request file. Also see **IDFMT**. This option is ignored in mini-database mode because it can be selected later in **Eventus**.

IDFMT=format Specifies the SAS informat of the identifying variable in the external request file. **IDFMT** is required if the **ID=** variable is not an integer; otherwise it is optional. For example, if your identifying variable is a five-alphanumeric-character string, specify **IDFMT=\$5.** (including the dot at the end.)

INSAS=*libref.membername* Used when the request file is a SAS data set. The data set must contain these variables:

- DSCD, the Datastream code for the equity security.
- For single event date event studies only, **EVENTDAT**, a SAS date variable containing day 0.
- For **TWIN** event studies and for mini-database mode, two names of SAS date variables must appear: **EVENTDA1** and **EVENTDA2**.
- If you use **EST=SPECIFIC** (see above), **ESTEND** (SAS date variable) must also be present in the data set.
- If you specify **ID=variable** (see below), the *variable* you name.
- If you specify **GROUP=group_variable**, the *group_variable* you name.
- If you specify the **GRWEIGHT** option, a numeric variable **GRWEIGHT** containing the weight.
- If the **NAME** option is present, a character variable of length 33, **NAME**. Individual values of the variable may be shorter than 33 characters.
- If you specify the **SHORT** option, a character variable of length one, **SL**, with a value of either ‘S’ or ‘L’ on each observation.
- If you specify the **OWNMKTIX** option, a character variable of length eight, **ds_indx**, containing the Datastream mnemonic of the desired Datastream Global Total Market equity index for each observation.

INTERLIB=*libref* Controls where **EventStream** stores working data between **DSMacroMaker** and **DSUserstok** runs. The default is **sasuser**. Normally there is no need to change this setting.

MACFILE=*name* Specifies the name of the **DSWindows** macro file to create in the files subfolder of the **DSWindows** folder. The default is **eventus.mac**. At this writing, **DSWindows** expects DOS-style macro file names. This implies that if *name* is not in 8.3 format (up to eight alphanumeric characters for the file name proper, followed by the dot, followed by up to three alphanumeric characters for the file extension), the file must be selected by its Windows-generated MS-DOS name in **DSWindows**. If *name* already exists, it will be overwritten. The user

typically can ignore this option; **EventStream** creates the file and the user does not need to manipulate the file contents.

MONTHLY Indicates that Datastream data for a monthly event study, instead of the default daily, should be downloaded.

NAME Indicates that the input request file includes a firm name. The name must be the last entry on each line of an external request file, which precludes using the **NAME** option in conjunction with the **SHORT** or **OWNMKTIX** options unless the request file is a SAS data set. Do not specify both **AUTONAME** (see above) and **NAME** on the **DSMacroMaker** statement. This option is ignored in mini-database mode.

NDAYS=*n* Specifies that you want to create a second date by adding *n* trading days (or weeks, months, etc.) to the first date for each security (each line of the request file.) If you specify **NDAYS**, do not specify a second event date in the request file; if the request file is a SAS data set, do not include the variable **EVENTDA2**.

NUMERIC This former option is no longer applicable.

OUTDTFMT=*format* Gives the date format for **EventStream** to use in the **DSWindows** macro. This should be the SAS expression of the date format for which the Datastream software is configured. Although this option will accept any SAS date format, the only ones that are likely to work with Datastream are **MMDDYY8**. (the default) and **DDMMYY8**..

OUTFILE=*name* Specifies the name of the file in which the **DSWindows** macro will store downloaded Datastream data. The default is **eventus**. As of this writing, **DSWindows** expects DOS-style output file names. Thus, *name* should be specified in 8.3 format (up to eight alphanumeric characters for the file name proper, followed by the dot, followed by up to three alphanumeric characters for the file extension.) If *name* does not include a file name extension, **EventStream** appends **.dat**. If *name* already exists, it will be overwritten.

If **DSWindows** is run on the same computer as **EventStream**, the user may ignore this option, because the file is intended only for temporary use by **EventStream**. If **DSWindows** is run on a different computer, then after running the **DSWindows** macro, the user must ensure that

the downloaded data file is transferred to the folder associated with the SAS file shortcut `DSFiles` on the computer that is running `EventStream`. Even in this case, there is generally no need for the `OUTFILE` option.

For permanent storage of the downloaded data after preparation for use by `Eventus`, please see the `DSUserstok` statement option `OUTSAS`.

OWNMKTIX By default, `EventStream` creates a macro that downloads the associated Datastream Global Index with each equity security. To download a Datastream Global Total Market equity index of your choosing for each security instead of the associated Datastream Global Index, specify `OWNMKTIX` on the `DSMacroMaker` statement and include the Datastream index mnemonic as the last item on each line of a ASCII request file or as a variable named `ds_indx` in a SAS data set request file.

POST=*periods* Specifies the number of trading days, weeks, months, quarters or years immediately following the event date for which to compute abnormal returns. The default is `POST=30` for daily and weekly event studies, `POST=12` for monthly event studies, `POST=8` for quarterly, and `POST=5` for annual.

