

How To Grow a Macro

Robert A. Lewis

nab

28/11/2007

Aims

- Demonstrate use of macros by recourse to examples of using SAS Graph

Plot 1 ►

What Is A SAS Macro?

- Macros are like subroutines.
- Can Be complete programs.
- Don't confuse with macro variables.

Why Use Macros?

- Difficult or repetitive tasks can be performed by executing a couple of lines.
- Control of macro source code.
- Less chance of corruption or errors.
- Ease of updating and maintenance, only needs to be altered at the source i.e. the macro library

Why Use Macros? (ctd.)

- May be stored in a library and accessed by many users via a reference in an autoexec.sas file
- Applications where the code is difficult or obscure (SAS Graph is extremely versatile and consequently has many features and options).
- Macros can be subsumed into other macros and programs.

Documentation

- Macros need to be documented and have change control in the documentation and the authors of such changes.
- The documentation should be in the macro source file and in a separate file accessible to prospective users.

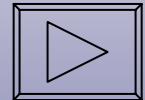
Documentation: Header

```
/*  
/*  
/* Title: genplt1.sas  
/*  
/* Author: Robert A. Lewis  
/*  
/* This macro does general plotting via PROC GPLOT.  
/* It assumes that the SYMBOL statement has been set  
/* up via the %symb10(dsn,yvar) or other macro,  
/* use the set of yvars that has the most variables to  
/* ensure that sufficient symbols have been defined.  
/*  
/* The ranges for the plots for both the x and y  
/* variables are dynamically determined, steps and  
/* minor ticks are determined by the ranges of the  
/* plotted variables.  
/*
```

(Continued)

Documentation: Usage

```
/* Usage: */
/* %genplt1(dsn,yvar,yttl,xvar,xttl,nm,lin,loff,lvrt, */
/*          llab,lval,info) */
/* dsn is the data set name */
/* yvar denotes the y-variables to be plotted */
/* yttl is the y-axis name */
/* xvar denotes the x-variable to be plotted */
/* xttl is the x-axis name */
/* nm is the graph name */
/* lin is for a special annotation */
/* 1 is for the note statement, required for the */
/* multimod macro */
/* 2 is for vertical reference line at 100 */
/* 3 is for vertical reference line at 1 */
/* loff is the legend offset (x,y) */
/* lvrt is the legend's vertical (y) position: */
/* bottom|middle|top */
/* llab is the legend label */
/* lval are the legend-values (see next line) */
/* "lval1" "lval2" ... */
/* info is required for the multimod macro. */
```



(Continued)

Documentation: Dependencies & History

```
/* Required Macros: */
/* */
/* symb10.sas or other symbol definitions for the plot */
/* multimod.sas when lin = 1. */
/* */
/* Revision History: */
/* 02/08/07 See when the value of lin is 1 above. */
/* 09/08/07 Modifications to the note statement. */
/* 15/08/07 Modifications to the note statement, */
/*          enquote info. */
/*****/
```

Costs Example

```
goptions reset=global gunit=pct cback=white
        colors=(black) border ftext=zapf htext=3;
```

```
data prodcost (drop=tcprev tfc tvc tc);
```

```
  retain tcprev 0;
```

```
  input quan tfc tvc @@;
```

```
  tc=tfc+tvc;
```

```
  afc=tfc/quan;          /* average fixed cost      */
```

```
  avc=tvc/quan;          /* average variable cost  */
```

```
  atc=tc/quan;           /* average total cost     */
```

```
  mc=tc-tcprev;         /* marginal cost          */
```

```
  tcprev=tc;
```

```
  datalines;
```

```
1      10      05      2      10      08      3      10      10      4      10      11
5      10      13      6      10      16      7      10      20      8      10      25
9      10      31     10      10      38     11      10      46
```

```
;
```

```
run;
```

Macro Invocation

```
%symb10(WORK.PRODCOST,mc atc afc avc,spline)
```

```
title1 height=6 'Projected Cost of Production';
```

```
%genplt1(WORK.PRODCOST
```

```
    ,mc atc afc avc
```

```
    ,Dollar Cost (hundreds)
```

```
    ,quan
```

```
    ,Thousands of Units,
```

```
    ,gph1
```

```
    ,
```

```
    ,(10, -15),
```

```
    ,top
```

```
    ,Component
```

```
    ,"Marginal Cost" "Avg. Total Cost"
```

```
    "Avg. Fixed Cost" "Avg. Variable Cost"
```

```
    ,)
```

[◀ Go Back To Doc 2](#)

