

PRODUCING GRAPHS IN SAS (AND EXCEL)

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OASUS meeting
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TOOLS AVAILABLE

□ SAS/GRAPH

- Utilization of SAS files
- SAS programming

□ EXCEL

- Exportation of the SAS files to EXCEL
- Utilization of menus in EXCEL

SAS/GRAPH

- Most commonly used procedures:
 - GPLOT -> equivalent to PLOT
 - GCHART -> equivalent to CHART

 - G3D)
 - G3GRID) for graphs in 3 dimensions
 - GCONTOUR)

SAS/GRAPH

- Statements to specify the general aspect of the graph
 - AXIS
 - LEGEND
 - PATTERN
 - SYMBOL
- Statements commonly used in SAS programs
 - TITLE
 - FOOTNOTE

I) SAS/GRAPH: PROC GPLOT

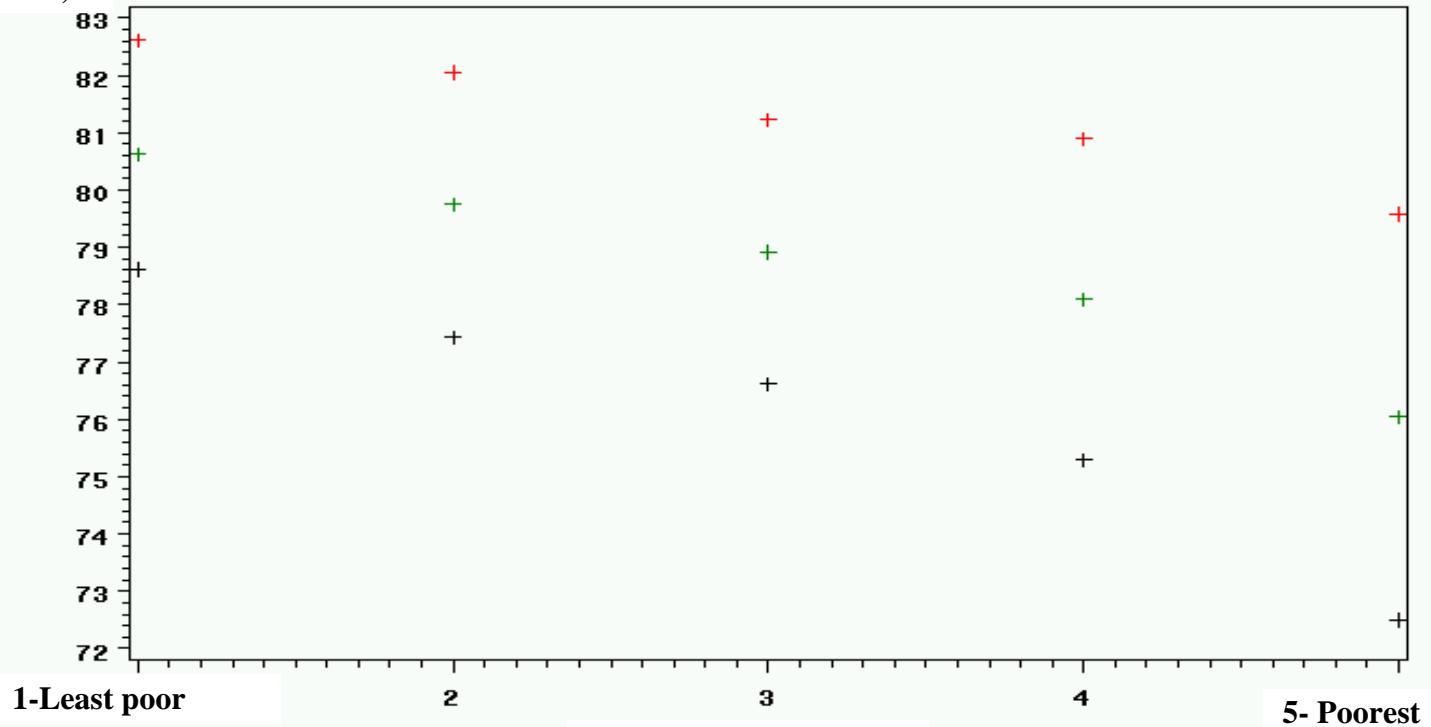
- Example used:
 - Life expectancy in Ottawa-Gatineau Census Metropolitan Area (1996)
 - By income quintile
 - By sex

I) SAS/GRAPH: PROC GGPLOT

1- With no specification

Life expectancy in Ottawa-Gatineau CMA

Life expectancy (years)



Income quintile
Sexe + + + M + + + F + + + F et M

No specification

I) SAS/GRAPH: PROC GPLOT

1- With no specification

SAS program:

```
proc format;
  value level  1='1-Least poor'
              5='5-Poorest';
  value sex    1='M'
              2='F'
              3='F and M';
run;

proc gplot data=newfile;
  plot e1*qa=sex;
  format qa level. sex sex. ;
  label e1='Life expectancy (years)';
  label qa='Income quintile';
run;
quit;
```

Creating the
formats

Scatter plot of life
expectancy as a
function of income
quintile (for each
value of sex)