PRE=*periods* Specifies the number of trading days, weeks, months, quarters or years immediately preceding the event date for which to compute abnormal returns. The default is `PRE=30` for daily and weekly event studies, `PRE=12` for monthly event studies, `PRE=8` for quarterly, and `PRE=5` for annual. This option is ignored in mini-database mode because it can be selected later in `Eventus`.

QUARTER Indicates that Datastream data for a quarterly event study, instead of the default daily, should be downloaded.

SASNONCRSP Invokes mini-database mode.

SHIFT1= n_1 ,SHIFT2= n_2 The `SHIFT n` options move the event date(s) forward or backward in calendar time. The first date in the request file is shifted by n_1 periods and the second date is shifted by n_2 days, weeks, months, quarters or years. Both n_1 and n_2 may be specified as any integer value. For example, `SHIFT1=-1` shifts June 1, 2000 back to May 31, 2000 when the data frequency is daily.

SHIFT1 and **SHIFT2** may be specified singly as well as together. In mini-database mode, these options affect the beginning or ending date of the downloaded time series; they can be selected later in **Eventus** to shift event dates.

SHORT Specifies that an **S** (for short position) or **L** (for long position) code appears at the end of each line in the request file. When **S** appears, all raw stock returns and index returns for that event are multiplied by -1 before any analysis. **EventStream** uses this option to design the **Eventus** statements and request file. **EventStream** itself does not reverse the signs of the returns. This option is ignored in mini-database mode because it can be selected later in **Eventus**.

TWIN Specify **TWIN** in event study programs when you want to estimate variable-length (firm-specific) event windows, instead of the conventional abnormal returns and windows around a single firm-specific event date. When **TWIN** is in effect, you provide two event dates for each observation instead of just one. In an external request file, the second event date immediately follows the first on the same line. In a SAS data set request file, the beginning and ending event dates are variables named **EVENTDA1** and **EVENTDA2**.

This option is ignored in mini-database mode because it can be selected later in **Eventus**. Note, however, that mini-database mode uses two dates like a **TWIN** run in legacy mode, but they are the beginning and ending date of the time series, not event dates.

WEEKLY Indicates that Datastream data for a weekly event study, instead of the default daily, should be downloaded.

Chapter 3

DSMiniDatabase Statement

3.1 Introduction

The `DSMiniDatabase` statement is only for mini-database mode, not legacy mode. It reprocesses downloaded Datastream data, builds the `Eventus` mini-database, and generates sample `Eventus` statements to perform event study estimation using the mini-database. The sample `Eventus` statements appear in the SAS log window. The researcher may add or change most options of the `Eventus` statements.

3.2 Format

The `DSMiniDatabase` statement consists of the word `DSMiniDatabase`, followed by zero or more option keywords separated by blanks, followed by a semicolon.

3.3 Options

By default, the mini-database goes into the SAS work library, which is erased when SAS is closed. To save the mini-database in a folder for use in later SAS sessions, use the SAS Explorer to copy and paste the data sets from the work library to a library of your choice. Alternatively, use the following options on the `DSMiniDatabase` statement. The options use two-level SAS data set names of the form *libname.membername*, where *libname* is to be replaced by

a SAS library name. The SAS library name is a short pointer to a particular folder on your system or network; the library name can be set up in the SAS Explorer. The folder should exist before running **EventStream**. You can change the member names from those shown below if desired. Typically, however, if you use these options, simply copy them as shown except for replacing *libname* with the desired SAS library name.

HEADD*S=libname.datastream_header* Specifies the SAS data set that **EventStream** should create containing the header component of the mini-database.

NAMED*S=libname.datastream_names* Specifies the SAS data set that **EventStream** should create containing the issuer names component of the mini-database.

PORT*1DS=libname.datastream_portfolios* Specifies the SAS data set that **EventStream** should create containing the portfolio assignments component of the mini-database.

RETURN*DS=libname.datastream_returns* Specifies the SAS data set that **EventStream** should create containing the returns component of the mini-database.

Instead of saving the mini-database in a folder you can simply preserve the raw data file downloaded by **DSWindows**, and re-run the **DSMacroMaker** and **DSMiniDatabase** statements in a future SAS session. There is no need to repeat the **DSWindows** download as long as the raw data file from the original download is available and the **DSMacroMaker** statement options and request file are the same as in the original session.

Chapter 4

DSUserstok Statement

4.1 Introduction

The `DSUserstok` statement is only for legacy mode, not mini-database mode. It reprocesses downloaded Datastream data, builds the *Eventus request file* and *userstok file*, and generates *Eventus* statements to perform event study estimation using the files. The *Eventus* statements appear in the SAS log window. The researcher may add options to the *Eventus* statements to control the statistical methods applied to the data but should not change options that deal with data period lengths or frequencies.

4.2 Format

The `DSUserstok` statement consists of the word `DSUserstok`, followed by zero or one option keyword separated by a blank, followed by a semicolon.