Standard Code

```
title1 height=6 'Projected Cost of Production';
axis1 minor=none value=(font=swissb) offset=(1,22)
    label=('Thousands of Units') width=2;
axis2 order=(0 to 16 by 2) minor=none value=(font=swiss)
    offset=(0,0)
    label=( angle=90 'Dollar Cost (in hundreds)') width=2;

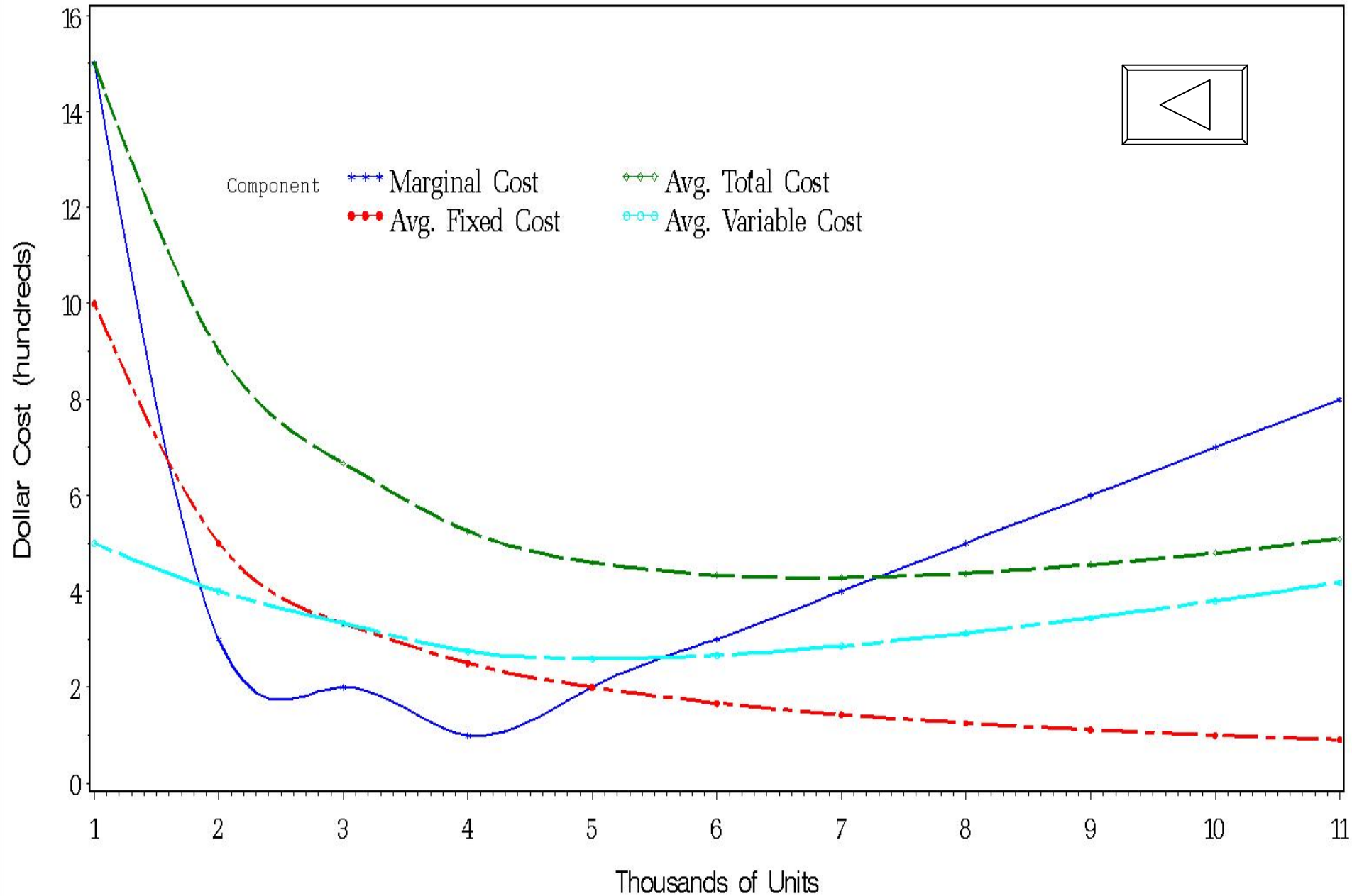
symbol1 interpol=spline width=2 color=blue line=1;
symbol2 interpol=spline width=2 color=green line=5;
symbol3 interpol=spline width=2 color=red line=9;
symbol4 interpol=spline width=2 color=cyan line=13;

Legend1 across=2 offset=(10,-15) pct
    position=(top left inside)
    label=(color=black font=courier "Component")
    value=("Marginal Cost" "Avg. Total Cost"
        "Avg. Fixed Cost" "Avg. Variable Cost") mode=share;
```