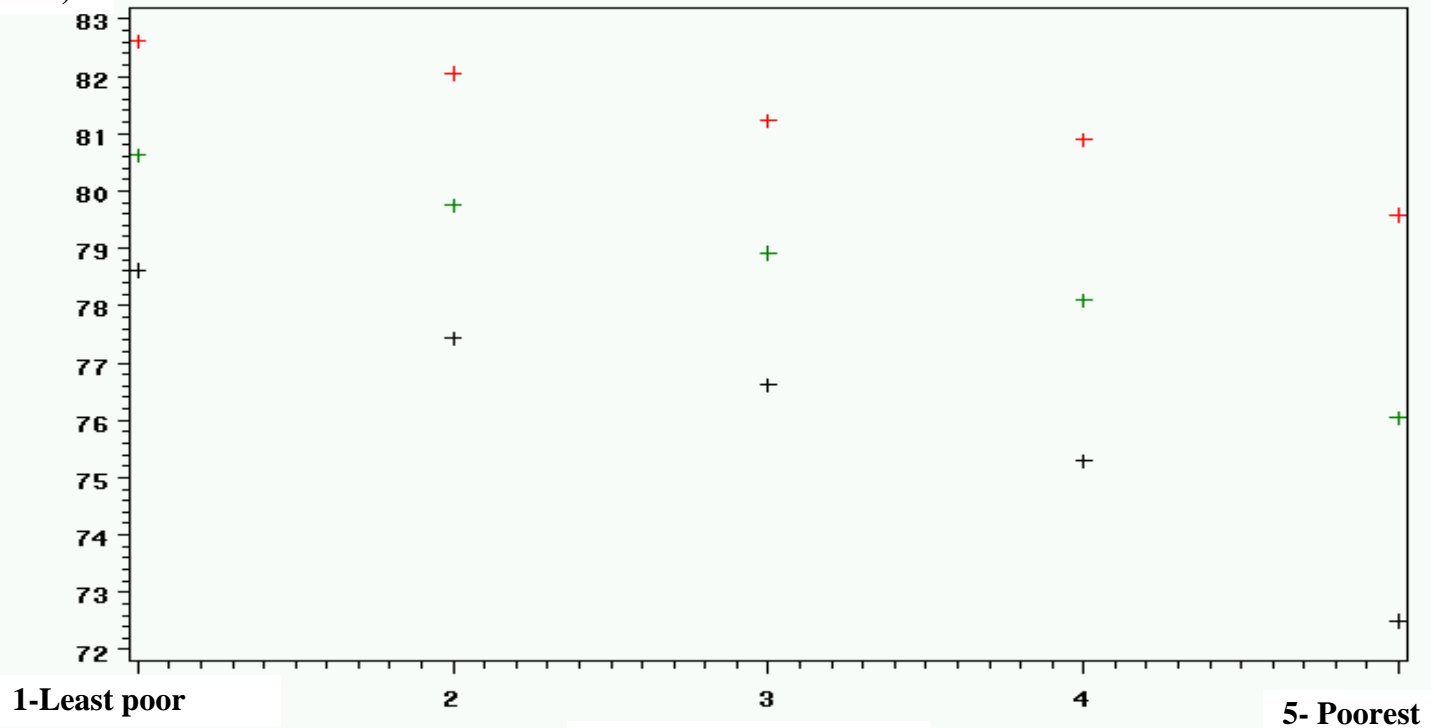
Assigning the
appropriate
formats

I) SAS/GRAPH: PROC GGPLOT

1- With no specification

Life expectancy in Ottawa-Gatineau CMA

Life expectancy (years)



Income quintile
Sexe + + + M + + + F + + + F et M

No specification

1) SAS/GRAPH: PROC GPLOT

2- With specifications

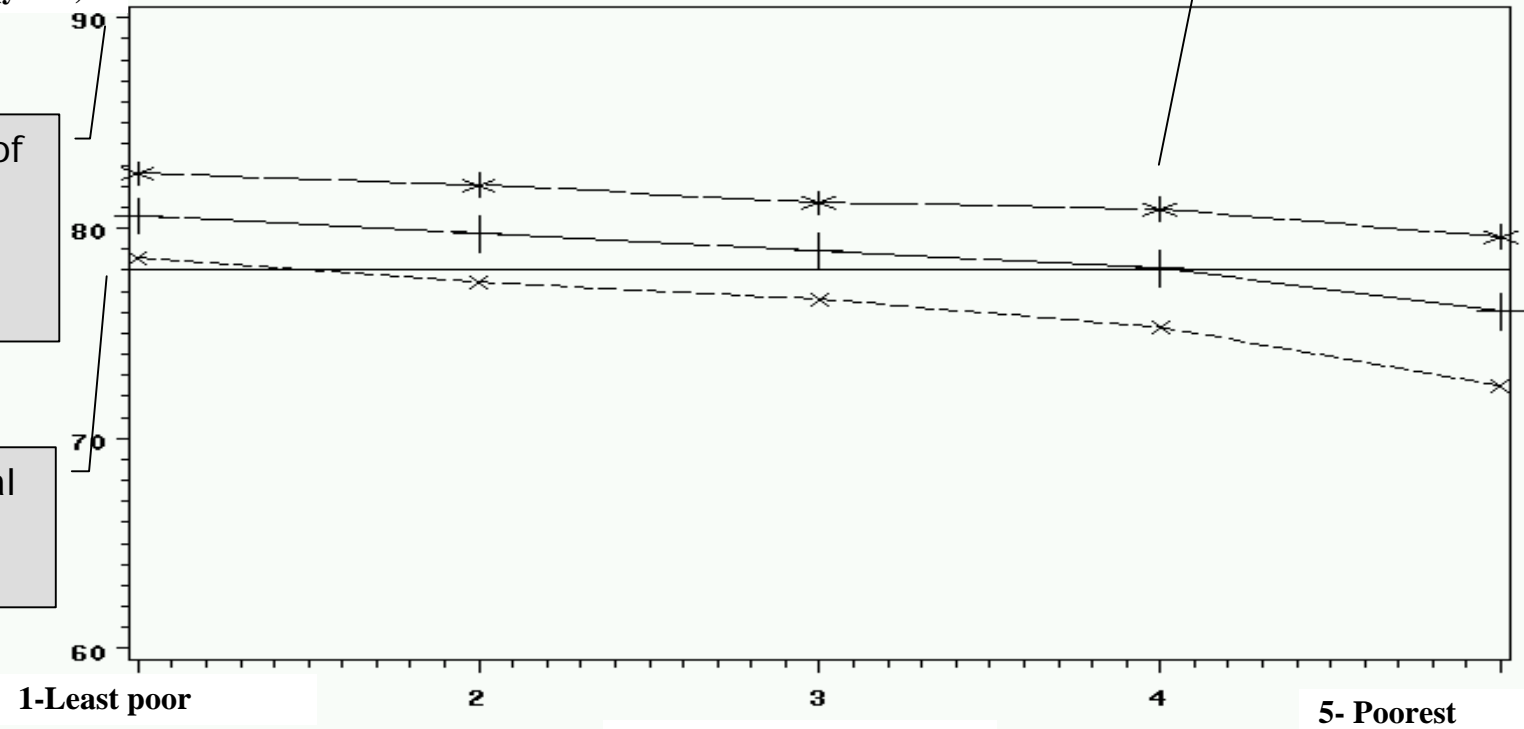
Life expectancy in Ottawa-Gatineau CMA

Choice of symbols:
symbol1-
symbol3

Life expectancy (years)

Bounds of vertical axis:
vaxis

Horizontal line:
vref



With specifications

1) SAS/GRAPH: PROC GPLOT

2- With specifications

SAS Program:

```
symbol1 f= c=black value=x      interpol=join height=1 l=3;  
symbol2 f= c=black value=star  interpol=join height=2 l=5;  
symbol3 f= c=black value=plus  interpol=join height=3 l=7;
```

symbol1-99: Symbol Number

F= Font C=Color Height=Height of symbol

Value=Type of symbol	point	star	plus	x	diamond	triangle	hash
	y	z	'/'	dot	circle	'_'	'"'
square	'#'	'\$'	'%'	'&'	' '	'='	' '
'-'	'@'	'*'	'+'	'>'	'<'	'('	' '
)'	:'	'?'	','	'.'			