4.3 Option

The `DSUserstok` statement can take one option. Omit the option if the default is desired.

OUTSAS=libref Tells *EventStream* to store the generated request file and *userstok* file in the folder pointed to by the specified SAS libref. The default is to store the generated files in the SAS temporary folder (libref `WORK`), which is erased at the end of every SAS session. The *libref* must

be allocated, using a SAS `libname` statement, the SAS Explorer, or the New Library icon or menu item, before submitting the `DSUserstok` statement. If the folder contains SAS data sets named `request` and `userstok`, the data sets will be overwritten. (The data sets are referenced within SAS as `libref.request` and `libref.userstok`. The corresponding Windows file names, within the folder that `libref` points to, are `request.sas7bcat` and `userstok.sas7bcat`.)

When the `OUTSAS` option is in effect, `EventStream` also records the generated `Eventus` statements in data set `libref.statement`. The researcher can retrieve the statements at a later time by examining the contents of the data set. For example, the researcher could print the data set by submitting the SAS statements

```
proc print data=libref.statement noobs; run;.
```

Chapter 5

Usage Example

This chapter illustrates `EventStream` usage with a simple minidatabase mode example. Users can select different or more elaborate option combinations in `Eventus` without changing the `EventStream` steps.

5.1 Request File

The researcher first uses any desired application, for example, Notepad, `TextPad` or the SAS editor window, to prepare an `EventStream` request file. The request file is a plain ASCII text file containing the DSCD code and the beginning and ending dates of the time series to include in the mini-database.¹ Figure 5.1 presents an example containing Datastream equity codes and time-series dates for several stocks. The figures does not show all the lines from the full request file used to run the example.

The researcher saves the file anywhere, for example as `C:\Program Files\EventStream\EventStreamDemoRequest.txt`, and defines a SAS file shortcut `request` to point to it, either manually in the SAS Explorer or by running the following statement from the SAS Editor:

```
filename request 'C:\Program Files\EventStream\EventStreamRequest.txt';
```

¹Page 2.4 documents the option to use a SAS data set as the request file.

Figure 5.1

EventStream request file: Datastream codes and dates of desired time series.

130256	19830101	20031231
130535	19830101	20031231
130588	19830101	20031231
131448	19830101	20031231
132709	19830101	20031231
14073N	19830101	20031231
14073P	19830101	20031231
141120	19830101	20011130
149032	19830101	20031231
151494	19830101	20031231
151495	19830101	20031231
921795	19830101	20031231
922309	19830101	20031231
929114	19830101	20031231
929286	19830101	20031231
929876	19830101	20031231
932288	19830101	20031231
951948	19830729	20031231
998250	19830101	20031231

5.2 DSMacroMaker Statement

The researcher runs the following `DSMacroMaker` statement from a SAS Editor window to generate a `DSWindows` macro to extract the required data. The researcher can select options that specify the date format, the output file name and so on. In this example, the researcher uses the `outfile` option to specify the name for the output file to contain the downloaded data from `DSWindows`.

```
DSMacroMaker outfile=MyDSReq;
```

After running the statement, the SAS log window may contain warnings like the following.

```
WARNING: Variable dsd1 already exists on file WORK.MATCHDAT.  
WARNING: Variable ds_indx already exists on file WORK.MATCHDAT.
```

Warnings phrased similarly to the above are normal and can be disregarded. Other warnings may refer to stocks that are listed in the request file for which `EventStream` cannot identify an associated Datastream index or other

parameters.

5.3 DSWindows

The end of the SAS log output looks like this:

```
Please log on to DSWindows and run macro C:\DSWINDOW\Files\eventus.mac,
then return to SAS and run DSMiniDatabase to prepare the data for Eventus.
```

NOTE: EventStream 2005.03 2000–2005 Cowan Research LC.

If DSWindows is installed on the computer where SAS and EventStream are running, the researcher can immediately log on to DSWindows and run the indicated macro from the Macro menu of the DSWindows application. If the researcher must switch to a different workstation, it may be necessary to manually transfer the macro by means of removable media, a network drive, e-mail or ftp if the folder listed in the SAS log, for example C:\DSWINDOW\Files, is not accessible to the DSWindows station.

The researcher can leave SAS open while running the DSWindows macro. After the DSWindows macro runs, the researcher can disconnect from Datastream and close DSWindows.

If the researcher runs DSWindows on a different computer, the downloaded data file, named `eventus.dat` by default, will need to be transferred back to the folder listed in the SAS log, for example C:\DSWINDOW\Files. This is the reverse direction from transferring the macro file before running DSWindows.

5.4 DSMiniDatabase Statement

The researcher returns to SAS and runs the `DSMiniDatabase` statement. Figure 5.2 shows an example of the `DSMiniDatabase` statement with options to specify the SAS two-level name (SAS library name assigned to the folder and data set name within the folder) for the mini-database components being created. The example includes a `SAS libname` statement to assign the library name `project` to the desired folder. The library name also could be assigned interactively using the SAS Explorer.

