

Eventus® Calendar-Time Portfolio Regression

This article shows how to use Eventus 7 or Eventus 8 to run just one of the available methods, a basic calendar-time portfolio regression, and explains what Eventus does in response. There is a more up to date version of this article for Eventus 9 users (including all Eventus for WRDS users) available from <http://support.eventstudy.com> or <http://www.eventstudy.com>.

1. Request file

The sample code below uses a SAS filename statement to point to a text request file containing CUSIP, event date and an optional user-determined unique ID variable. The following lines can be pasted into Notepad, TextPad (a third party Windows package), Joe (Unix) or any other plain text file editor and saved in plain text format to make the request file. Alternatively, the user can write SAS code to make a SAS data set from the lines, then use the InSAS option of the Request statement in Eventus to point to the data set.

```
05461510    19971021    10718
37803P10    19971020    10719
00797310    19971017    10720
48007410    19971016    10721
70322410    19971015    10722
25375210    19971015    10723
62991310    19970618    10802
52903910    19970617    10803
02078710    19970612    10804
69487310    19970611    10805
41078310    19970611    10806
13886910    19970605    10810
74070610    19970429    10822
12658310    19970424    10823
44992310    19970423    10824
84610H10    19970416    10825
07367810    19970410    10830
46047F10    19970408    10831
00847410    19970408    10832
```

2. Eventus program

The Eventus program for this example appears below. In a monthly return event study, month 0 initially is the month of the date in the request file. For purposes of this example, we assume that the user wants to include each stock in the calendar-time portfolio for the twelve calendar months following (not including) the event month. We specify the option `shift1=+1` to redefine month 0 as one month later than the date in the request file. We specify the options `pre=0 post=11` to include each stock in the calendar-time portfolio

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from zero months before through 11 months after the new month 0.¹ If one prefers to think in terms of prices, we are buying each stock at its closing price at the end of new month -1 (original month 0) and selling it at the closing price at the end of new month +11 (original month +12). Each stock earns 12 monthly returns (barring missing data) during its tenure in the portfolio.

```
filename request 'file path and name go here';
Eventus Monthly FFF=FF.Factors;
Request CusiPerm shift1=+1 ID=SecurityEvent IDFmt=5.;
EvtStudy pre=0 post=11 FamaFrench;
```

3. What Eventus does

In this example, Eventus extracts CRSP monthly returns for each stock from zero months before through 11 months after its redefined month 0, and calculates the excess return by subtracting the risk-free return (from FF.Factors) from each stock return. For each calendar month in which at least one stock excess return is obtained, Eventus calculates the portfolio excess return as the arithmetic mean of stock excess returns. The portfolio excess returns are merged with the Fama-French factor return series and a regression is estimated by OLS. The dependent variable is the monthly portfolio excess return and the independent variables are the monthly excess return of the market index and the monthly returns of the HML and SMB factors. Heteroskedasticity-consistent test statistic are also calculated.

4. Example results

The results are in Table 1. The intercept, or alpha, estimates the component of the mean monthly return over the twelve months that is not explained by the three factors. The alpha of -0.16% is not significantly different from zero using the OLS or heteroskedasticity-consistent t-test.

Table 1: Calendar-Time Portfolio Regression Event Study Results

	Fama-French Calendar-Time Portfolio Regressions		
	Average Month in (-0,+11)	OLS t	Hetero- skedasticity Consistent t
Intercept (Abnormal Return)	-0.0016	-0.19	-0.20
b(p)	1.1382	6.46***	8.31***
s(p)	1.3434	5.76***	6.01***
h(p)	-0.0033	-0.01	-0.01
R-squared	0.9109		

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

¹ Options and output in event-study runs, that refer to days or months, count daily or monthly holding periods and returns. The holding period for the month t return is from the last market close of month $t-1$ to that of month t . Eventus takes the return from CRSP or the user's mini-database in a non-CRSP run.

5. Running the example in Eventus

The zip file http://www.eventstudy.com/Eventus_ffctpr_demo.zip contains versions of the above Eventus program formatted for use in Eventus for Windows and Eventus for WRDS. The results appear in the Output window of PC SAS, the *.lst file from a command-line run or the result page from a web query.

6. Replicating the results outside of Eventus

Included in zip file http://www.eventstudy.com/Eventus_ffctpr_demo.zip is an Excel workbook, Eventus_FFCTPR_demo.xls, showing the stock excess returns aligned in calendar time, the resulting portfolio excess returns and the Fama-French factor returns. The Fama-French factor returns and risk-free returns can be verified by using data from Ken French's web site. The stock excess returns can be replicated by using CRSP software or WRDS to obtain stock returns for the indicated calendar months, then subtracting the corresponding risk-free returns. The final data for the calendar-time regression, which are in green in the spreadsheet, can be used with any statistical or econometric package to replicate the regression results.

7. Additional options

Several potential ways to tailor the above calendar-time portfolio regression program to meet your research needs are in Table 2. If you don't see what you are looking for, please visit our support web site <http://support.eventstudy.com> and open a support ticket or post in our discussion forums. More options appear in later versions of Eventus.

8. About this article

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This is the Eventus 8.0 and earlier version of this article. All WRDS users and other Eventus 9 or later users should read the newer version of the article available from <http://support.eventstudy.com>.

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Table 2: How to modify the example program for selected Eventus calendar-time portfolio regression tasks

To do this	Change this option	On this statement
Run the calendar-time portfolio regression for the year ending the month before the request-file date.	Shift1=-1 <i>and</i> Pre=11 Post=0	Request EvtStudy
Run the calendar-time portfolio regression for the year beginning the month of the request-file date.	(omit Shift1=+1)	Request
Indicate that the first column of my request file is PERMNO, not CUSIP.	(omit CusiPerm)	Request
Do not use an optional ID variable.	(omit ID= <i>and</i> IDFMT= <i>options</i>)	Request
Extend the model to four factors by adding the momentum factor UMD.	Momentum	EvtStudy
Exclude any stock that has a missing return in the months to be used.	MaxMiss=0	EvtStudy
Allow one missing return, but exclude a stock that has two or more.	MaxMiss=1	EvtStudy
Use GMM estimation.	GMM	EvtStudy
Use my own factors instead of Fama-French factors. (Please see the User's Guide for detailed requirements for these options.)	(omit FFF= <i>etc.</i>) <i>and add</i> MyFactors= <i>etc.</i> (omit FamaFrench) <i>and add</i> Factors= <i>n</i>	Eventus Eventus EvtStudy EvtStudy
Make a four- or five-factor model by adding one factor that I construct myself to the three or four Fama-French (and momentum) factors.	Same as "my own factors" immediately above. Create the MyFactors= data set by merging the Fama-French factor data set with the data set containing the additional factor, and rename the Fama-French factor return columns Factor _{<i>i</i>} where <i>i</i> is a sequential integer.	
Allow each stock to be in the calendar-time portfolio for a different number of months, where the start and end date are two columns in the request file. (Please see the User's Guide for detailed requirements.)	Twin <i>and</i> (omit <i>or include</i> Shift1= <i>or</i> Shift2= <i>as desired</i>) <i>and</i> (omit Pre= <i>and</i> Post=)	Eventus Request EvtStudy
Calculate the portfolio return with each stock weighted by its market capitalization immediately preceding its inclusion in the portfolio.	ValueWeightSample	EvtStudy