Interpol=Type of interpolation L=Type of interpolation line

```
proc gplot data=newfile;  
plot e1*qa=sex / vaxis=60 to 90 by 10 vref=78;  
format qa level. sex sex.;  
label e1='Life expectancy (years)';  
label qa='Income quintile';  
run; quit;
```

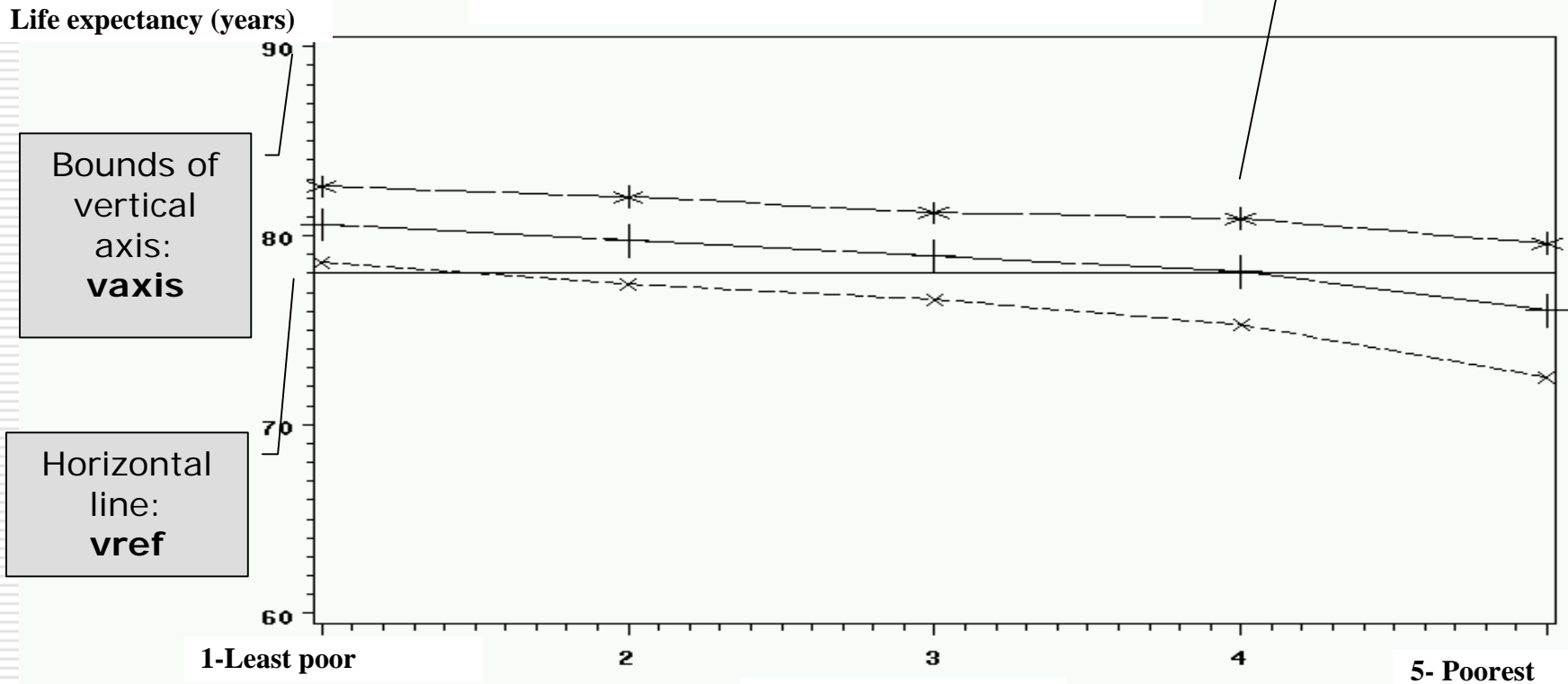
Vaxis=Bounds of
vertical axis

Vref=Horizontal line

1) SAS/GRAPH: PROC GGPLOT

2- With specifications

Life expectancy in Ottawa-Gatineau CMA



Bounds of vertical axis:
vaxis

Horizontal line:
vref

Choice of symbols:
symbol1-
symbol3

Income quintile u

Sexe x-x-x M *-*-* F +--+ F et M

With specifications

II) EXCEL

- Exporting the SAS file to EXCEL
- Producing the graph in EXCEL

II) EXCEL

a) Exporting the SAS file to EXCEL

1- Longer in SAS, simpler in EXCEL

qa	ev1	ev2	ev3
1	78.61956	82.61789	80.61873
2	77.4327	82.05474	79.74372
3	76.6182	81.22078	78.91949
4	75.28657	80.90498	78.09577
5	72.50332	79.58368	76.0435

EXCEL file
to obtain

II) EXCEL

a) Exporting the SAS file to EXCEL

1- Longer in SAS, simpler in EXCEL

```
data ev;  
set newfile (keep=qa e1 sex);  
run;
```

Selecting the desired
variables

```
proc sort data=ev;  
by qa; run;
```

Merging by income quintile

```
data ev1(drop=sex);  
merge ev(where=(sex=1) rename=(e1=ev1))  
ev(where=(sex=2) rename=(e1=ev2))  
ev(where=(sex=3) rename=(e1=ev3));  
by qa;  
run;
```

```
proc export  
data=ev1  
outfile="h:\EV1"  
dbms=excel2000 replace;  
run;
```

Exporting to
EXCEL

II) EXCEL

a) Exporting the SAS file to EXCEL

2- Simpler in SAS, longer in EXCEL

```
data ev;  
set newfile (keep=sex qa e1);  
run;
```

Selecting
the desired
variables

```
proc export  
  data=ev  
  outfile="h:\EV"  
  dbms=excel2000 replace;  
run;
```