Figure 5.2

Second part of the EventStream program: DSMiniDatabase statement.

```
libname project 'C:\Documents and Settings\Me\MyDocuments\Project\SASFiles';
DSMiniDatabase returnds=project.datastream_returns
    headds=project.datastream_header nameds=project.datastream_names
    portlds=project.datastream_portfolios;
```

When the DSMiniDatabase statement finishes, the following appears at the end of the SAS log:

NOTE: Use Eventus statements similar to the ones below.

NOTE: Add desired options, for example (see User's Guide for full list):

NOTE: * title and title2 statements, after the eventus statement

NOTE: * windows statement, after the request statement

NOTE: * benchmark specifications (RAW, NOMAR, etc.) on evtstudy stmt

NOTE: * statistical specifications (ranktest etc.) on evtstudy stmt

NOTE: * outsas= and package= specifications on evtstudy statement

```
Eventus sasnoncrsp indexds=ds.indexds returnds=project.datastream_returns
    headds=project.datastream_header nameds=project.datastream_names
    portlds=project.datastream_portfolios;
request issuekey=DSCD issuefmt=$6. EventStream name ;
evtstudy;
```

At this point, the user is done with EventStream and ready to run Eventus. The Eventus statements in the log message simply illustrate the basic structure of an event study that can be run with the mini-database created by EventStream. Eventus offers many options to tailor the event study to the researcher's needs. The Eventus request file needs to specify the event dates rather than the mini-database time-series dates in the EventStream request file. Figure 5.3 illustrates a simple Eventus request file; each line consists of the Datastream DSCD code and the event date. In this example, the stocks all have a common event date. In other event studies, the event date could differ from one stock to another. Some Eventus options require more information

Figure 5.3

Sample **Eventus** request file. 30 lines used to run the demo are omitted.

```
130256 20000303
130535 20000303
130588 20000303
132709 20000303
151495 20000303
307852 20000303
309905 20000303
314920 20000303
929286 20000303
929876 20000303
932288 20000303
951948 20000303
998250 20000303
```

in the request file, as described in **Eventus** documentation.

Figure 5.4 displays an **Eventus** program to run an event study using the mini-database and request file. The program includes SAS `filename` statements to clear the definition of the SAS file shortcut `request`, then redefine it so that it points to the request file for the event study. Both **EventStream** and **Eventus** look for the shortcut by default. The program includes the following specifications that are mandatory for an **EventStream**-based event study: the `sasnoncrsp`, `indexds=`, `returnds=`, `headds=`, `nameds=` and `port1ds=` specifications on the **Eventus** statement to invoke the mini-database mode of **Eventus** and point to the mini-database components, and the `issuekey=`, `eventstream` and `name` options on the **Request** statement to point to the name of the security issue key variable, load special **EventStream** support and specify the use of names from the mini-database. The program also includes a `windows` statement to select multiday windows of interest around the event day ($t = 0$). The `evtstudy` statement option `buyhold` specifies that window returns are to be compounded (buy-and-hold) rather than cumulated, and `csecterr` and `transnorm` select the cross-sectional and skewnewss-adjusted transformed normal parametric tests. The cross-sectional test is robust to event-date clustering and the skewness-adjusted test is robust to the skewness present in longer buy-and-hold windows. The output of the event study appears in the Appendix.

Figure 5.4

Sample **Eventus** event study using the mini-database.

```
filename request clear;
filename request 'C:\Documents and Settings\Me\MyDocuments\Project\EventStudyRequest.txt';
eventus sasnoncrsp indexds=ds.indexds returnds=project.datastream_returns
      headds=project.datastream_header nameds=project.datastream_names
      portlds=project.datastream_portfolios;
request issuekey=dscd issuefmt=$6. eventstream name;
windows (-1,0) (0,0) (-1,1) (-1,+5) (-1,+10) (-1,+20) (-1,+30);
evtstudy buyhold csecterr transnorm;
```

Chapter 6

Technical Notes

This chapter presents technical details that may be of interest.

Calendar Conversion When an option for a non-daily return interval is in effect, `EventStream` converts event dates to the appropriate interval precisely. However, the lengths of the estimation period, and the event period in a single-date event study, are determined approximately. For example, when the researcher sets up a monthly event study, the event month and the placement of the estimation period with respect to the event month will be correct. The number of months in the estimation period and in the `PRE` and `POST` segments of the event period can vary slightly from the researcher's specifications. The `Eventus` output will report the actual number of months in each period.

Calendar Synchronization In mini-database mode, all markets are synchronized to the U.K. trading calendar as follows. On a day when market X is open for trading but the U.K. is not, security returns and market index returns are compounded with the following day's returns. For example, if market X is open on days 1, 2 and 3, but the U.K. is closed on day 1 and 2 and open on day 3, the market X index and any stock traded in market X will be treated as if market X were closed on days 1 and 2, but the actual day 3 return will be replaced by the compounded total return for the three-day period.