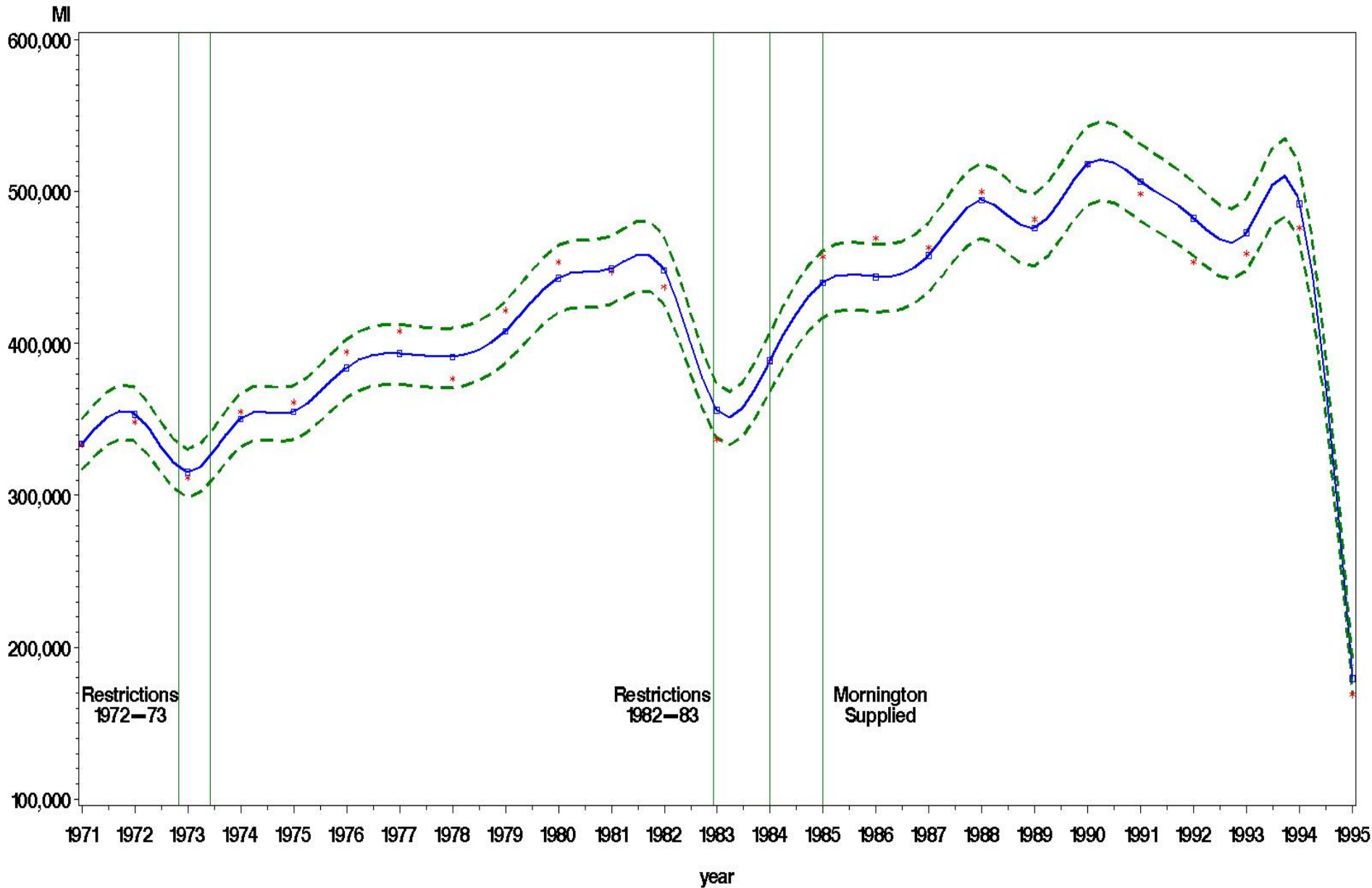
Standard Code (ctd.)

```
proc gplot data=prodcost;  
    plot (mc atc afc avc)*quan  
    /overlay frame haxis=axis1 vaxis=axis2 legend=legend1;  
run;  
quit;
```

Projected Cost of Production



Annual Total Consumption in MI



type - - - Lower 95% Limit * * * Observed Values □ - □ Predicted Values - - - Upper 95% Limit

Model for Total Monthly Consumption (MTHCONS)

Plot of Residuals vs. Date