Exporting to
EXCEL

EXCEL file obtained.
One can then use Pivot
table report
in EXCEL

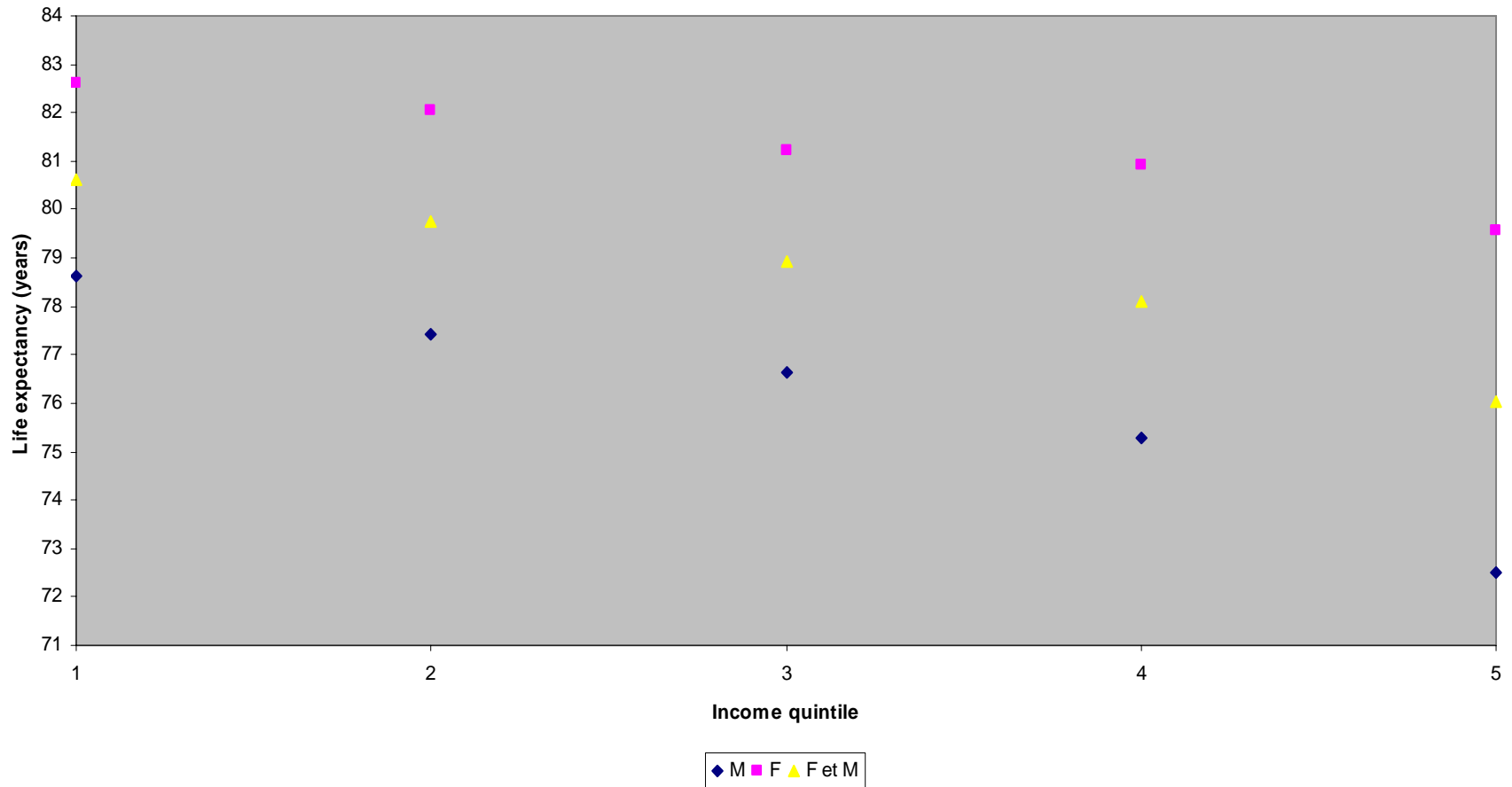
SEX	qa	e1	
1	5		72.50332
1	4		75.28657
1	3		76.6182
1	2		77.4327
1	1		78.61956
2	5		79.58368
2	4		80.90498
2	3		81.22078
2	2		82.05474
2	1		82.61789
3	5		76.0435
3	4		78.09577
3	3		78.91949
3	2		79.74372
3	1		80.61873