Calendar synchronization is necessary in mini-database mode to allow `Eventus` to align security-events in event time. Legacy mode does not require synchronization because `EventStream` performs the event-time alignment, at the cost of reduced flexibility in using the data in `Eventus`.

Datastream Market Index The only equity market indices supported by the current version are the Datastream Global total market indices, the mnemonics of which begin with TOTMK.

DSFiles shortcut Correct operation of **EventStream** requires that the SAS file shortcut (formerly called a fileref) **DSFiles** point to the folder where **EventStream** should read and write DSWindows macros and downloaded data files. **DSFiles** is typically set by the installation routine.

Eventus Version **EventStream** in legacy mode produces Userstok files and **Eventus** statements designed for use with **Eventus** version 6.3C release 99.06 and higher. Usage with **Eventus** versions 6.3b and earlier is not supported. **EventStream** in mini-database mode produces mini-databases and **Eventus** statements designed for use with **Eventus** 7.09 and higher.

SAS **Version** **EventStream** requires SAS 8.2, or 9.1 or greater.

Appendix A

Output from the Usage Example

This appendix presents the detailed Eventus output from the usage example.

Figure A.1

Eventus Output from the Event Study: First Page.

Eventus (R) software is produced by Cowan Research, L.C.
<http://www.eventstudy.com/>

ESTIMATION PERIOD: Ends 46 days before the event date; 255 days in length.

TOTAL NUMBER OF EVENTS:	43
EVENTS WITH USEABLE RETURNS:	42
EVENTS DROPPED:	1

STATISTICAL SIGNIFICANCE LEVELS: 1 tailed

NOTE: Using associated or user-specified Datastream total market indices for market returns.

NOTE: Useable returns means all nonmissing returns except the first day after a missing estimation period return.

Figure A.2
 Eventus Output from the Usage Example: Second Page.
 Eventus (R) Software from Cowan Research, L.C.
 Results of Daily Security Return Data Input

DSCD code	Datstream	Name on Event Date	Event Date	Esti-		Reason if no useable returns
				mation	Event	
				Period	Period	
				Returns	Returns	
				<=255	<=61	
130256		TAM PN 1000DEAD - DLIST 6/12/20 B	Friday, March 3, 2000	255	61	
130535		AVIANCA DEAD - DELIST.1/21/2003 C	Friday, March 3, 2000	255	61	
130588		NORTHWEST AIRLINES 'A' @NWAC	Friday, March 3, 2000	244	60	
132709		UAL @UALAQ	Friday, March 3, 2000	244	60	
151495		ALL NPN.AIRW.SPN.ADR 1:2 @ALNPNY	Friday, March 3, 2000	228	59	
307852		TURK HAVA YOLLARI TK:THY	Friday, March 3, 2000	255	61	
309905		BRAATHENS DEAD - DELIST 2/11/20 N	Friday, March 3, 2000	255	61	
314920		THAI AIRWAYS INTL. Q:TAI	Friday, March 3, 2000	235	57	
316665		CHINA AIR LINES TW:CAC	Friday, March 3, 2000	255	61	
321123		VARIG PN BR:VI4	Friday, March 3, 2000	255	61	
322013		AEROMEX CPO DEAD - DELST 7/18/1 M	Friday, March 3, 2000	255	61	
328619		CONT.AIRL.B U:CAL	Friday, March 3, 2000	244	60	
357529		LAN CL:LAN	Friday, March 3, 2000	255	61	
502874		AIR NEW ZEALAND Z:AIRN	Friday, March 3, 2000	251	61	
504794		SAS W:SAS	Friday, March 3, 2000	244	61	
505966		FINWAIR M:FNNA	Friday, March 3, 2000	242	61	
510794		AIR CANADA DEAD - DELIST.11/18/ C	Friday, March 3, 2000	255	61	
511751		BRANIFF DEAD - B'RUPT.11/14/198	Friday, March 3, 2000	244	60	
513105		DEUTSCHE LUFTHANSA AG SPN.ADR 1 @	Friday, March 3, 2000	246	61	
691870		EVA AIRWAYS TW:EAA	Friday, March 3, 2000	41	61	
700490		SINGAPORE AIRLINES T:SAIR	Friday, March 3, 2000	244	59	
702940		QANTAS AIRWAYS A:QANX	Friday, March 3, 2000	251	60	
740848		BRITISH AIRWAYS ADR 1:10 U:BAW	Friday, March 3, 2000	255	61	
741965		JAPAN AIR SYSTEM DEAD - MERGER J	Friday, March 3, 2000	255	61	
759734		JAPAN AIRLINES ADR 1:5 @JALSY	Friday, March 3, 2000	228	59	
772803		AUSTRIAN AIRLINES O:AUA	Friday, March 3, 2000	238	61	
891779		RYANAIR SPN.ADR 1:5 @RYAAY	Friday, March 3, 2000	255	61	

* No useable returns found.
 Portfolio assignment is checked before return availability.

Figure A.3
 Eventus Output from the Usage Example: Third Page.
 Eventus (R) Software from Cowan Research, L.C.

