

# The New SAS ODS Excel Destination: A User Review and Demonstration

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## Abstract

The common destination for SAS-prepared results is often an Excel workbook. Everyone already has Excel and knows how to use it, to reformat or further explore their results however they wish. But SAS programmers want only one SAS tool to meet all of their highly formatted Excel reporting needs. Twice since June 2013, I have provided vigorous comparisons of five (Yes, 5) different ways of Excel Reporting from SAS: HTML, ExcelXP, MSOffice2K\_x, TableEditor, and Dynamic Data Exchange (DDE). Deemed by me as inadequate compared to MSOffice2K\_x, I omitted the MSOffice2K destination, but even it has its distinct advantages. DDE is clearly the strongest solution, and I still get requests for my DDE ToolKit from around the world, but it can be clumsy to work with if you have to run SAS on a remote server (especially via SAS Enterprise Guide), rather than on your own PC). The new SAS ODS Excel destination, which is available in pre-production experimental status in SAS 9.4 TS1M2, is intended to provide relief from the too many partial SAS solutions and to add capabilities not available in any of the partial solutions. It will not have the disadvantages of DDE. As of the date of this abstract, there is no formal documentation available. I show you what I have been able to do with the new ODS Excel technology, including production status features available in SAS 9.4 TS1M3, which is expected to be available in July 2015, and am providing herein a user-created substitute for currently unavailable vendor documentation. I'm really excited about this long desired solution to an important and popular need. The Excel files created by ODS Excel can be opened and viewed with Excel 2010+ or OpenOffice.org/LibreOffice 3.3+. **The ODS Excel capability does not require Excel to be installed on the machine that creates ODS Excel output.** An interesting feature in TS1M3 is the ability to use ODS Excel and the new PROC MSCHART to produce Excel Charts in a spreadsheet with SAS. Note that PROC MSCHART is pre-production experimental status in TS1M3. **PROC MSCHART does not require Excel to be installed on the machine to produce Excel Charts in a spreadsheet with SAS. You can use ODS EXCEL and/or PROC MSCHART running SAS on MVS, Unix, Linux, or Windows.**

## Introduction

When I was still consulting in the winter of 2012-2013, I was working on an application where, besides graphs, I wanted to provide lots of Excel spreadsheets, linked backwards and forwards with the graphs, and to let summary spreadsheets have links to detail spreadsheets for each summary row. And I wanted a lot of control over spreadsheet features and format. My frustration was that there was no single SAS solution to address ALL of my spreadsheet function and feature needs. After this experience, I made two successive (published) forays into comparing

the capabilities of the various SAS-provided tools. In the Options Available Prior to the ODS Excel Destination section below, I summarize my conclusions.

My first in-depth adventure, ten years earlier, with using SAS to create highly formatted reports that can be opened with Excel was DDE (Dynamic Data Exchange). See Reference 1 (the latest update to my original 2003 paper), which mentions a DDE toolkit for which I still get requests frequently twelve years later. Unless you need to create a pivot table, for which the best resource is Reference 2, I suspect that DDE will remain a popular solution for some SAS users. Your SAS program runs as a client of an Excel session that your program starts to serve as its Excel server. It's only clumsy to deal with when using Enterprise Guide and a remote SAS server. If something goes wrong, you end up with a hung SAS process and a hung Excel process that are Sanalogous tools can be created to deal with the hung Excel process.

The main content of this paper is the section ODS Excel – Demonstration By Examples. It is followed by lists in four sections: Options Demonstrated In This Paper; Options Not Demonstrated In This Paper; Printing Options (None Were Demonstrated In This Paper); and Options Not Retained From ExcelXP. Evidently, the developers regarded the capabilities of ODS tagset ExcelXP as a starting point for improvement. (I was never a fan of ExcelXP, which has no support for graphs.)

Before getting into the examples, there is a comparison of Options Available Prior to the ODS Excel Destination, as well as a section on Set-Up and Common Code for all of the Examples.

**NOTE:** Be sure to see Appendix A for documentation of ALL of the ODS Excel options available in TS1M3. Almost all are in release TS1M2 of SAS V9.4, but some require TS1M3. It does not have the convenient format of the SAS Tip Sheets that are available at SAS Global Forum conferences (which can be found online at the SAS web site), but it is the next best thing.

## Acknowledgements

Essential to this project was assistance from Wayne Hester, Nancy Goodling, Chevell Parker, Scott Huntley, Dan O'Connor, and Amy Peters at SAS Institute.

Any errors or imperfections in this paper are my responsibility.

## Options Available Prior to the ODS Excel Destination

Other users might have options interests other than those listed below, but it is my judgement that these are the ones most commonly desired.

Feature	TableEditor*	ExcelXP	Msoffice2K_x	HTML	DDE**
Pivot Table	Yes	No	No	No	requires an Excel macro
AutoFit Columns	By Default***	No	By Default***	By Default	Yes
Filters	Yes, but All Columns only	Yes	Yes, but All Columns only	No	Yes
Freeze Panes	Row 1 only	Yes	Yes	No	Yes
Side-By-Side Elements in WorkSheet	Yes	No	Yes	No	Yes
Multi-Sheet WorkBook	Yes	Yes, Easy	Yes	No	Yes
Graphs	Yes	No	Yes	Yes	Yes
Titles	Not with other features	Yes	Yes	Yes	Yes

\*Javascript must be enabled

\*\*SAS must be running on Windows

\*\*\*Headings of columns autofit by default can be overlaid by filter buttons

Note: The comparison above omits Msoffice2K. It was not evaluated by me because it has fewer capabilities than Msoffice2K\_x.

## Set-Up and Common Code for all of the Examples

```
%macro RunDayDateTime(RunDayDateTimeAsFileNameSuffix=NO);
%GLOBAL RunDayDateTime FileNameDTsuffix;
DATA _NULL_;
RunDate = DATE(); RunTime = TIME();
RunDayDateTimeText =
    TRIM(LEFT(PUT(RunDate,weekdatx37.))) || ' at ' ||
    TRIM(LEFT(PUT(RunTime,timeampm11.)));
CALL SYMPUT('RunDayDateTime',TRIM(LEFT(RunDayDateTimeText)));
RunDayDateTimeFileNameSuffix =
    TRIM(LEFT(PUT(RunDate,downname3.))) || '_' ||
    TRIM(LEFT(PUT(RunDate,date9.))) || '_' ||
    TRIM(LEFT(COMPRESS(PUT(RunTime,TOD8.),':'))) || '_' ||
    SUBSTR(PUT(RunTime,TOD12.3),10,3); /* prevent duplicate
    timestamps when two successive macro invocations run
    during the same second */
CALL SYMPUT('FileNameDTsuffix',
    TRIM(LEFT(RunDayDateTimeFileNameSuffix)));
RUN;
%if %upcase(&RunDayDateTimeAsFileNameSuffix) EQ YES
%then %let FileNameDTsuffix = %str(&FileNameDTsuffix);
%else %let FileNameDTsuffix = %str();
%mend RunDayDateTime;

%RunDayDateTime(RunDayDateTimeAsFileNameSuffix=YES);

/* Common Framing: */

%let SASenv = V94TS1M2; /* Modification Level 2 for V9.4 */

%let Path = D:\! ! ! ODS Excel Destination\results\;
%let CodePath = D:\! ! ! ODS Excel Destination\code\;

%let ODSstyle = HTMLblue; /* this is the shipped default */

%let OBScount = 10; /* fit results on 1 sheet without scroll */

%let N = 1; /* where Demo Step N will vary 1, 2, 3, . . . */

%let ZoomPct = P; /* P chosen to nearly fill Excel window */

ods noresults; /* not opening result in SAS session */

ods _all_ close;
< ODS Code Block goes here >
options obs=max;
```

```
/* Start of Common Framing for Early Adopter Release of SAS: */  
  
%let SASenv = V94TS1M3; /* Modification Level 3 for V9.4 */  
  
%let Path =  
    /folders/myfolders/!!! ODS Excel Destination/results/;  
  
%let CodePath =  
    /folders/myfolders/!!! ODS Excel Destination/code/;
```

The Early Adopter Release is distributed only via SAS University Edition, which runs on a Linux Virtual Machine, and is accessed by SAS Studio.