II) EXCEL

b) Producing the graph in EXCEL

1- Similar to GPLOT with no specification

Life expectancy in Ottawa-Gatineau CMA

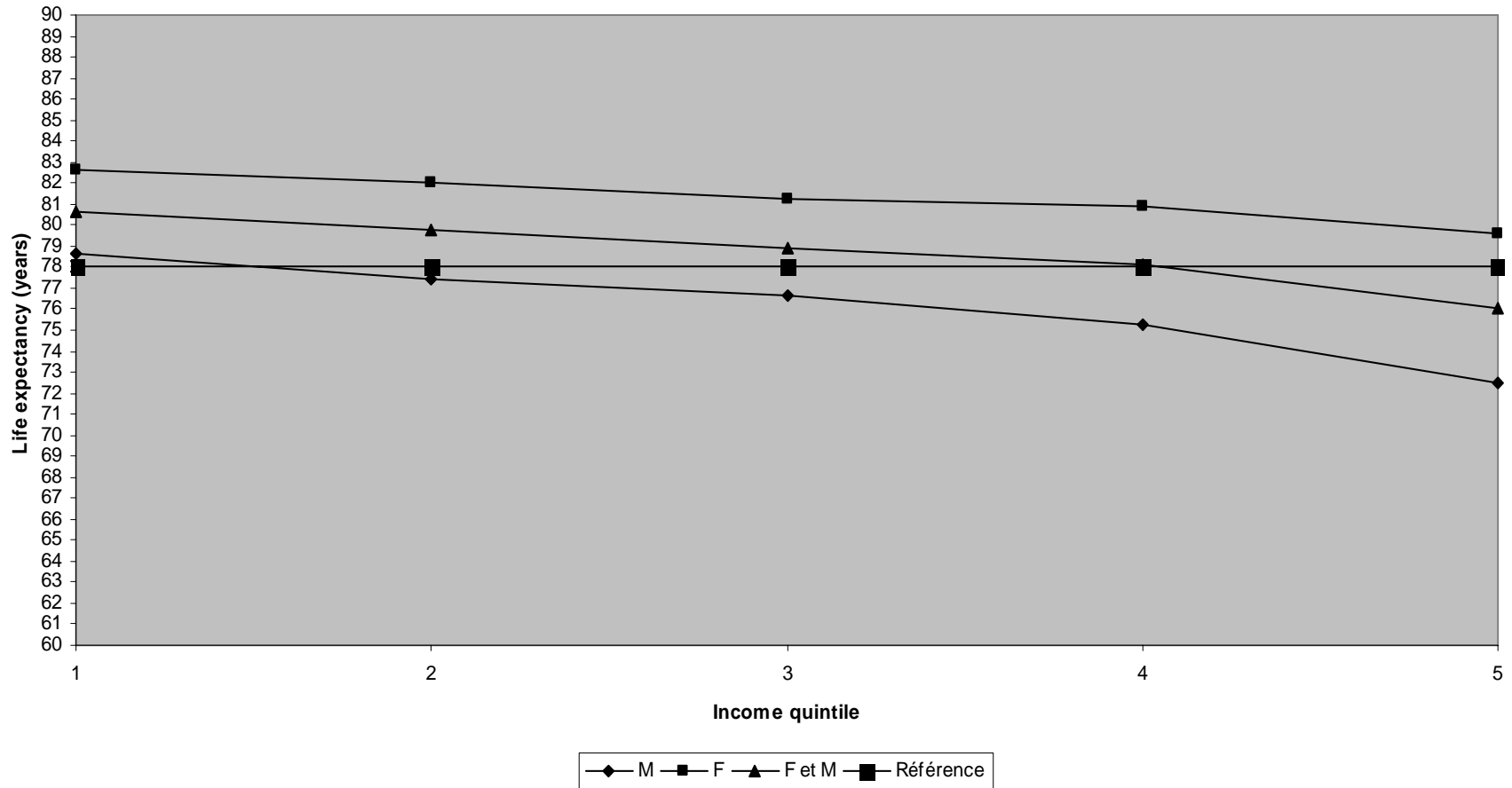


II) EXCEL

b) Producing the graph in EXCEL

1- Similar to GPLOT with specifications

Life expectancy in Ottawa-Gatineau CMA



III) SAS/GRAPH: PROC GCHART

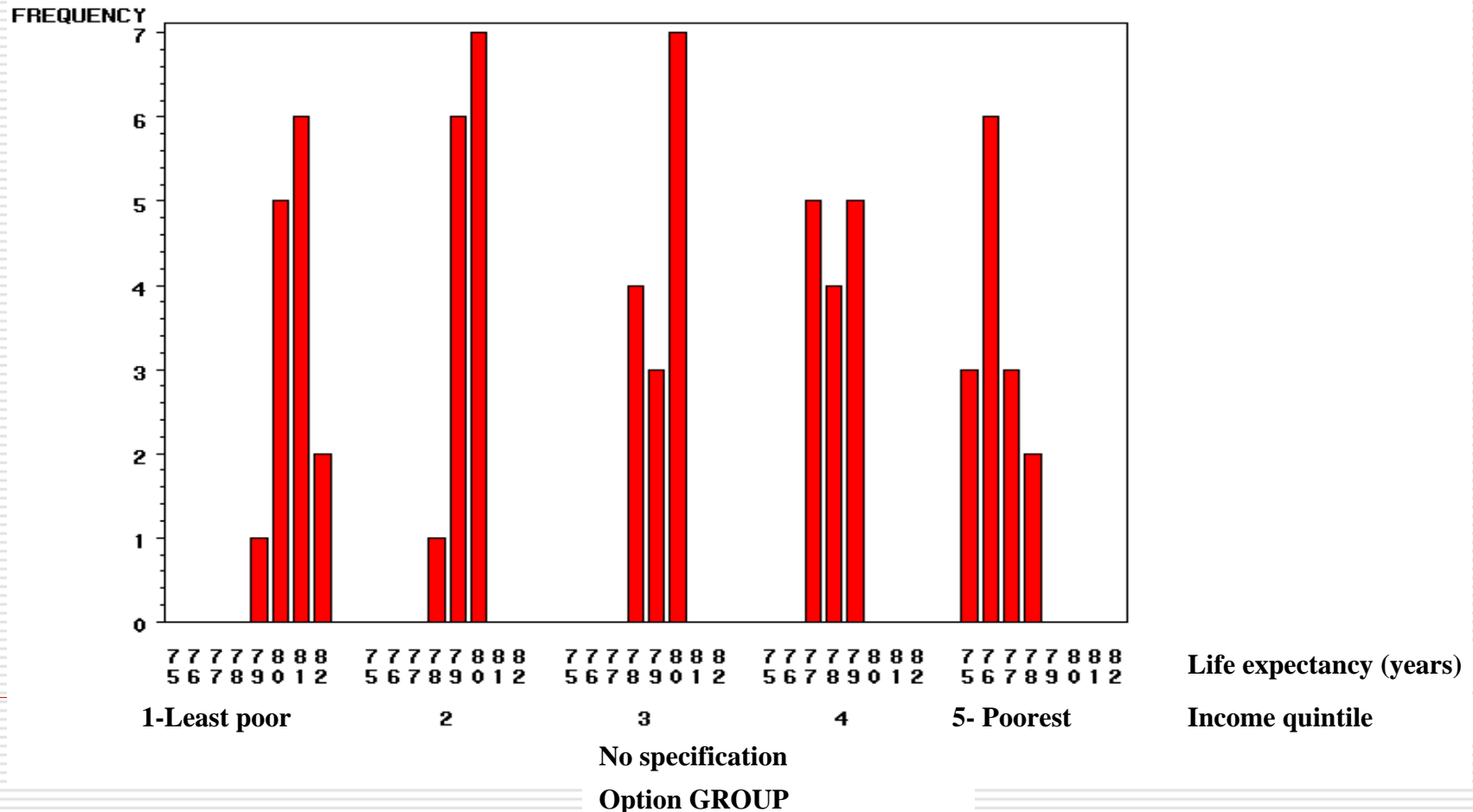
Example used:

- Life expectancy in the 14 Census Metropolitan Areas in Canada of more than 300 000 persons (1996)
 - By income quintile
 - Men and women together

III) SAS/GRAPH: PROC GCHART

1- With no specification – Histograms separated

Life expectancy in 14 CMAs



III) SAS/GRAPH: PROC GCHART

1- With no specification – Histograms separated

```
footnote2 'Option group';  
proc gchart data=newfile2;  
  vbar e1/group=qa;  
run;  
quit;
```