Results of Daily Security Return Data Input

DataStream	DSCD code	Name on Event Date	Event Date	Esti- mation Period Returns	Event Period Returns	Reason if no useable returns
				<=255	<=61	
	896253	AIR NEW ZEALAND (ASX) A:AIZX	Friday, March 3, 2000	251	60	
	897365	RYANAIR RY4	Friday, March 3, 2000	255	61	
	898443	LAN CHILE SPN.ADR 1:5 U:LFL	Friday, March 3, 2000	255	61	
	912131	PAN AM @PNAA	Friday, March 3, 2000	0	0	All data missing in event peri
	912260	US AIRWAYS GP. DEAD - DELIST 10 @	Friday, March 3, 2000	255	61	
	912520	KLM DEAD - DELIST 6/14/2004 H:KLM	Friday, March 3, 2000	255	61	
	912595	DELTA AIR LINES U:DAL	Friday, March 3, 2000	244	60	
	914447	BRITISH AIRWAYS BAY	Friday, March 3, 2000	255	61	
	921795	AMR (AMERICAN AIRLINES) U:AMR	Friday, March 3, 2000	244	60	
	922309	JAPAN AIRLINES J:JA@N	Friday, March 3, 2000	228	59	
	929114	DEUTSCHE LUFTHANSA D:LHA	Friday, March 3, 2000	246	61	
	929286	AIR FRANCE-KLM F:UTA	Friday, March 3, 2000	247	61	
	929876	SAIRGROUP R DEAD - DELIST 1/31/ S	Friday, March 3, 2000	255	61	
	932288	ALL NIPPON AIRWAYS J:ANAW	Friday, March 3, 2000	228	59	
	951948	KLM RYL.DU.AIRL. @KLMR	Friday, March 3, 2000	244	60	
	998250	ALITALIA I:AZA	Friday, March 3, 2000	248	61	

* No useable returns found.
 Portfolio assignment is checked before return availability.

Figure A.4
 Eventus Output from the Usage Example: Fourth Page.
 Parameter Estimates and Estimation Period Statistics

----- Market Index=Datastream -----											
Datastream DSCD code	Event Date	Market Number	Mean Total Return	% of Raw Returns >0	Alpha	Beta	Market Model Res- iduals>0	Total Return Variance	Residual Standard Deviation	Autocor- relation*	
130256	03MAR2000	46	0.00094	9.01%	0.00085	0.13	29.41%	0.00529	0.07288	-0.0954	
130535	03MAR2000	46	0.00630	0.39%	0.00626	0.05	0.39%	0.01013	0.10085	-0.0031	
130588	03MAR2000	47	0.00062	47.13%	-0.00013	1.14	46.72%	0.00116	0.03128	-0.0867	
132709	03MAR2000	47	0.00130	46.31%	0.00084	0.70	45.49%	0.00063	0.02369	-0.1312	
151495	03MAR2000	24	-0.00052	41.66%	-0.00192	0.65	47.80%	0.00046	0.02026	-0.1422	
307852	03MAR2000	45	0.00673	43.52%	-0.00063	0.99	52.15%	0.00183	0.02767	0.0026	
309905	03MAR2000	46	0.00127	34.90%	0.00107	0.27	45.49%	0.00112	0.03337	-0.0962	
314920	03MAR2000	44	0.00060	40.85%	0.00001	0.80	46.80%	0.00124	0.02958	-0.0019	
316665	03MAR2000	43	-0.00009	38.43%	-0.00098	0.55	49.80%	0.00045	0.01889	-0.0503	
321123	03MAR2000	5	0.00644	24.70%	0.00572	0.21	27.05%	0.00556	0.07456	-0.0635	
328619	03MAR2000	47	0.00152	48.77%	0.00101	0.76	45.08%	0.00078	0.02657	0.0348	
357529	03MAR2000	8	0.00314	30.19%	0.00193	0.81	34.50%	0.00073	0.02603	0.2236	
502874	03MAR2000	31	0.00024	39.44%	-0.00012	0.73	47.41%	0.00031	0.01635	-0.0405	
504794	03MAR2000	40	0.00068	39.75%	-0.00018	0.35	46.72%	0.00037	0.01890	-0.1179	
505966	03MAR2000	15	0.00045	39.66%	0.00011	0.09	47.10%	0.00026	0.01603	-0.0606	
510794	03MAR2000	46	0.00333	41.17%	0.00286	0.63	45.09%	0.00133	0.03604	-0.1104	
513105	03MAR2000	3	0.00086	46.34%	0.00020	0.50	47.96%	0.00052	0.02213	-0.0291	
691870	03MAR2000	43	-0.00374	34.14%	-0.00494	0.55	48.78%	0.00111	0.03272	0.0265	
700490	03MAR2000	41	0.00443	55.32%	0.00234	0.79	45.08%	0.00069	0.02379	-0.1100	
702940	03MAR2000	2	0.00111	50.59%	0.00072	0.62	51.79%	0.00040	0.01923	0.1282	
740848	03MAR2000	46	0.00031	43.92%	-0.00015	0.61	43.13%	0.00051	0.02182	-0.0101	
741965	03MAR2000	46	-0.00038	25.88%	-0.00035	-0.04	66.27%	0.00051	0.02262	-0.2612	
759734	03MAR2000	24	0.00210	44.29%	0.00122	0.41	46.05%	0.00124	0.03499	-0.1985	
772803	03MAR2000	32	-0.00113	45.37%	-0.00163	1.21	48.73%	0.00056	0.02151	-0.1801	
891779	03MAR2000	46	0.00228	44.70%	0.00213	0.20	44.31%	0.00059	0.02427	0.0761	

