Moving Data Between SAS® and FAME

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ABSTRACT

FAME (**F**orecasting, **A**nalysis, and **M**odeling **En**vironment) is a time series database product of FAME Software Corporation. This paper will describe two SAS macros. The first, GETFAME, copies time series from a FAME database into a SAS dataset. The second macro, PUTFAME, writes SAS variables into a FAME database. The macros pass user input to a FORTRAN program which utilizes subroutines that access FAME databases. These subroutines are the Host Language Interface (or HLI) routines written by FAME Software Corporation. HLI, which is an application programming interface with FAME, can be called by either FORTRAN or C programs. The FORTRAN program called by PUTFAME reads parameters passed by the SAS macro and writes data into a FAME database. The FORTRAN program called by GETFAME reads the parameters passed by SAS, and retrieves FAME time series. It then passes the FAME series back to SAS. PUTFAME is used when data is read from its source by SAS before it is stored as FAME data. These programs are executed under UNIX on SOLARIS 2. To understand this paper, one must be familiar with SAS macros and also have FAME experience. Knowledge of FORTRAN would be helpful.

FAME

FAME is a product for storing, analyzing, and publishing time series data. FAME data bases are special files managed and indexed by FAME. A FAME database can contain time series with different frequencies such as weekly, monthly, and annual. The FAME language is an interactive command driven language.

GETFAME MACRO

The GETFAME macro copies data from a FAME database to a SAS data set.
The GETFAME syntax follows:
%getfame(sy= *startyr*, **sp=** *startper*, **ey=** *endyr*,
ep=*endper*, **listin**=*SAS–data–set–vars,*
data=*SAS–data–set–output,*
dbn= '*database–name*'**);**
where
startyr is the start year of the data to be retrieved,
startper is the start period of the data to be retrieved (monthly time series have 12 periods for example),
endyr is the end year of the data to be retrieved,
endper is the end period of the data to be retrieved,
SAS–data–set–vars is the name of an existing SAS data set containing the following two character variables:

fname which contains the names of the FAME series to be retrieved, and
sname which contains the corresponding SAS variable names of the FAME series. (These two variables are needed because many FAME series names are not valid SAS variable names.)
SAS–data–set–output is the SAS data set containing the data retrieved from FAME, and
database–name is the FAME database from which data are retrieved.

Note:
1. The number of observations in
SAS–data–set–vars will equal the number of FAME series retrieved.
2. The output SAS data set also contains a variable called __date, which is the YYYYMMDD date for each observation.
3. All FAME series retrieved by an execution of GETFAME must have the same frequency.

GETFAME EXAMPLE

In the following example, data from the series *gnp.q* and *gnp_w.q* are retrieved from the FAME database /fm/a.db. The FAME series are written into the SAS data set *f1,* where they are renamed *gnpquar* and *qnpwq.* The FAME data, which is *quarterly*, will be retrieved from from 1960 quarter 1, until 1962 quarter 2.

```
 /* start SAS code */
data fname;  length fname $ 60 sname $ 8 ;
   input fname $ sname $ ; cards;
   'gnp.q' gnpquar
   'gnp_w.q' gnpwq
   ;
%getfame(sy=1960,    sp=1,    ey=1962,    ep=2,
listin=fname,  dbn='/fm/a.db',data=f1);
```

The output SAS dataset *f1* is printed below.