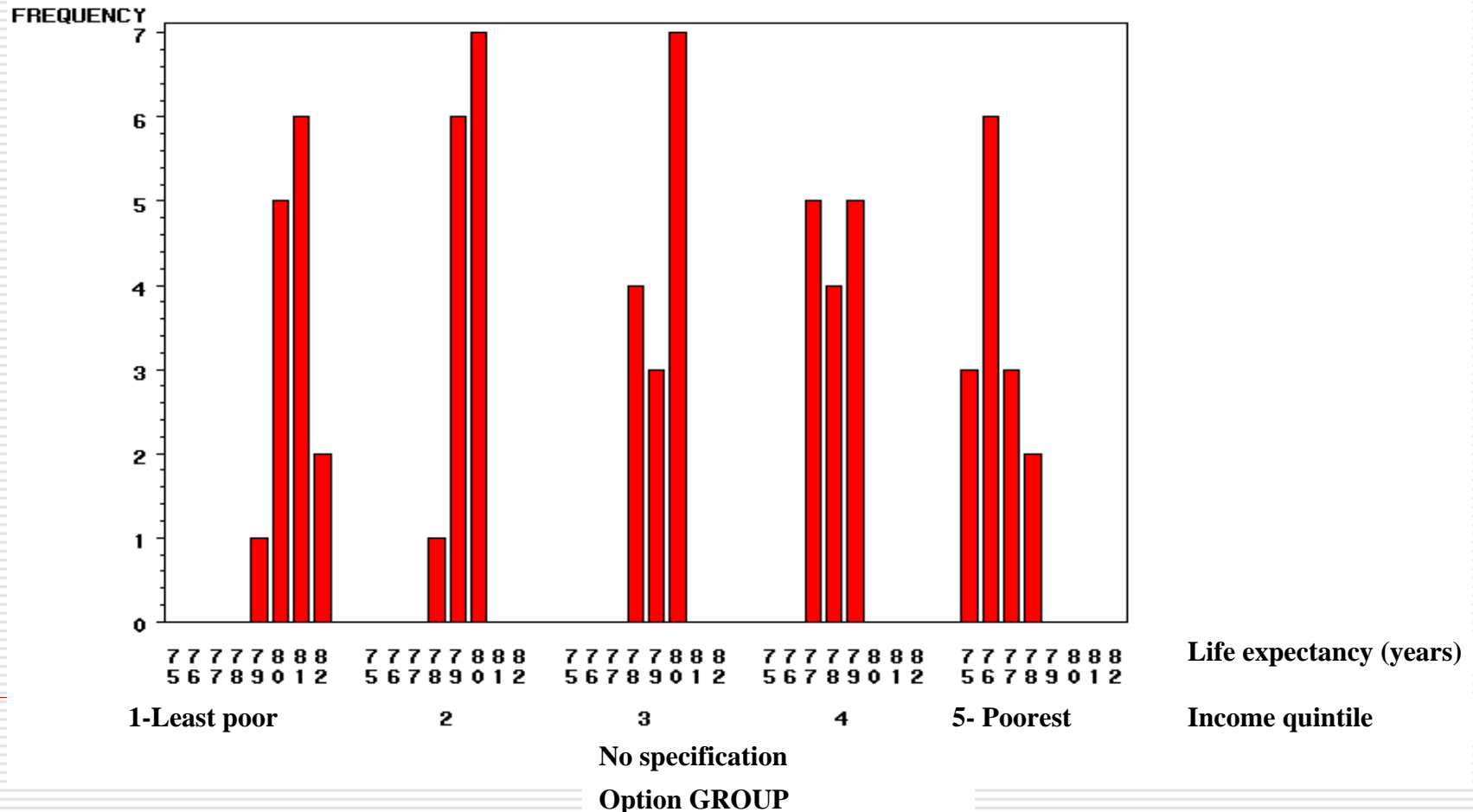
Vertical bar
chart of life
expectancy

GROUP: charts
separated

III) SAS/GRAPH: PROC GCHART

1- With no specification – Histograms separated

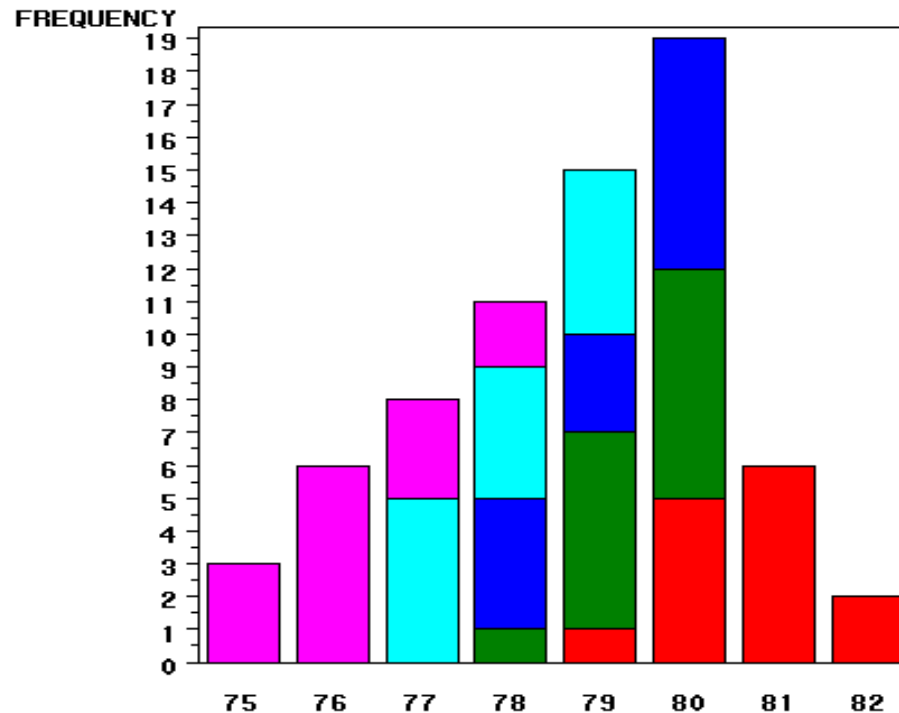
Life expectancy in 14 CMAs



III) SAS/GRAPH: PROC GCHART

1- With no specification – Histograms stacked

Life expectancy in 14 CMAs



Income quintile

1- Least poor

2

3

4

5- Poorest

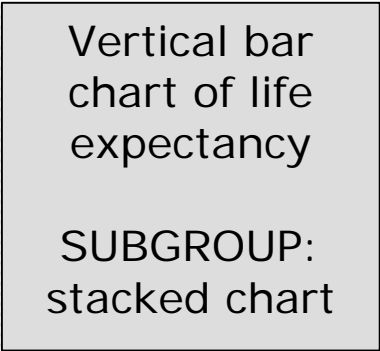
No specification

Option SUBGROUP

III) SAS/GRAPH: PROC GCHART

1- With no specification – Histograms stacked

```
footnote2 'Option subgroup';  
proc gchart data=newfile2;  
  vbar e1/subgroup=qa;  
run;  
quit;
```



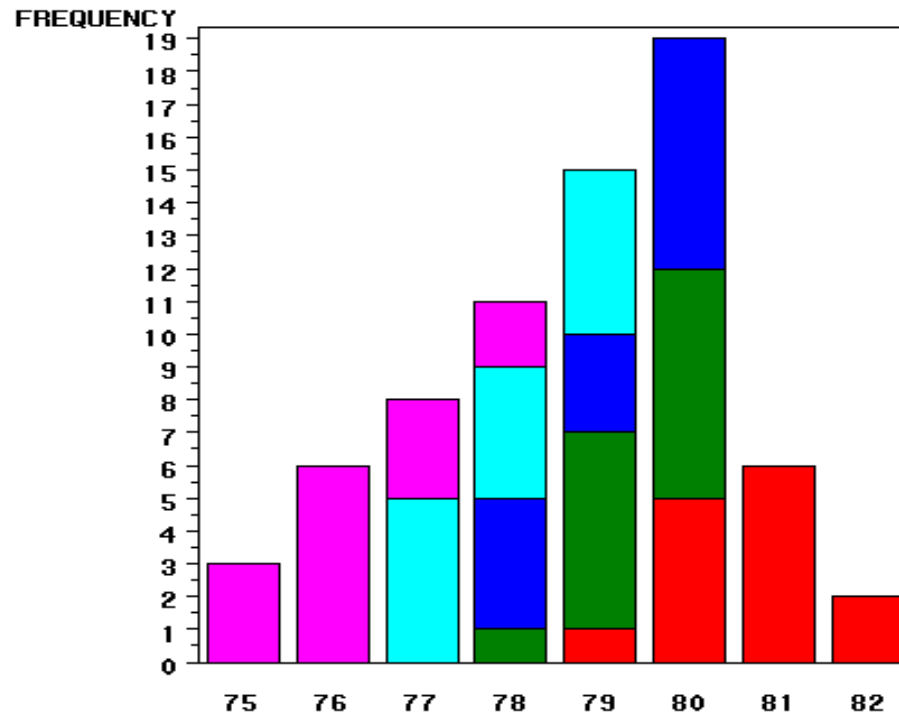
Vertical bar
chart of life
expectancy

SUBGROUP:
stacked chart

III) SAS/GRAPH: PROC GCHART

1- With no specification – Histograms stacked

Life expectancy in 14 CMAs



Income quintile



1- Least poor

4



5- Poorest

2



3

No specification

Option SUBGROUP

III) SAS/GRAPH: PROC GCHART

2- With specifications

```
pattern1 value=l5;
footnote2 'Option group';
proc gchart data=newfile2;
  vbar e1/group=qa;
run;
quit;

footnote2 'Option subgroup';
proc gchart data=newfile2;
  vbar e1/subgroup=qa;
run;
quit;
```

Pattern of bars:
Style specifies the direction of the lines:
L=left-slanting lines.
R=right-slanting lines.
X=crosshatched lines.