* First order autocorrelation of market model abnormal returns

Figure A.5
 Eventus Output from the Usage Example: Fifth Page.
 Parameter Estimates and Estimation Period Statistics

----- Market Index=Datastream -----
 (continued)

Datastream DSCD code	Event Date	Market Number	Mean Total Return	% of Raw Returns >0	Alpha	Beta	Market Res- iduals>0	Total Return Variance	Residual Standard Deviation	Autocor- relation*
896253	03MAR2000	2	-0.00011	23.10%	-0.00021	0.15	50.59%	0.00078	0.02796	0.0375
897365	03MAR2000	21	0.00313	38.43%	0.00306	0.65	46.66%	0.00058	0.02310	0.1037
898443	03MAR2000	8	0.00298	36.47%	0.00145	1.03	42.35%	0.00118	0.03311	0.0425
912260	03MAR2000	46	-0.00132	41.96%	-0.00203	0.96	46.27%	0.00115	0.03262	-0.1064
912520	03MAR2000	46	0.00045	45.49%	0.00009	0.49	45.88%	0.00047	0.02125	0.0130
912595	03MAR2000	47	0.00067	45.08%	-0.00005	0.80	48.36%	0.00080	0.02685	-0.1113
914447	03MAR2000	46	0.00060	48.23%	0.00004	0.74	46.27%	0.00055	0.02223	-0.0195
921795	03MAR2000	47	0.00109	45.90%	0.00029	0.95	44.26%	0.00077	0.02571	-0.0238
922309	03MAR2000	24	0.00086	46.49%	-0.00068	0.71	49.56%	0.00067	0.02464	-0.0965
929114	03MAR2000	3	0.00127	48.37%	0.00019	0.88	47.56%	0.00046	0.01865	0.0247
929286	03MAR2000	16	0.00098	40.48%	0.00072	0.15	43.31%	0.00046	0.02152	-0.0100
929876	03MAR2000	46	-0.00034	42.74%	-0.00071	0.49	47.05%	0.00018	0.01273	-0.0861
932288	03MAR2000	24	-0.00106	40.35%	-0.00244	0.64	47.80%	0.00040	0.01857	-0.1330
951948	03MAR2000	47	-0.00107	51.22%	-0.00153	0.57	52.45%	0.00066	0.02501	0.0097
998250	03MAR2000	23	-0.00118	41.12%	-0.00188	0.87	47.58%	0.00047	0.01915	-0.1341
MEAN			0.00114	39.80%	0.00031	0.59	45.13%	0.00118	0.02873	-0.0447
MEDIAN			0.00077	41.81%	0.00007	0.64	46.72%	0.00065	0.02403	-0.0454

* First order autocorrelation of market model abnormal returns

Figure A.6
 Eventus Output from the Usage Example: Sixth Page.
 Market Model, Datastream Total Market Indices

Day	N	Mean		Positive: Negative	CS t	Generalized Sign Z	Skewness Corrected T1
		Abnormal Return	CS t				
-30	26	-1.45%	12:14	-2.714**	0.105	-3.099***	
-29	40	0.22%	21:19	0.786	0.937	0.767	
-28	40	-1.02%	12:28	-3.855***	-1.923*	-4.059***	
-27	38	-0.17%	19:19	-0.379	0.603	-0.383	
-26	40	-0.20%	19:21	-0.599	0.301	-0.600	
-25	40	0.66%	21:19	0.740	0.937	0.904	
-24	40	-0.15%	19:21	-0.160	0.301	-0.160	
-23	40	-0.76%	18:22	-1.868*	-0.017	-1.942*	
-22	40	0.24%	16:24	0.293	-0.652	0.316	
-21	40	0.16%	15:25	0.258	-0.970	0.268	
-20	40	-1.18%	10:30	-2.653**	-2.559**	-2.202*	
-19	39	0.12%	16:23	0.277	-0.515	0.288	
-18	40	-0.01%	21:19	-0.010	0.937	-0.010	
-17	40	-1.48%	9:31	-4.322***	-2.876**	-3.889***	
-16	40	-0.57%	16:24	-1.251	-0.652	-1.261	
-15	36	-0.03%	18:18	-0.044	0.587	-0.044	
-14	40	-0.33%	22:18	-0.781	1.254	-0.811	
-13	40	-0.90%	14:26	-2.699**	-1.288\$	-2.594**	
-12	40	0.05%	22:18	0.123	1.254	0.123	
-11	40	0.76%	23:17	1.862*	1.572\$	2.041*	
-10	40	-0.03%	21:19	-0.074	0.937	-0.074	
-9	33	1.05%	25:8	2.710**	3.536***	3.167***	
-8	40	-0.51%	19:21	-0.765	0.301	-0.799	
-7	40	0.04%	13:27	0.060	-1.605\$	0.061	
-6	40	-0.23%	19:21	-0.497	0.301	-0.494	
-5	40	-0.33%	14:26	-0.748	-1.288\$	-0.713	
-4	40	-0.56%	14:26	-1.594\$	-1.288\$	-1.491\$	
-3	40	-0.77%	17:23	-1.758*	-0.334	-1.929*	
-2	40	-0.13%	14:26	-0.229	-1.288\$	-0.227	
-1	40	0.04%	15:25	0.091	-0.970	0.092	
0	40	0.96%	23:17	2.068*	1.572\$	2.248*	

