Abstract

In economic analysis of time series, it is often helpful to plot the data in order to reveal underlying patterns. One type of plot is a tier chart in which monthly data for individual years are overlaid on one another. A TSO batch job to produce such charts from monthly data was developed. However, in applications where many series need to be charted, this job must be edited repeatedly to specify the chart parameters associated with each series. To facilitate this procedure, SAS/AF, SAS/FSP and SAS/DMI have been combined to create a menu-driven facility for editing and submitting these batch jobs.

Introduction

This paper presents an application of a menu-driven facility using SAS/AF, SAS/FSP and SAS/DMI that enables users to specify parameters for batch jobs and then submit these jobs. In the example presented below, each batch job draws a tier chart of an economic time series with PROC GPLOT using plotting parameters unique to that series. However, the methodology can be used to edit any type of batch job, including jobs that do not use SAS software!

Data Sets Used in the Paper

The example in this paper works with two SAS data sets, VARS and PARAMS. Data set VARS contains a number of time series and a corresponding monthly date array. There are 168 observations in the data set, from January 1975 through December 1988. Each observation in data set PARAMS contains information relevant to one of the time series in data set VARS; there are many observations in the data set PARAMS as there are time series in data set VARS. The variable NAME in PARAMS holds the corresponding time series name. See Figures 1a and 1b for detailed mappings of these data sets.

Through processes outside of this example, whenever a data series is added to data set VARS, a corresponding observation is added to data set PARAMS (one variable in PARAMS will hold the name of the variable added to VARS; other variables in PARAMS will be set to initial values).

Figure 1a.
The last 12 observations of data set VARS.

<table>
<thead>
<tr>
<th>OBS</th>
<th>DATE</th>
<th>M34</th>
<th>M46</th>
<th>M100</th>
<th>M550</th>
</tr>
</thead>
<tbody>
<tr>
<td>157</td>
<td>8801</td>
<td>197.0</td>
<td>4.6</td>
<td>295.9</td>
<td>265.7</td>
</tr>
<tr>
<td>158</td>
<td>8802</td>
<td>197.3</td>
<td>4.6</td>
<td>279.1</td>
<td>252.6</td>
</tr>
<tr>
<td>159</td>
<td>8803</td>
<td>190.4</td>
<td>4.9</td>
<td>279.9</td>
<td>266.7</td>
</tr>
<tr>
<td>160</td>
<td>8804</td>
<td>241.6</td>
<td>4.9</td>
<td>292.1</td>
<td>276.5</td>
</tr>
<tr>
<td>161</td>
<td>8805</td>
<td>265.6</td>
<td>7.1</td>
<td>283.1</td>
<td>276.8</td>
</tr>
<tr>
<td>162</td>
<td>8806</td>
<td>205.7</td>
<td>7.6</td>
<td>293.1</td>
<td>275.3</td>
</tr>
<tr>
<td>163</td>
<td>8807</td>
<td>296.0</td>
<td>8.2</td>
<td>293.1</td>
<td>277.7</td>
</tr>
<tr>
<td>164</td>
<td>8808</td>
<td>207.9</td>
<td>8.2</td>
<td>269.9</td>
<td>277.2</td>
</tr>
<tr>
<td>165</td>
<td>8809</td>
<td>268.0</td>
<td>7.9</td>
<td>287.4</td>
<td>271.8</td>
</tr>
<tr>
<td>166</td>
<td>8810</td>
<td>269.0</td>
<td>7.3</td>
<td>286.7</td>
<td>276.9</td>
</tr>
<tr>
<td>167</td>
<td>8811</td>
<td>213.3</td>
<td>7.1</td>
<td>240.0</td>
<td>278.8</td>
</tr>
<tr>
<td>168</td>
<td>8812</td>
<td>214.9</td>
<td>6.9</td>
<td>298.9</td>
<td>265.7</td>
</tr>
</tbody>
</table>

Figure 1b.
Data set PARAMS.