In the examples that follow,  
the successful version of Demo 2 requires TS1M3;  
Demo 23 and Demo 24 requires TS1M3;  
and  
Demo 9 was tested on TS1M3 to verify the difference in syntax for the Start\_At option as compared with TS1M2.

## ODS Excel - Demonstration By Examples

Each example on the following pages is accompanied by complete, or nearly complete, code. In some cases, inessential code was “abbreviated” in order to achieve the delivery goal of supplying all code on the same page as the Demonstration output.

**NOTE:** Available upon email request to the author are a zip file of all of the complete code and a zip file of all of the output Excel files.

A companion slide presentation, just as is the case for this paper, is in the Conference Proceedings and Tools package, which is available only to conference attendees.

Any graphs in the paper are not intended as examples of good graphic design. They are provided only to serve as proof of concept. For my latest paper, as of 24 June 2015, on communication-effective graphic design, see Reference 4.

To conserve vertical space, the “captions” for each example are the comment that is immediately below each screen image of the spreadsheet output.

There are few comments in the code, but the ODS Excel option(s) and/or SAS statement(s) required to deliver the distinguishing feature of each example are highlighted with blue or red.

10 Obs - Shoe Sales - V94TS1M2 ODS EXCEL - ODS Style HTMLblue - 220% Zoom

Default Sheet Name (maximum is 28 characters)

Region	Subsidiary	Product	Stores	Sales	Inventory	Returns
Africa	Addis Ababa	Boot	12	\$29,761	\$191,821	\$769
Africa	Addis Ababa	Men's Casual	4	\$67,242	\$118,036	\$2,284
Africa	Addis Ababa	Men's Dress	7	\$76,793	\$136,273	\$2,433
Africa	Addis Ababa	Sandal	10	\$62,819	\$204,284	\$1,861
Africa	Addis Ababa	Slipper	14	\$68,641	\$279,795	\$1,771
Africa	Addis Ababa	Sport Shoe	4	\$1,690	\$16,634	\$79
Africa	Addis Ababa	Women's Casual	2	\$51,541	\$98,641	\$940
Africa	Addis Ababa	Women's Dress	12	\$108,942	\$311,017	\$3,233
Africa	Algiers	Boot	21	\$21,297	\$73,737	\$710
Africa	Algiers	Men's Casual	4	\$63,206	\$100,982	\$2,221

Source Data: SASHELP.SHOES  
Code: D:\!!! ODS Excel Destination\code\demo0.sas  
Run on: Tuesday, 9 June 2015 at 7:55:16 PM

```

/* Simplest Example, Default Sheet Name, Title Line Wrap */
%RunDayDateTime(RunDayDateTimeAsFileNameSuffix=YES);
%let SASenv = V94TS1M2;
%let Path = D:\!!! ODS Excel Destination\results\;
%let CodePath = D:\!!! ODS Excel Destination\code\;
%let ZoomPct = 220; /* want to fill the slide */
%let ODSstyle = HTMLblue; /* this is the shipped default */
%let OBScount = 10;
%let N = 0; /* Demo Step */
footnote1 justify=left bold "Source Data: SASHELP.SHOES";
footnote2 justify=left bold "Code: &CodePath.Demo&N..sas";
footnote3 justify=left bold "Run on: &RunDayDateTime";
ods noresults;
ods _all_ close;
Ods excel style=styles.&ODSstyle
    file="&Path.&SASenv._Demo&N._&FileNameDTsuffix..xlsx"
    options(embedded_titles='yes' embedded_footnotes='yes'
            zoom="&ZoomPct");
title1 justify=left bold "&OBScount Obs - Shoe Sales - &SASenv
ODS EXCEL - ODS Style &ODSstyle - &ZoomPct.% Zoom";
title2 justify=left bold color=red "Default Sheet Name (maximum
is 28 characters)";
options obs=&OBScount;
proc print data=sashelp.shoes noobs;
id region subsidiary product;
run;
ods excel close;
options obs=max;

```

Region	Subsidiary	Product	Stores	Sales	Inventory	Returns
Africa	Addis Ababa	Boot	12	\$29,761	\$191,821	\$769
Africa	Addis Ababa	Men's Casual	4	\$67,242	\$118,036	\$2,284
Africa	Addis Ababa	Men's Dress	7	\$76,793	\$136,273	\$2,433
Africa	Addis Ababa	Sandal	10	\$62,819	\$204,284	\$1,861
Africa	Addis Ababa	Slipper	14	\$68,641	\$279,795	\$1,771
Africa	Addis Ababa	Sport Shoe	4	\$1,690	\$16,634	\$79
Africa	Addis Ababa	Women's Casual	2	\$51,541	\$98,641	\$940
Africa	Addis Ababa	Women's Dress	12	\$108,942	\$311,017	\$3,233
Africa	Algiers	Boot	21	\$21,297	\$73,737	\$710
Africa	Algiers	Men's Casual	4	\$63,206	\$100,982	\$2,221

```

/* Custom Sheet Name, But Unwanted Title Line Wrap */
%RunDayDateTime(RunDayDateTimeAsFileNameSuffix=YES);
%let SASenv = V94TS1M2;
%let Path = D:\!!! ODS Excel Destination\results\;
%let CodePath = D:\!!! ODS Excel Destination\code\;
%let ZoomPct = 220; /* want to fill the slide */
%let ODSstyle = HTMLblue; /* this is the shipped default */
%let OBScount = 10;
%let N = 1; /* Demo Step */
footnote1 justify=left bold "Source Data: SASHELP.SHOES";
footnote2 justify=left bold "Code: &CodePath.Demo&N..sas";
footnote3 justify=left bold "Run on: &RunDayDateTime";
ods noresults;
ods _all_ close;
Ods excel style=styles.&ODSstyle
    file="&Path.&SASenv._Demo&N._&FileNameDTsuffix..xlsx"
    options(embedded_titles='yes' embedded_footnotes='yes'
        zoom="&ZoomPct" sheet_name='Custom Sheet Name');
title1 justify=left bold "&OBScount Obs - Shoe Sales - &SASenv
ODS EXCEL - ODS Style &ODSstyle - &ZoomPct.% Zoom";
options obs=&OBScount;
proc print data=sashelp.shoes noobs;
id region subsidiary product;
run;
ods excel close;
options obs=max;