OBS	GNPQUAR	GNPWQ	__DATE
1	530.3	3.0	19600331
2	529.2	3.1	19600630
3	532.2	3.3	19600930
4	527.3	3.4	19601231
5	531.8	3.7	19610331
6	542.4	3.5	19610630
7	553.2	3.6	19610930
8	566.3	3.7	19611231
9	579.0	3.7	19620331
10	586.9	4.1	19620603

HOW GETFAME WORKS

The GETFAME macro does the following:
1. Writes the user input to a flat file. The flat file lists start year, start period, end year, end period, number of series, database name, and series list. For the example above, the flat file is:

```
1960
1
1962
2
2
/fm/a.db
gnp.q
gnp_w.q
```

2. The macro then executes a FORTRAN program (via a SAS pipe command) that uses the FAME supplied HLI (Host Language Interface) routines. These routines allow you to read from or write to a FAME database from a FORTRAN or C program. The flat file above is read in by the FORTRAN program. The FORTRAN program then accesses the FAME database and produces a second flat file containing the requested data retrieved from the FAME database along with corresponding date values. The first number on the file is the number of observations. For the above example, this flat file is:

```
10
  530.3   529.2   532.2   527.3
  531.8   542.4   553.2   566.3
  579.0   586.9
    3.0    3.1    3.3    3.4
    3.7    3.5    3.6    3.7
    3.7    4.1
19600331      19600630      19600930      19601231
19610331      19610630      19610930      19611231
19620331      19620630
```

3. The GETFAME macro then reads the second flat file into a SAS dataset and names the SAS variables as requested.

THE PUTFAME MACRO

The PUTFAME macro copies data from a SAS dataset to a FAME database. The source files for many FAME series are flat files read by SAS. This macro allows a user to read the source file with SAS and write the data directly into FAME.

The PUTFAME syntax follows:

%putfame(sy=startyr, **sp=**startper, **freq='**fre**',**
listin=SAS–data–set–vars,
data=SAS–data–set–input, **basis='**bas**',**
obs='observed**',** **dbn='**database–name**');**

where

startyr is the start year of the FAME data series to be created or updated,

startper is the start period of the FAME data series to be created or updated,

fre is the frequency of the FAME series such as quarterly, business, etc.,

SAS–data–set–vars is an existing SAS data set containing the following two character variables:

 fname, the FAME names given to the SAS variables to be copied into the FAME database.

 sname, the names of the SAS variables to be copied to the FAME database, and

SAS–data–set–input is the SAS data set containing the data to be copied to the FAME database,

bas is the basis attribute (either daily and business) of the FAME series,

observed is the observed attribute of the FAME series,

database–name is the FAME database where the data is written.

The following example copies the variables gnpsas and invsas from the SAS dataset sasfrom to the FAME database /xxx/fame/f.db. The variables are renamed gnp...fame and in1234567890fame. The FAME series have a monthly frequency, and begin in February 1970. Other FAME attributes are a basis of business, and an observed of beginning. Prior to executing PUTFAME, we create the SAS data set fametest containing the corresponding SAS and FAME names.

```
  /* create the variable list */
  data fametest;
    length fname $ 60 sname $ 8 ;
    input fname $ sname $ ; cards;
    'gnp...fame' gnpsas
    'in1234567890fame' invsas
    ;
  /* write the data  into FAME */
%putfame(sy=1970,sp=2,freq='monthly',
listin=fametest,data=sasfrom,basis='business',
observed='beginning',dbn='/xxx/fame/f.db');
```

HOW PUTFAME WORKS

The PUTFAME macro creates a flat file from the user input values. It then calls a FORTRAN HLI program (via a SAS pipe command) which opens a FAME database and writes the data values from the specified SAS dataset into the FAME database. If the FAME series exist, they are updated. If they do not exist, they are created. The flat file created by the macro contains the number of observations, start year, start period, number of variables, database name, frequency, basis, observed, first series name, first series values, second series name, second series values, ..., etc.

SAS SOFTWARE CAPABILITIES

UNIX SAS Release 6.11 has GETFAME capability in PROC DATASOURCE, which is a SAS/ETS® procedure. UNIX SAS release 6.12 users can obtain an experimental sasefame engine which can be used to retrieve FAME data into a SAS dataset. Users at our site are testing these new capabilities and have the option to use the SAS supplied capabilities or the macros. The macros have been used since SAS Release 6.03. SAS software has no PUTFAME capability.