<table>
<thead>
<tr>
<th>OBS</th>
<th>NAME</th>
<th>DESC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>M100</td>
<td>DEMAND DEPOSITS, NSA</td>
</tr>
<tr>
<td>2</td>
<td>M150</td>
<td>OTHER CHECKABLE DEPOSITS, NSA</td>
</tr>
<tr>
<td>3</td>
<td>M274</td>
<td>SAVINGS DEPOSITS AT COMM. BANKS, NSA</td>
</tr>
<tr>
<td>4</td>
<td>M276</td>
<td>SMALL TIME DEPOSITS AT COMM. BANKS, NSA</td>
</tr>
<tr>
<td>5</td>
<td>M320</td>
<td>SAVINGS DEPOSITS AT Thrift Inst., NSA</td>
</tr>
<tr>
<td>6</td>
<td>M34</td>
<td>CURRENCY, NSA</td>
</tr>
<tr>
<td>7</td>
<td>M180</td>
<td>SMALL TIME DEPOSITS AT Thrift Inst., NSA</td>
</tr>
<tr>
<td>8</td>
<td>M46</td>
<td>TRAVELERS CHECKS, NSA</td>
</tr>
</tbody>
</table>

Accessing and Running the Procedure

The user begins the process by executing a clist. This clist allocates the necessary data...
sets and brings up the SAS System with a SYSIN to initiate a noninteractive SAS session. The program passed via the SYSIN uses PROC DISPLAY to present an initial menu (see Figure 2).

**Figure 2.**
Initial SAS/AF menu.

```
MENU SCREEN FOR SUGI EXAMPLE
1. Submit batch jobs to create tier charts.
2. Option Z.
3. Option 3.
X. EXIT to previous menu screen.
```

The user chooses the charts option from this selection menu. This option begins execution of the program shown in Figure 3.

**Figure 3.**
Program to select and submit batch jobs.

```
X-- Create data for use in an FSEDIT screen.
DATA SHOW (KEEP=BIGDESC NAME);
SET SUGI.PARAHS;
LENGTH lIGDESC $ 122;
SUBSTR(BIGDESC,1.6) = tEFT(NAME}, , SUBSTRCBIGDESC,11.75) =
LEFT(DESC)~
RUN;
```

```
DATA RUNS.
LENGTH RUNI-RUNZS $ 1~
LENGTH DESCI-DESC25 $ 12Z;
RUN;
```

```
PROC TRANSPOSE DATA=SHOW OUT=TP1 PREFIX=DESC;
VAR BIGDESC;
RUN;
```

```
DATA MSEll ;
MERGE RUNS TP1;
RUN;
```

```
DATA TOP;
LENGTH C0MI-CONS 65;
C0MI = "To create a tier chart of a series, place";
CONS = "any character in the selection field."
NOTE: you may select more than one variable";
RUN;
```

```
DATA SELl;
MERGE TOP MSEll;
RUN;
```

```
PROC FSEDIT DATA=SELl SCREEN=SUGI.MAINCAT.SELECT.SCREEN;
RUN;
```

```
X-- Based on the user input, keep the
-- observation of PARAMS only if user
-- has selected to chart that series.
DATA SEL2;
SET SELl;
DROP _NAME_ DESCI-DESC25 CONI-CONS;
RUN;
```

```
DATA MINIPARM;
MERGE SUGI.PARAMS STP;
DROP COLI; IF COLI = "M";
LENGTH TYPEI-TYPE6 8 1;
RUN;
```

```
X-- For each selected series, have user fill
-- in a screen to select the type(s) of
-- chart(s) and modify chart parameters.
PROC FSEDIT DATA=MINIPARM
SCREEN=SUGI.MAINCAT.PARAMS . SCREEN;
RUN;
```

```
X-- Submit the batch chart jobs.
DATA _NULL_.
SET MINIPARM;
RETAIN AFTER ' ';
ARRAY TYPE 6 6 1 TYPE1-TYPE6;
N = 0;
TITLE2 = "MONETARY DATA - FROM THE PUBLIC DATABASE"
SERIES = TRIM(LEFT(NAME)).
DO I = 1 TO 6;
IF TYPEI = "M" THEN DO;
TYPEPLOT = I;
CALL ISPEXEC('VDEFINElassen'), . .);
CALL ISPEXEC('FPERM ENGLOT');
CALL ISPEXEC('FPERM ENGLOT');
RUN;
```

```
X-- Update the dataset sugl.par.m with
-- changes user has made to parameters.
PROC SORT DATA=MINIPARM;
BY NAME;
RUN;
```

```
DATA SUGI.PARAMS;
UPDATE SUGI.PARAMS MINIPARM;
BY NAME;
DROP _NAME_ TYPEI-TYPE6;
RUN;
```

```
X-- Return to the menu.
PROC DISPLAY;
RUN;
```