```



10 Obs - Shoe Sales - V94TS1M2 ODS EXCEL - ODS Style HTMLblue - 220% Zoom

Region	Subsidiary	Product	Stores	Sales	Inventory	Returns
Africa	Addis Ababa	Boot	12	\$29,761	\$191,821	\$769
Africa	Addis Ababa	Men's Casual	4	\$67,242	\$118,036	\$2,284
Africa	Addis Ababa	Men's Dress	7	\$76,793	\$136,273	\$2,433
Africa	Addis Ababa	Sandal	10	\$62,819	\$204,284	\$1,861
Africa	Addis Ababa	Slipper	14	\$68,641	\$279,795	\$1,771
Africa	Addis Ababa	Sport Shoe	4	\$1,690	\$16,634	\$79
Africa	Addis Ababa	Women's Casual	2	\$51,541	\$98,641	\$940
Africa	Addis Ababa	Women's Dress	12	\$108,942	\$311,017	\$3,233
Africa	Algiers	Boot	21	\$21,297	\$73,737	\$710
Africa	Algiers	Men's Casual	4	\$63,206	\$100,982	\$2,221

Source Data: SASHELP.SHOES  
Code: D:\!!! ODS Excel Destination\code\demo2.sas  
Run on: Tuesday, 9 June 2015 at 9:30:17 PM

```

/* title_footnote_nobreak='yes', but Title Line Wrap Persists */
%RunDayDateTime(RunDayDateTimeAsFileNameSuffix=YES);
%let SASenv = V94TS1M2;
%let Path = D:\!!! ODS Excel Destination\results\;
%let CodePath = D:\!!! ODS Excel Destination\code\;
%let ZoomPct = 220; /* want to fill the slide */
%let ODSstyle = HTMLblue; /* this is the shipped default */
%let OBScount = 10;
%let N = 2; /* Demo Step */
footnote1 justify=left bold "Source Data: SASHELP.SHOES";
footnote2 justify=left bold "Code: &CodePath.Demo&N..sas";
footnote3 justify=left bold "Run on: &RunDayDateTime";
ods noresults;
ods _all_ close;
ods excel style=styles.&ODSstyle
    file="&Path.&SASenv._Demo&N._&FileNameDTsuffix..xlsx"
    options(embedded_titles='yes' embedded_footnotes='yes'
        zoom="&ZoomPct" sheet_name='Title Wrap Persists'
        title_footnote_nobreak='yes');
title1 justify=left bold "&OBScount Obs - Shoe Sales - &SASenv
ODS EXCEL - ODS Style &ODSstyle - &ZoomPct.% Zoom";
options obs=&OBScount;
proc print data=sashelp.shoes noobs;
id region subsidiary product;
run;
ods excel close;
options obs=max;

```

Region	Subsidiary	Product	Stores	Sales	Inventory	Returns
Africa	Addis Ababa	Boot	12	\$29,761	\$191,821	\$769
Africa	Addis Ababa	Men's Casual	4	\$67,242	\$118,036	\$2,284
Africa	Addis Ababa	Men's Dress	7	\$76,793	\$136,273	\$2,433
Africa	Addis Ababa	Sandal	10	\$62,819	\$204,284	\$1,861
Africa	Addis Ababa	Slipper	14	\$68,641	\$279,795	\$1,771
Africa	Addis Ababa	Sport Shoe	4	\$1,690	\$16,634	\$79
Africa	Addis Ababa	Women's Casual	2	\$51,541	\$98,641	\$940
Africa	Addis Ababa	Women's Dress	12	\$108,942	\$311,017	\$3,233
Africa	Algiers	Boot	21	\$21,297	\$73,737	\$710
Africa	Algiers	Men's Casual	4	\$63,206	\$100,982	\$2,221

Source Data: SASHELP.SHOES  
Code: D:\!!! ODS Excel Destination\code\Demo3.sas  
Run on: Wednesday, 10 June 2015 at 1:01:40 AM

```

/* allocate enough title space, but the row is too high */
%RunDayDateTime(RunDayDateTimeAsFileNameSuffix=YES);
%let SASenv = V94TS1M2;
%let Path = D:\!!! ODS Excel Destination\results\;
%let CodePath = D:\!!! ODS Excel Destination\code\;
%let ZoomPct = 220; /* want to fill the slide */
%let ODSstyle = HTMLblue; /* this is the shipped default */
%let OBScount = 10;
%let N = 3; /* Demo Step */
footnote1 justify=left bold "Source Data: SASHELP.SHOES";
footnote2 justify=left bold "Code: &CodePath.Demo&N..sas";
footnote3 justify=left bold "Run on: &RunDayDateTime";
ods noresults;
ods _all_ close;
ods excel style=styles.&ODSstyle
    file="&Path.&SASenv._Demo&N._&FileNameDTsuffix..xlsx"
    options(embedded_titles='yes' embedded_footnotes='yes'
        zoom="&ZoomPct" sheet_name='No Title Wrap, Row Too High'
        title_footnote_width='8');
title1 justify=left bold "&OBScount Obs - Shoe Sales - &SASenv
ODS EXCEL - ODS Style &ODSstyle - &ZoomPct.% Zoom";
options obs=&OBScount;
proc print data=sashelp.shoes noobs;
id region subsidiary product;
run;
ods excel close;
options obs=max;

```

	A	B	C	D	E	F	G	H
1	<b>10 Obs - Shoe Sales - V94TS1M2 ODS EXCEL - ODS Style HTMLblue - 220% Zoom</b>							
2								
3	<b>Region</b>	<b>Subsidiary</b>	<b>Product</b>	<b>Stores</b>	<b>Sales</b>	<b>Inventory</b>	<b>Returns</b>	
4	Africa	Addis Ababa	Boot	12	\$29,761	\$191,821	\$769	
5	Africa	Addis Ababa	Men's Casual	4	\$67,242	\$118,036	\$2,284	
6	Africa	Addis Ababa	Men's Dress	7	\$76,793	\$136,273	\$2,433	
7	Africa	Addis Ababa	Sandal	10	\$62,819	\$204,284	\$1,861	
8	Africa	Addis Ababa	Slipper	14	\$68,641	\$279,795	\$1,771	
9	Africa	Addis Ababa	Sport Shoe	4	\$1,690	\$16,634	\$79	
10	Africa	Addis Ababa	Women's Casual	2	\$51,541	\$98,641	\$940	
11	Africa	Addis Ababa	Women's Dress	12	\$108,942	\$311,017	\$3,233	
12	Africa	Algiers	Boot	21	\$21,297	\$73,737	\$710	
13	Africa	Algiers	Men's Casual	4	\$63,206	\$100,982	\$2,221	
14								
15	Source Data: SASHELP.SHOES							
16	Code: D:\!!! ODS Excel Destination\code\demo4.sas							
17	Run on: Wednesday, 10 June 2015 at 1:09:18 AM							
18								
19								
20								

```

/* title row height set to that of other rows */
%RunDayDateTime(RunDayDateTimeAsFileNameSuffix=YES);
%let SASenv = V94TS1M2;
%let Path = D:\!!! ODS Excel Destination\results\;
%let CodePath = D:\!!! ODS Excel Destination\code\;
%let ZoomPct = 220; /* want to fill the slide */
%let ODSstyle = HTMLblue; /* this is the shipped default */
%let OBScount = 10;
%let N = 4; /* Demo Step */
footnote1 justify=left bold "Source Data: SASHELP.SHOES";
footnote2 justify=left bold "Code: &CodePath.Demo&N..sas";
footnote3 justify=left bold "Run on: &RunDayDateTime";
ods noresults;
ods _all_ close;
ods excel style=styles.&ODSstyle
  file="&Path.&SASenv._Demo&N._&FileNameDTsuffix..xlsx"
  options(embedded_titles='yes' embedded_footnotes='yes'
    zoom="&ZoomPct" sheet_name='Set Row Height To Necessary'
    title_footnote_width='8' absolute_row_height='14');
title1 justify=left bold "&OBScount Obs - Shoe Sales - &SASenv
ODS EXCEL - ODS Style &ODSstyle - &ZoomPct.% Zoom";
options obs=&OBScount;
proc print data=sashelp.shoes noobs;
id region subsidiary product;
run;
ods excel close;
options obs=max;

