

**DEX ... PARETO ABSOLUTE EFFECTS PLOT****PURPOSE**

Generates a dex Pareto absolute effects plot for a given statistic.

**DESCRIPTION**

A dex Pareto absolute effects plot is a graphical method for representing a design of experiment problem. The first variable is a response variable while the remaining variables (must be at least one) represent levels of factors. The user specified statistic is computed for each level of each factor. This plot consists of:

- Vertical axis = if there are exactly 2 levels, the effect is the value of the statistic for the lower level subtracted from the value of the statistic for the higher level (this can be positive or negative). The absolute value of this number is taken. If there are more than 2 levels, the lowest value of the statistic is subtracted from the highest value of the statistic (this value is always positive). The values are then sorted from highest to lowest.
- Horizontal axis = the factor id (i.e., 1 for the factor with the highest value, 2 for the factor with the second highest value, and so on).

This plot graphically shows the following:

1. The magnitude of the maximum differences for a given statistic between levels of a factor;
2. How these maximum differences vary between factors.

**SYNTAX 1**

DEX <stat> PARETO ABSOLUTE EFFECTS PLOT <y> <x1> ... <xn> <SUBSET/EXCEPT/FOR qualification>

where <y> is the response variable;

<x1> ... <xn> are a sequence of variables representing factors in a designed experiment;

<stat> is one of the following statistics:

MEAN (or AVERAGE), MIDMEAN, MEDIAN, TRIMMED MEAN, WINDSORIZED MEAN,  
 SUM, PRODUCT, SIZE (or NUMBER or COUNT), MINIMUM, MAXIMUM,  
 STANDARD DEVIATION (or SD), VARIANCE,  
 STANDARD DEVIATION OF MEAN (or SDM), VARIANCE OF MEAN (or VM),  
 RELATIVE STANDARD DEVIATION (or RELSD),  
 RELATIVE VARIANCE (or RELV or COEFFICIENT OF VARIATION),  
 RANGE, MIDRANGE, LOWER HINGE, UPPER HINGE, LOWER QUARTILE, UPPER QUARTILE,  
 <FIRST/SECOND/THIRD/FOURTH/FIFTH/SIXTH/SEVENTH/EIGHTH/NINTH> DECILE (or 1DEC, 2DEC,  
 3DEC, 4DEC, 5DEC, 6DEC, 7DEC, 8DEC, 9DEC),  
 SKEWNESS, KURTOSIS, PROPORTION,  
 AUTOCORRELATION, AUTOCOVARANCE,  
 SINE FREQUENCY, SINE AMPLITUDE,  
 CP, CPK, EXPECTED LOSS, PERCENT DEFECTIVE,  
 SINE FREQUENCY, SINE AMPLITUDE,  
 TAGUCHI SN, TAGUCHI SN+, TAGUCHI SN-, TAGUCHI SN00;

and where the <SUBSET/EXCEPT/FOR qualification> is optional.

This syntax is used for statistics that only require a single variable to compute.

**SYNTAX 2**

DEX <stat> PARETO ABSOLUTE EFFECTS PLOT <y> <x> <x1> ... <xn> <SUBSET/EXCEPT/FOR qualification>

where <y> is the response variable;

<x> is a second variable used in calculating the statistic (e.g., a linear fit is computed between <y1> and <x>);

<x1> ... <xn> are a sequence of variables representing factors in a designed experiment;

<stat> is one of the following statistics:

LINEAR INTERCEPT, LINEAR SLOPE, LINEAR RESSD, LINEAR CORRELATION,

and where the <SUBSET/EXCEPT/FOR qualification> is optional.

This syntax is used for statistics that require two variables to compute.