Information in the data set PARAMS is used in generating a PROC FSEDIT screen that shows all of the series available for charting along with a selection field (see Figure 4). The user places any non-blank character in the selection field of any series that she would like to chart.
To create a tier chart of a series, place any character in the selection field.

NOTE: You may select more than one variable.

- M10 DEMAND DEPOSITS, NSA
- M158 OTHER CHECKABLE DEPOSITS, NSA
- M246 SAVINGS Deposits AT COMM. BANKS, NSA
- M278 SMALL TIME DEPOSITS AT COMM. BANKS, NSA
- M320 SAVINGS Deposits AT THRIFT INST., NSA
- M34 CURRENCY, NSA
- M388 SMALL TIME DEPOSITS AT THRIFT INST. NSA
- M46 TRAVELERS CHECKS, NSA

The screen is exited, and the program (in Figure 3) continues to execute. Data set MINIPARM is created by subsetting PARAMS based on the user's selections. Then the data set MINIPARM is accessed via PROC FSEDIT so that the parameters for charting can be modified (see Figure 5).

Figure 5.
FSEDIT screen to modify chart parameters.

Figure 4.
FSEDIT screen to select variables to chart.

After the user fills in values to be used by the chart routine, the screen is exited and the program (in Figure 3) continues to execute.

For each observation in the data set MINIPARM, a batch chart job is submitted by using IBM ISPF services from within the data step.

The SAS/DMI facility serves as a bridge between SAS software and ISPF. ISPF file tailoring is used to edit the skeleton (the first few lines of which are shown in Figure 6), and the job is submitted. In the skeleton containing the batch job, variables prefixed with any of the default characters specified in the first line are replaced with values from the current SAS dataset observation. An ampersand should not be used as a default character if the program also contains macros.

Figure 6.
First few lines of the skeleton.

The chart drawn with the parameters specified in Figure 5 appears in Figure 7 at the end of this paper.

Conclusion
This paper presents a procedure which takes the the parameters stored in a SAS data set and uses them to edit skeletons for batch job submission. Full screen editing is used so the user can select which series to chart and then modify the chart parameters. Using SAS/DMI, one batch job is submitted for each observation in the data set. I could not find an easier way to implement this procedure in ISPF, even for batch jobs which do not use SAS software.
Acknowledgements

SAS, SAS/AF, SAS/FS and SAS/GMI are registered trademarks of SAS Institute Inc., Cary, NC, USA.

This paper does not necessarily reflect the views of the Board of Governors of the Federal Reserve System; therefore, no official endorsement should be inferred.

Author Contact

Catherine Fitzgerald
Federal Reserve Board, Stop 60
20th and Constitution Ave. N.W.
Washington, D.C. 20551

TIER CHART OF DIFF. OF LOG-LEVELS OF M244
MONETARY DATA - FROM THE PUBLIC DATABASE

These points were set to minimum or maximum bounds:

8301  -0.0782457