```

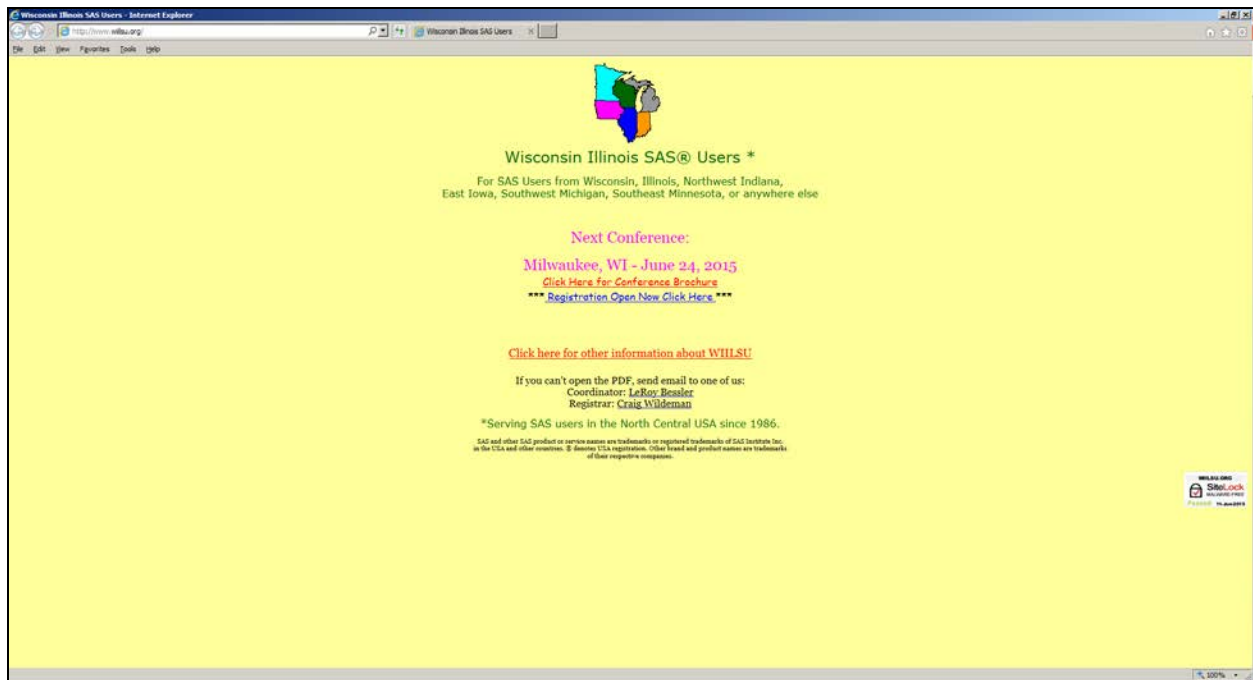
Region	Subsidiary	Product	Stores	Sales	Inventory	Returns
Africa	Addis Ababa	Boot	12	\$29,761	\$191,821	\$769
Africa	Addis Ababa	Men's Casual	4	\$67,242	\$118,036	\$2,284
Africa	Addis Ababa	Men's Dress	7	\$76,793	\$136,273	\$2,433
Africa	Addis Ababa	Sandal	10	\$62,819	\$204,284	\$1,861
Africa	Addis Ababa	Slipper	14	\$68,641	\$279,795	\$1,771
Africa	Addis Ababa	Sport Shoe	4	\$1,690	\$16,634	\$79
Africa	Addis Ababa	Women's Casual	2	\$51,541	\$98,641	\$940
Africa	Addis Ababa	Women's Dress	12	\$108,942	\$311,017	\$3,233
Africa	Algiers	Boot	21	\$21,297	\$73,737	\$710
Africa	Algiers	Men's Casual	4	\$63,206	\$100,982	\$2,221

Source Data: SASHELP.SHOES  
Code: D:\!!! ODS Excel Destination\code\demo5.sas  
Run on: Wednesday, 10 June 2015 at 1:14:17 AM

```

/* make title2 a hyperlink, it could link to another workbook */
%RunDayDateTime(RunDayDateTimeAsFileNameSuffix=YES);
%let SASenv = V94TS1M2;
%let Path = D:\!!! ODS Excel Destination\results\;
%let CodePath = D:\!!! ODS Excel Destination\code\;
%let ZoomPct = 220; /* want to fill the slide */
%let ODSstyle = HTMLblue; /* this is the shipped default */
%let OBScount = 10;
%let N = 5; /* Demo Step */
footnote1 justify=left bold "Source Data: SASHELP.SHOES";
footnote2 justify=left bold "Code: &CodePath.Demo&N..sas";
footnote3 justify=left bold "Run on: &RunDayDateTime";
ods noresults;
ods _all_ close;
ods excel style=styles.&ODSstyle
    file="&Path.&SASenv._Demo&N._&FileNameDTsuffix..xlsx"
    options(embedded_titles='yes' embedded_footnotes='yes'
        zoom="&ZoomPct" sheet_name='Title2 Is Hyperlink'
        title_footnote_width='8' absolute_row_height='14');
title1 justify=left bold "&OBScount Obs - Shoe Sales - &SASenv
ODS EXCEL - ODS Style &ODSstyle - &ZoomPct.% Zoom";
title2 justify=left bold color=blue underlin=1
    link='http://www.wiilsu.org'
    'Go to Wisconsin Illinois SAS Users Home Page';
options obs=&OBScount;
proc print data=sashelp.shoes noobs;
id region subsidiary product;
run;
ods excel close; options obs=max;

```



Clicking on the hyperlink in Title2 of the spreadsheet takes you to one of my favorite web sites. It could instead take you a relevant graph or other document, which could be linked back to the spreadsheet.