**EXAMPLES**

DEX MEAN PARETO ABSOLUTE EFFECTS PLOT Y X1 X2

DEX SD PARETO ABSOLUTE EFFECTS PLOT Y X1 X2 X3

DEX RANGE PARETO ABSOLUTE EFFECTS PLOT Y X1 X2 X3 X4  
 DEX RANGE PARETO ABSOLUTE EFFECTS PLOT Y X1 TO X4

**NOTE 1**

This plot is similar to the DEX ... PARETO EFFECTS PLOT. The distinction is that the Pareto absolute effects plot takes the absolute value of the effect while the Pareto effects plot does not. This only applies if there are exactly two levels (for more than two levels, the two plots are identical). The DEX ... ABSOLUTE EFFECTS PLOT is also similar (the effects are not ordered). The unordered version is often generated first so that the ordered plot can be labeled with the correct factors on the horizontal axis (as was done in the example program below).

**NOTE 2**

This plot is normally done for a location parameter (typically the mean or median) or a spread parameter (typically the standard deviation or range). The other statistics are less often used.

**NOTE 3**

The TO syntax is allowed for the list of factor variables (see the EXAMPLES above).

**NOTE 4**

The CHARACTER, BAR, SPIKE, and LINE settings can be used to control the appearance of the plot. The trace is typically drawn with a blank line and some type of character set (the choice of character is a matter of user preference) or with no character and a bar. In any event, the user must explicitly set character and line settings (they default to all lines solid and all characters blank).

**DEFAULT**

None

**SYNONYMS**

DEX ... EFFECTS PARETO ABSOLUTE PLOT  
 DEX ... EFFECTS ABSOLUTE PARETO PLOT  
 DEX ... PARETO EFFECTS ABSOLUTE PLOT  
 DEX ... ABSOLUTE PARETO EFFECTS PLOT  
 DEX ... ABSOLUTE EFFECTS PARETO PLOT

**RELATED COMMANDS**

LINES	=	Sets the type for plot lines.
CHARACTER	=	Sets the type for plot characters
PLOT	=	Generates a data or function plot.
DEX SCATTER PLOT	=	Generates a dex scatter plot.
DEX SIGN PLOT	=	Generates a dex sign plot.
DEX ... PLOT	=	Generates a dex plot for a statistic.
DEX ... PARETO PLOT	=	Generates a Pareto dex plot for a statistic.
DEX ... YOUNDEN PLOT	=	Generates a Youden dex plot for a statistic.
DEX ... EFFECTS PLOT	=	Generates an effects dex plot for a statistic.
DEX ... PARETO EFFECTS PLOT	=	Generates a Pareto effects dex plot for a statistic.
DEX WIDTH	=	Specifies the width of levels in a dex plot.

**REFERENCE**

“Statistics for Experimenters,” Box, Hunter, and Hunter, Wiley and Sons, 1978.

**APPLICATIONS**

Design of Experiments

**IMPLEMENTATION DATE**

89/12

## PROGRAM

```

SKIP 25
READ SHEESLE2.DAT Y PROC PLANT SPEED SHIFT PROC
.
BAR ON
BAR WIDTH 0.5
LINE BLANK
TITLE DEX PARETO ABSOLUTE EFFECTS PLOT
LET NUMFAC = 4
XLIMITS 1 NUMFAC
MAJOR XTIC MARK NUMBER NUMFAC
MINOR XTIC MARK NUMBER 0
XTIC OFFSET 1 1
XTIC LABEL FORMAT ALPHA
.
MULTIPLY 2 2; MULTIPLY CORNER COORDINATES 0 0 100 100
YILABEL MEAN
XTIC LABEL CONTENT SHIFT SPEED PLANT PROCESS
DEX MEAN PARETO ABSOLUTE EFFECTS PLOT Y PROC PLANT SPEED SHIFT
YILABEL MEDIAN
XTIC LABEL CONTENT SHIFT SPEED PLANT PROCESS
DEX MEDIAN PARETO ABSOLUTE EFFECTS PLOT Y PROC PLANT SPEED SHIFT
YILABEL STANDARD DEVIATION
XTIC LABEL CONTENT SHIFT PLANT SPEED PROCESS
DEX SD PARETO ABSOLUTE EFFECTS PLOT Y PROC PLANT SPEED SHIFT
YILABEL RANGE
XTIC LABEL CONTENT SHIFT PLANT SPEED PROCESS
DEX RANGE PARETO ABSOLUTE EFFECTS PLOT Y PROC PLANT SPEED SHIFT
END OF MULTIPLY

```