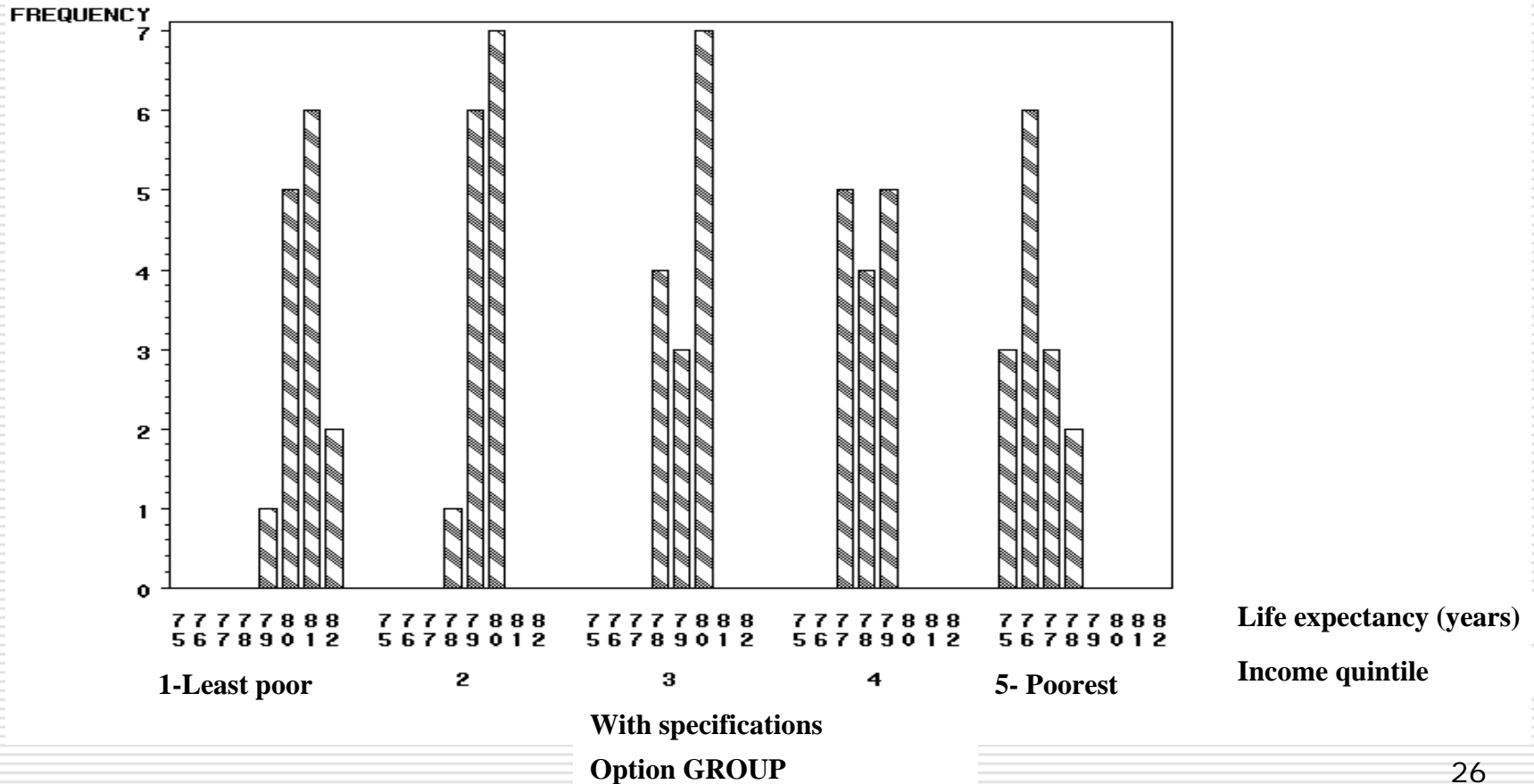
Density specifies the density of the pattern's shading: 1...5
1 produces the lightest shading and 5 produces the heaviest shading.

(Other options are possible)

III) SAS/GRAPH: PROC GCHART

2- With specifications – Histograms separated

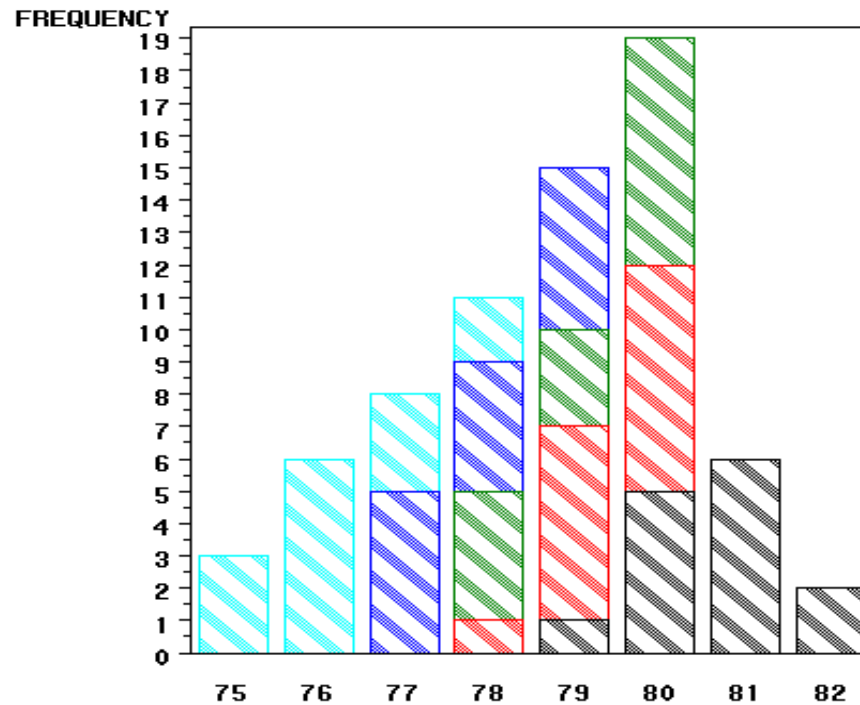
Life expectancy in 14 CMAs



III) SAS/GRAPH: PROC GCHART

2- With specifications – Histograms stacked

Life expectancy in 14 CMAs



Income quintile



1-Least poor

4



5- Poorest

2



3

With specifications

Option SUBGROUP

IV) SAS/GRAPH: PROC G3D

Example used:

Life expectancy in 5 Census Metropolitan Areas in Canada (1996)