**NOTE:** I have stated elsewhere that a graph and a spreadsheet of its input data as an interlinked pair is always an excellent delivery method (see Reference 5)—as an advocate for and creator of communication-effective graphs, I have long said:  
**Image + Precise Numbers = quick, easy inference + reliable inference**

10 Obs - Shoe Sales - V94TS1M2 ODS EXCEL - ODS Style HTMLblue - 220% Zoom  
 Go to Wisconsin Illinois SAS Users Home Page

Region	Subsidiary	Product	Stores	Sales	Inventory	Returns
Africa	Addis Ababa	Boot	12	\$29,761	\$191,821	\$769
Africa	Addis Ababa	Men's Casual	4	\$67,242	\$118,036	\$2,284
Africa	Addis Ababa	Men's Dress	7	\$76,793	\$136,273	\$2,433
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Africa	Addis Ababa	Sport Shoe	4	\$1,690	\$16,634	\$79
Africa	Addis Ababa	Women's Casual	2	\$51,541	\$98,641	\$940
Africa	Addis Ababa	Women's Dress	12	\$108,942	\$311,017	\$3,233
Africa	Algiers	Boot	21	\$21,297	\$73,737	\$710
Africa	Algiers	Men's Casual	4	\$63,206	\$100,982	\$2,221

Source Data: SASHELP.SHOES  
 Code: D:\!!! ODS Excel Destination\code\Demo6.sas  
 Run on: Wednesday, 10 June 2015 at 1:20:51 AM

```

/* freeze headers and row headers */
%RunDayDateTime(RunDayDateTimeAsFileNameSuffix=YES);
%let SASenv = V94TS1M2;
%let Path = D:\!!! ODS Excel Destination\results\;
%let CodePath = D:\!!! ODS Excel Destination\code\;
%let ZoomPct = 220; /* want to fill the slide */
%let ODSstyle = HTMLblue; /* this is the shipped default */
%let OBScount = 10;
%let N = 6; /* Demo Step */
footnote1 justify=left bold "Source Data: SASHELP.SHOES";
footnote2 justify=left bold "Code: &CodePath.Demo&N..sas";
footnote3 justify=left bold "Run on: &RunDayDateTime";
ods noresults;
ods _all_ close;
ods excel style=styles.&ODSstyle
  file="&Path.&SASenv._Demo&N._&FileNameDTsuffix..xlsx"
  options(embedded_titles='yes' embedded_footnotes='yes'
    zoom="&ZoomPct" sheet_name='Freeze Headers + RowHeaders'
    /* & in sheet_name would get converted to - */
    title_footnote_width='8' absolute_row_height='14'
    frozen_headers='4' frozen_rowheaders='3');
title1 justify=left bold "&OBScount Obs - Shoe Sales - &SASenv
  ODS EXCEL - ODS Style &ODSstyle - &ZoomPct.% Zoom";
title2 justify=left bold color=blue underlin=1
  link='http://www.wiilsu.org' 'Go to ...';
options obs=&OBScount;
proc print data=sashelp.shoes noobs;
id region subsidiary product; run;
ods excel close; options obs=max;

```



10 Obs - Shoe Sales - V94TS1M2 ODS EXCEL - ODS Style HTMLblue - 220% Zoom  
 Go to Wisconsin Illinois SAS Users Home Page

Region	Subsidiary	Product	Store	Sales	Inventory	Returns
Africa	Addis Ababa	Boot	12	\$29,761	\$191,821	\$769
Africa	Addis Ababa	Men's Casual	4	\$67,242	\$118,036	\$2,284
Africa	Addis Ababa	Men's Dress	7	\$76,793	\$136,273	\$2,433
Africa	Addis Ababa	Sandal	10	\$62,819	\$204,284	\$1,861
Africa	Addis Ababa	Slipper	14	\$68,641	\$279,795	\$1,771
Africa	Addis Ababa	Sport Shoe	4	\$1,690	\$16,634	\$79
Africa	Addis Ababa	Women's Casual	2	\$51,541	\$98,641	\$940
Africa	Addis Ababa	Women's Dress	12	\$108,942	\$311,017	\$3,233
Africa	Algiers	Boot	21	\$21,297	\$73,737	\$710
Africa	Algiers	Men's Casual	4	\$63,206	\$100,982	\$2,221

Source Data: SASHELP.SHOES  
 Code: D:\!!! ODS Excel Destination\code\Demo7.sas  
 Run on: Wednesday, 10 June 2015 at 1:28:22 AM

```

/* turn on some autofilters */
%RunDayDateTime(RunDayDateTimeAsFileNameSuffix=YES);
%let SASenv = V94TS1M2;
%let Path = D:\!!! ODS Excel Destination\results\;
%let CodePath = D:\!!! ODS Excel Destination\code\;
%let ZoomPct = 220; /* want to fill the slide */
%let ODSstyle = HTMLblue; /* this is the shipped default */
%let OBScount = 10;
%let N = 7; /* Demo Step */
footnote1 justify=left bold "Source Data: SASHELP.SHOES";
footnote2 justify=left bold "Code: &CodePath.Demo&N..sas";
footnote3 justify=left bold "Run on: &RunDayDateTime";
ods noresults;
ods _all_ close;
ods excel style=styles.&ODSstyle
  file="&Path.&SASenv._Demo&N._&FileNameDTsuffix..xlsx"
  options(embedded_titles='yes' embedded_footnotes='yes'
    zoom="&ZoomPct" autofilter='1-4'
    sheet_name='AutoFilters Columns A-D'
    title_footnote_width='8' absolute_row_height='14'
    frozen_headers='4' frozen_rowheaders='3');
title1 justify=left bold "&OBScount Obs - Shoe Sales - &SASenv
  ODS EXCEL - ODS Style &ODSstyle - &ZoomPct.% Zoom";
title2 justify=left bold color=blue underlin=1
  link='http://www.wiilsu.org' 'Go to ...;
options obs=&OBScount;
proc print data=sashelp.shoes noobs;
id region subsidiary product;run;
ods excel close; options obs=max;

```

10 Obs - Shoe Sales - V94TS1M2 ODS EXCEL - ODS Style HTMLblue - 220% Zoom  
 Go to Wisconsin Illinois SAS Users Home Page

Region	Subsidiary	Product	Store	Sales	Inventory	Returns
Africa	Addis Ababa	Boot	12	\$29,761	\$191,821	\$769
Africa	Addis Ababa	Men's Casual	4	\$67,242	\$118,036	\$2,284
Africa	Addis Ababa	Men's Dress	7	\$76,793	\$136,273	\$2,433
Africa	Addis Ababa	Sandal	10	\$62,819	\$204,284	\$1,861
Africa	Addis Ababa	Slipper	14	\$68,641	\$279,795	\$1,771
Africa	Addis Ababa	Sport Shoe	4	\$1,690	\$16,634	\$79
Africa	Addis Ababa	Women's Casual	2	\$51,541	\$98,641	\$940
Africa	Addis Ababa	Women's Dress	12	\$108,942	\$311,017	\$3,233
Africa	Algiers	Boot	21	\$21,297	\$73,737	\$710
Africa	Algiers	Men's Casual	4	\$63,206	\$100,982	\$2,221

Source Data: SASHELP.SHOES  
 Code: D:\!!! ODS Excel Destination\code\Demo8.sas  
 Run on: Wednesday, 10 June 2015 at 1:33:31 AM