The symbols \$, *, **, and *** denote statistical significance at the 10%, 5%, 1% and 0.1% levels, respectively, using a 1-tail test.

Figure A.7
 Eventus Output from the Usage Example: Seventh Page.
 Market Model, Datastream Total Market Indices

Day	N	Mean Abnormal Return	Positive:		CS t	Generalized Sign Z	Skewness Corrected T1
			Negative	Sign Z			
+1	40	-0.76%	9:31	-2.266*	-2.876**	-2.146*	
+2	40	-1.74%	16:24	-3.198***	-0.652	-3.959***	
+3	40	0.96%	20:20	1.240	0.619	1.443\$	
+4	40	-0.44%	15:25	-0.791	-0.970	-0.805	
+5	40	1.71%	25:15	2.557**	2.208*	2.912**	
+6	40	1.26%	21:19	2.077*	0.937	2.706**	
+7	40	-0.58%	19:21	-1.423\$	0.301	-1.475\$	
+8	40	1.95%	23:17	2.682**	1.572\$	3.120***	
+9	39	1.41%	19:20	2.097*	0.450	2.414**	
+10	40	-1.07%	14:26	-2.578**	-1.288\$	-2.526**	
+11	36	-0.38%	13:23	-1.074	-1.088	-0.986	
+12	40	0.52%	23:17	1.414\$	1.572\$	1.407\$	
+13	40	0.49%	22:18	0.848	1.254	0.850	
+14	40	0.76%	25:15	2.196*	2.208*	2.138*	
+15	40	0.28%	12:28	0.403	-1.923*	0.416	
+16	40	0.57%	16:24	0.866	-0.652	0.917	
+17	40	0.52%	20:20	0.829	0.619	0.816	
+18	40	0.62%	24:16	1.648*	1.890*	1.809*	
+19	40	-0.40%	18:22	-0.825	-0.017	-0.858	
+20	40	0.38%	18:22	0.741	-0.017	0.792	
+21	40	0.74%	25:15	1.736*	2.208*	1.741*	
+22	40	1.72%	25:15	2.527**	2.208*	3.142***	
+23	40	0.74%	23:17	1.662*	1.572\$	1.685*	
+24	39	-0.35%	15:24	-0.894	-0.837	-0.899	
+25	40	-0.75%	17:23	-1.638\$	-0.394	-1.772*	
+26	40	0.00%	18:22	0.009	-0.017	0.009	
+27	40	0.49%	25:15	1.252	2.208*	1.291\$	
+28	40	0.52%	26:14	0.619	2.525**	0.539	
+29	39	0.08%	18:21	0.215	0.128	0.216	
+30	39	-1.48%	14:25	-3.397***	-1.159	-3.890***	

The symbols \$, *, **, and *** denote statistical significance at the 10%, 5%, 1% and 0.1% levels, respectively, using a 1-tail test.

Figure A.8
 Eventus Output from the Usage Example: Eighth Page.
 Eventus (R) Software from Cowan Research, L.C.

Market Model, Datastream Total Market Indices

Days	N	Mean Compound Abnormal Return	Positive:		CS t	Generalized Sign Z	Skewness Corrected T1
			Negative	t			
(-1,0)	40	0.99%	20:20	1.572\$	0.619	1.882*	
(0,0)	40	0.96%	23:17	2.068*	1.572\$	2.248*	
(-1,+1)	40	0.24%	14:26	0.293	-1.288\$	0.305	
(-1,+5)	40	0.51%	18:22	0.429	-0.017	0.440	
(-1,+10)	40	3.51%	23:17	2.022*	1.572\$	2.006*	
(-1,+20)	40	6.99%	25:15	2.778**	2.208*	2.957**	
(-1,+30)	40	8.48%	27:13	2.500**	2.843**	2.278*	

The symbols \$,*,**, and *** denote statistical significance at the 10%, 5%, 1% and 0.1% levels, respectively, using a 1-tail test.

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