- Halifax
- Québec City
- Montréal
- Ottawa-Gatineau
- Toronto

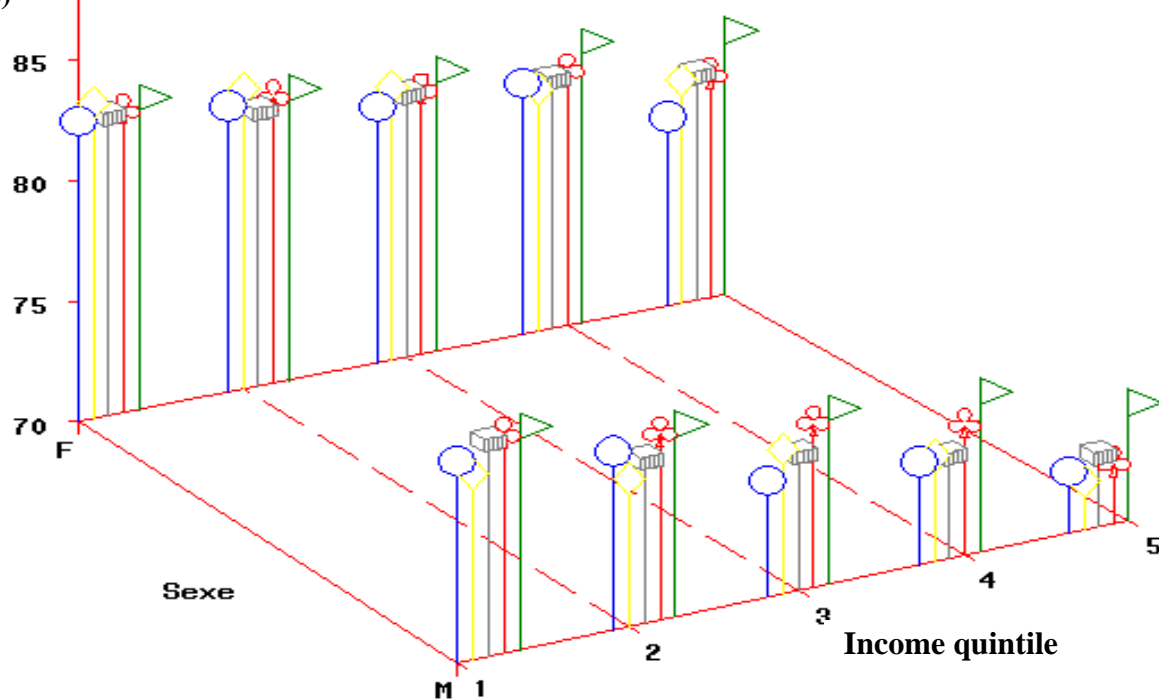
By income quintile

By sex (M or F)

IV) SAS/GRAPH: PROC G3D

Life expectancy in 5 CMAs

Life expectancy (years)



Blue balloon=Halifax -- Yellow diamond=Québec
Gray cube=Montréal -- Red club=Ottawa-Gatineau
Green flag=Toronto

IV) SAS/GRAPH: PROC G3D

```
data newfile4;
  set newfile3;
  select(cma);
    when('205') do;
      qa=qa-0.2; form='BALLOON';col='B';end;
    when('421') do;
      qa=qa-0.1; form='DIAMOND';col='Y';end;
    when('462') do;
      qa=qa;      form='CUBE';      col='A';end;
    when('505') do;
      qa=qa+0.1; form='CLUB';      col='R';end;
    when('535') do;
      qa=qa+0.2; form='FLAG';      col='G';end;
    otherwise;
  end;
run;
footnote 'Blue balloon=Halifax --
        Yellow diamond=Québec';
footnote2 'Gray cube=Montréal --
        Red club=Ottawa-Gatineau';
footnote3 'Green flag=Toronto';
```

For each CMA, we move slightly the values of quintile. Also, we choose
-the shape → form
-the color → col

Shapes available:
BALLOON
DIAMOND
PRISM
CLUB
FLAG
PYRAMID
CROSS
HEART
SPADE
CUBE
PILLAR
SQUARE
CYLINDER
POINT
STAR

Colors available:
B blue
C cyan
W white
A gray | grey
R red
P pink
K black
N brown
G green
Y yellow
M magenta
O orange

We specify the choices in the legend

IV) SAS/GRAPH: PROC G3D

```
proc g3d data=newfile4;  
scatter sex*qa=e1/
```

Life expectancy as a function of sex and income quintile

```
color=col  
shape=form
```

Specification of color and shape

```
rotate=30  
tilt=60 to 80 by 10
```

Rotation and pivoting angles

```
xticknum=5  
yticknum=2  
zmin=70 zmax=85;
```

Number of ticks in x and y

```
format sex sex. qa 1.;  
label e1='Life expectancy (years)';  
label qa='Income quintile';
```

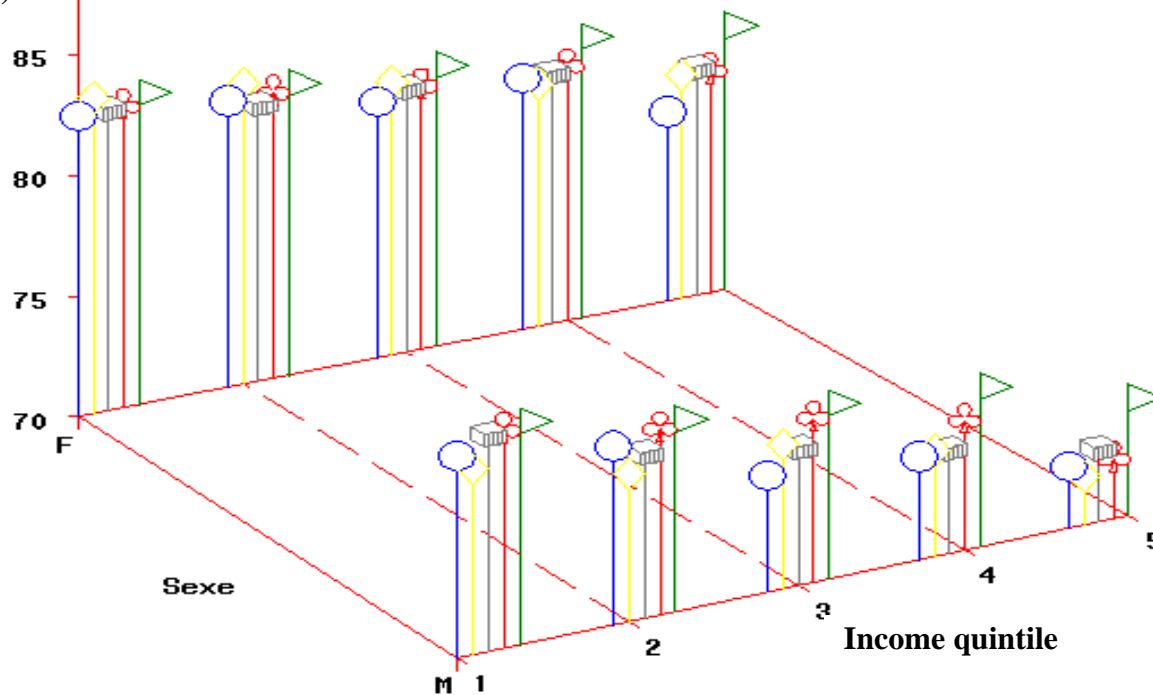
Bounds on z-axis

```
run;  
quit;
```

IV) SAS/GRAPH: PROC G3D

Life expectancy in 5 CMAs

Life expectancy (years)



Blue balloon=Halifax -- Yellow diamond=Québec
Gray cube=Montréal -- Red club=Ottawa-Gatineau
Green flag=Toronto

□ Thank you for your attention!

□ To contact me:

- Philippe Finès

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