SheetName Max Length 28 Char

```

/* s in Chars is dropped */
/* verify that the maximum sheet name length is 28 characters */
%RunDayDateTime(RunDayDateTimeAsFileNameSuffix=YES);
%let SASenv = V94TS1M2;
%let Path = D:\!!! ODS Excel Destination\results\;
%let CodePath = D:\!!! ODS Excel Destination\code\;
%let ZoomPct = 220; /* want to fill the slide */
%let ODSstyle = HTMLblue; /* this is the shipped default */
%let OBScount = 10;
%let N = 8; /* Demo Step */
footnote1 justify=left bold "Source Data: SASHELP.SHOES";
footnote2 justify=left bold "Code: &CodePath.Demo&N..sas";
footnote3 justify=left bold "Run on: &RunDayDateTime";
ods noresults; ods _all_ close;
ods excel style=styles.&ODSstyle
  file="&Path.&SASenv._Demo&N._&FileNameDTsuffix..xlsx"
  options(embedded_titles='yes' embedded_footnotes='yes'
    zoom="&ZoomPct" autofilter='1-4'
    title_footnote_width='8' absolute_row_height='14'
    frozen_headers='4' frozen_rowheaders='3'
    sheet_name='SheetName Max Length 28 Chars');
title1 justify=left bold "&OBScount Obs - Shoe Sales - &SASenv
  ODS EXCEL - ODS Style &ODSstyle - &ZoomPct.% Zoom";
title2 justify=left bold color=blue underlin=1
  link='http://www.wiilsu.org' 'Go to ...';
options obs=&OBScount;
proc print data=sashelp.shoes noobs;
id region subsidiary product; run;
ods excel close; options obs=max;

```



10 Obs - Shoe Sales - V94TS1M2 ODS EXCEL - ODS Style HTMLblue -  
[Go to Wisconsin Illinois SAS Users Home Page](#)

Region	Subsidiary	Product	Store	Sales	Inventory	Returns
Africa	Addis Ababa	Boot	12	\$29,761	\$191,821	\$769
Africa	Addis Ababa	Men's Casual	4	\$67,242	\$118,036	\$2,284
Africa	Addis Ababa	Men's Dress	7	\$76,793	\$136,273	\$2,433
Africa	Addis Ababa	Sandal	10	\$62,819	\$204,284	\$1,861
Africa	Addis Ababa	Slipper	14	\$68,641	\$279,795	\$1,771
Africa	Addis Ababa	Sport Shoe	4	\$1,690	\$16,634	\$79
Africa	Addis Ababa	Women's Casual	2	\$51,541	\$98,641	\$940
Africa	Addis Ababa	Women's Dress	12	\$108,942	\$311,017	\$3,233
Africa	Algiers	Boot	21	\$21,297	\$73,737	\$710
Africa	Algiers	Men's Casual	4	\$63,206	\$100,982	\$2,221

Source Data: SASHELP.SHOES  
Code: D:\!!! ODS Excel Destination\code\Demo9.sas  
Run on: Wednesday, 10 June 2015 at 1:59:18 AM

```

/* Start at Column C Row 2. If TS1M3 Start at Column 3 Row 2. */
%RunDayDateTime(RunDayDateTimeAsFileNameSuffix=YES);
%let SASenv = V94TS1M2;
%let Path = D:\!!! ODS Excel Destination\results\;
%let CodePath = D:\!!! ODS Excel Destination\code\;
%let ZoomPct = 220; /* want to fill the slide */
%let ODSstyle = HTMLblue; /* this is the shipped default */
%let OBScount = 10;
%let N = 9; /* Demo Step */
footnote1 justify=left bold "Source Data: SASHELP.SHOES";
footnote2 justify=left bold "Code: &CodePath.Demo&N..sas";
footnote3 justify=left bold "Run on: &RunDayDateTime";
ods noresults; ods _all_ close;
ods excel style=styles.&ODSstyle
    file="&Path.&SASenv._Demo&N._&FileNameDTsuffix..xlsx"
    options(embedded_titles='yes' embedded_footnotes='yes'
        zoom="&ZoomPct"
        title_footnote_width='8' absolute_row_height='14'
        frozen_headers='5' frozen_rowheaders='5'
        autofilter='1-4' start_at='C2'
        sheet_name='Start Content at ColCRow2');
title1 justify=left bold "&OBScount Obs - Shoe Sales - &SASenv
ODS EXCEL - ODS Style &ODSstyle - &ZoomPct.% Zoom";
title2 justify=left bold color=blue underlin=1
link='http://www.wiilsu.org' 'Go to ...';
options obs=&OBScount;
proc print data=sashelp.shoes noobs;
id region subsidiary product; run;
ods excel close; options obs=max;

```

10 Obs - Shoe Sales - V94TS1M3 ODS EXCEL - ODS Style HTMLblue - 180% Zoom  
[Go to Wisconsin Illinois SAS Users Home Page](#)

Region	Subsidiary	Product	Store	Sales	Inventory	Returns
Africa	Addis Ababa	Boot	12	\$29,761	\$191,821	\$769
Africa	Addis Ababa	Men's Casual	4	\$67,242	\$118,036	\$2,284
Africa	Addis Ababa	Men's Dress	7	\$76,793	\$136,273	\$2,433
Africa	Addis Ababa	Sandal	10	\$62,819	\$204,284	\$1,861
Africa	Addis Ababa	Slipper	14	\$68,641	\$279,795	\$1,771
Africa	Addis Ababa	Sport Shoe	4	\$1,690	\$16,634	\$79
Africa	Addis Ababa	Women's Casual	2	\$51,541	\$98,641	\$940
Africa	Addis Ababa	Women's Dress	12	\$108,942	\$311,017	\$3,233
Africa	Algiers	Boot	21	\$21,297	\$73,737	\$710
Africa	Algiers	Men's Casual	4	\$63,206	\$100,982	\$2,221

Code: /folders/myfolders/!!! ODS Excel Destination/code/Demo9.sas  
 Run on: Thursday, 11 June 2015 at 7:05:06 PM

```

/* Start_At=(3,2) for Col3 Row2 on TS1M3, unlike TS1M2 */
%RunDayDateTime(RunDayDateTimeAsFileNameSuffix=YES);
%let SASenv = V94TS1M3;
%let Path = /folders/myfolders/!!! ODS Excel
Destination/results/;
%let CodePath = /folders/myfolders/!!! ODS Excel
Destination/code/;
%let ZoomPct = 180; want to fill the slide */
%let ODSstyle = HTMLblue; /* EXCEL is the TS1M3 default */
%let OBScount = 10;
%let N = 9; /* Demo Step */
footnote1 justify=left bold "Source Data: SASHELP.SHOES";
footnote2 justify=left bold "Code: &CodePath.Demo&N..sas";
footnote3 justify=left bold "Run on: &RunDayDateTime";
ods noresults; ods _all_ close;
ods excel style=styles.&ODSstyle
  file="&Path.&SASenv._Demo&N._&FileNameDTsuffix..xlsx"
  options(embedded_titles='yes' embedded_footnotes='yes'
    title_footnote_width='8' absolute_row_height='14'
    frozen_headers='5' frozen_rowheaders='5'
    start_at='3,2' autofilter='1-4' zoom="&ZoomPct"
    sheet_name='Start Content at Col3Row2');
title1 justify=left bold "&OBScount Obs - Shoe Sales ...";
title2 justify=left bold color=blue underlin=1
  link='http://www.wiilsu.org' 'Go to ...';
options obs=&OBScount;
proc print data=sashelp.shoes noobs;
id region subsidiary product; run;
ods excel close; options obs=max;

```

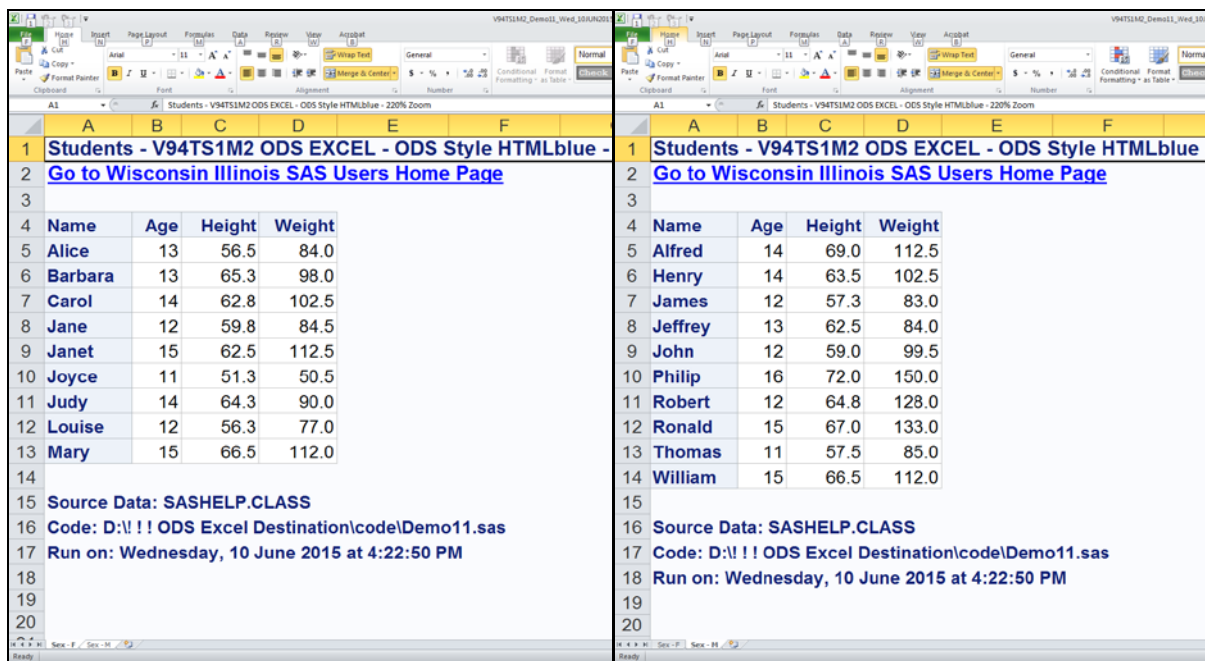
Region	Subsidiary	Product	Store	Sales
Africa	Addis Ababa	Boot	12	\$29,761
Africa	Addis Ababa	Men's Casual	4	\$67,242
Africa	Addis Ababa	Men's Dress	7	\$76,793
Africa	Addis Ababa	Sandal	10	\$62,819
Africa	Addis Ababa	Slipper	14	\$68,641
Africa	Addis Ababa	Sport Shoe	4	\$1,690
Africa	Addis Ababa	Women's Casual	2	\$51,541
Africa	Addis Ababa	Women's Dress	12	\$108,942

Source Data: SASHELP.SHOES  
Code: D:\!!! ODS Excel Destination\code\Demo10.sas  
Run on: Wednesday, 10 June 2015 at 2:08:50 PM

```

/* hide rows 13-14 & cols 6-7, narrow title space to cols 1-5 */
%RunDayDateTime(RunDayDateTimeAsFileNameSuffix=YES);
%let SASenv = V94TS1M2;
%let Path = D:\!!! ODS Excel Destination\results\;
%let CodePath = D:\!!! ODS Excel Destination\code\;
%let ZoomPct = 220; /* want to fill the slide */
%let ODSstyle = HTMLblue; /* this is the shipped default */
%let OBScount = 10;
%let N = 10; /* Demo Step */
footnote1 justify=left bold "Source Data: SASHELP.SHOES";
footnote2 justify=left bold "Code: &CodePath.Demo&N..sas";
footnote3 justify=left bold "Run on: &RunDayDateTime";
ods noresults; ods _all_ close;
ods excel style=styles.&ODSstyle
    file="&Path.&SASenv._Demo&N._&FileNameDTsuffix..xlsx"
    options(embedded_titles='yes' embedded_footnotes='yes'
        zoom="&ZoomPct" autofilter='1-4' title_footnote_width='5'
            /* adjust to absence of columns 6 & 7 */
            frozen_headers='5' frozen_rowheaders='3'
            sheet_name='hide rows 13-14 and cols 6-7'
            hidden_rows='13-14' hidden_columns='6-7');
title1 justify=left bold "&OBScount Obs - Shoe Sales - &SASenv
ODS EXCEL - ODS Style &ODSstyle - &ZoomPct.% Zoom";
title2 justify=left bold color=blue underlin=1
link='http://www.wiilsu.org' 'Go to ...';
options obs=&OBScount;
proc print data=sashelp.shoes noobs;
id region subsidiary product; run;
ods excel close; options obs=max;

```

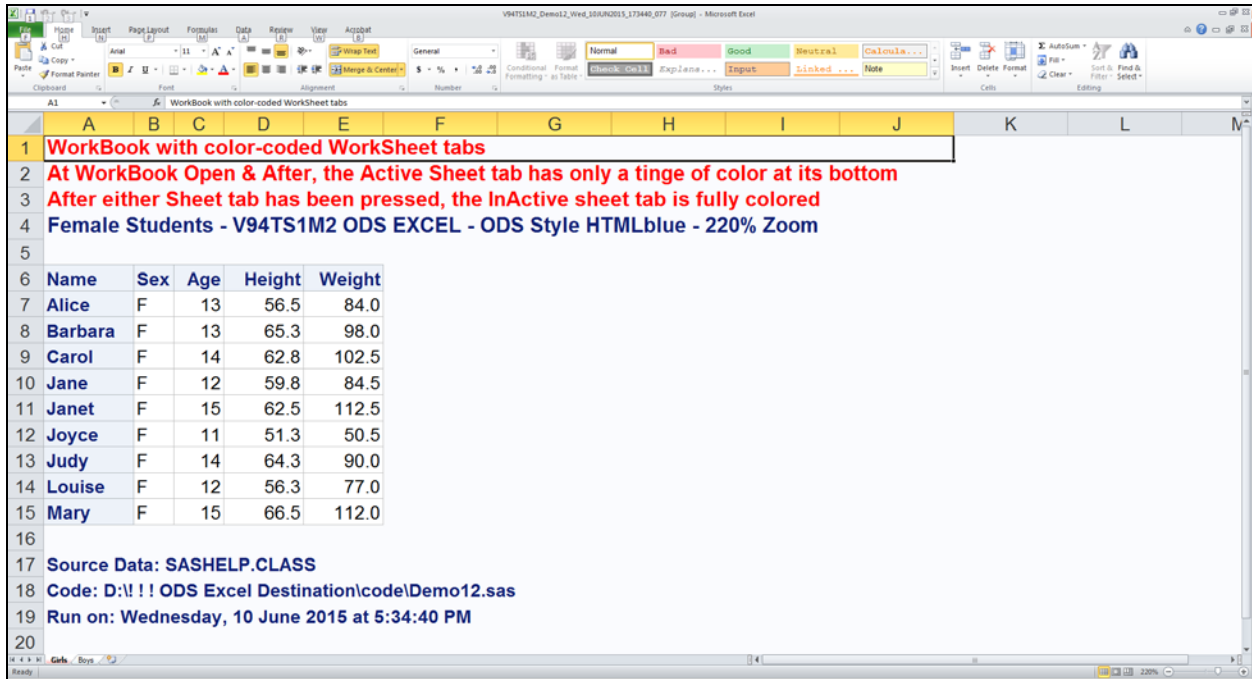


```

/* open workbook on Sex=F sheet | after click on Sex=M sheet */
/* above are in workbook with sheet_interval='bygroup' */
%RunDayDateTime(RunDayDateTimeAsFileNameSuffix=YES);
%let SASenv = V94TS1M2;
%let Path = D:\!!! ODS Excel Destination\results\;
%let CodePath = D:\!!! ODS Excel Destination\code\;
%let ZoomPct = 220; /* want to fill the slide */
%let ODSstyle = HTMLblue; /* this is the shipped default */
%let N = 11; /* Demo Step */
footnote1 justify=left bold "Source Data: SASHELP.CLASS";
footnote2 justify=left bold "Code: &CodePath.Demo&N..sas";
footnote3 justify=left bold "Run on: &RunDayDateTime";
ods noresults;
ods _all_ close;
ods excel style=styles.&ODSstyle
    file="&Path.&SASenv._Demo&N._&FileNameDTsuffix..xlsx"
    options(embedded_titles='yes' embedded_footnotes='yes'
        title_footnote_width='8' absolute_row_height='14'
        sheet_interval='bygroup' suppress_bylines='yes'
        sheet_label='Sex' zoom="&ZoomPct");
title1 justify=left bold "Students - &SASenv ODS EXCEL - ODS
Style &ODSstyle - &ZoomPct.% Zoom";
title2 justify=left bold color=blue underlin=1
link='http://www.wiilsu.org' 'Go to ...';
proc sort data=sashelp.class out=work.ToPrint; by sex; run;
proc print data=work.ToPrint noobs; by sex; id name; run;
ods excel close;
options obs=max;

```

## Demonstration of the Effect of Using the Tab\_Color Option



Tab Colors at Initial Open (faint colors at bottom of tabs):



After Clicking on the Boys Tab:



After Clicking back to the Girls Tab:



## Code for Using the Tab\_Color Option

**NOTE:** Using full-strength colors, unless they are light colors, for the tabs is likely to make the sheet name difficult to read.

```
%RunDayDateTime(RunDayDateTimeAsFileNameSuffix=YES);
%let SASenv = V94TS1M2;
%let Path = D:\! ! ! ODS Excel Destination\results\;
%let CodePath = D:\! ! ! ODS Excel Destination\code\;
%let ZoomPct = 220; /* want to fill the slide */
%let ODSstyle = HTMLblue; /* this is the shipped default */
%let N = 12; /* Demo Step */

footnote1 justify=left bold "Source Data: SASHELP.CLASS";
footnote2 justify=left bold "Code: &CodePath.Demo&N..sas";
footnote3 justify=left bold "Run on: &RunDayDateTime";
title1 justify=left bold color=red "WorkBook with color-coded
WorkSheet tabs";
title2 justify=left bold color=red "At WorkBook Open & After,
the Active Sheet tab has only a tinge of color at its bottom";
title3 justify=left bold color=red "After either Sheet tab has
been pressed, the InActive sheet tab is fully colored";

ods noresults; ods _all_ close;

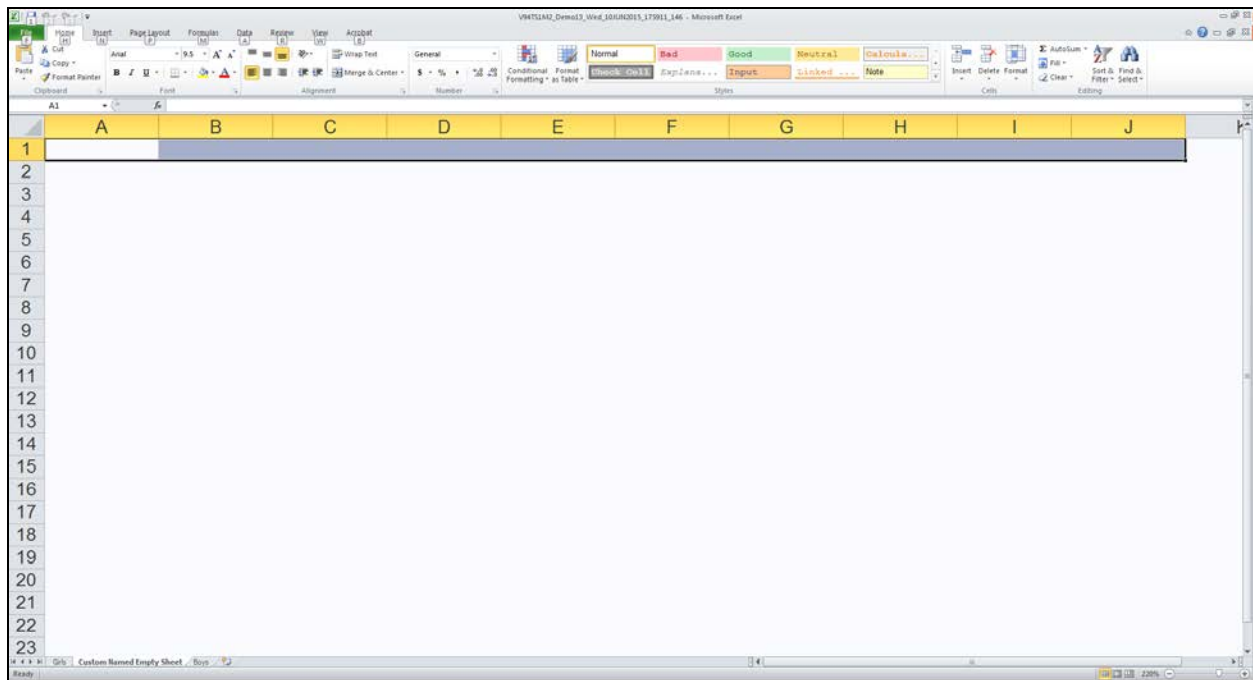
ods excel style=styles.&ODSstyle
  file="&Path.&SASenv._Demo&N._&FileNameDTsuffix..xlsx"
  options(embedded_titles='yes' embedded_footnotes='yes'
    title_footnote_width='10' absolute_row_height='14'
    sheet_interval='proc' zoom="&ZoomPct");

ods excel options(sheet_name='Girls' tab_color='LightRed');
title4 justify=left bold "Female Students - &SASenv ODS EXCEL -
ODS Style &ODSstyle - &ZoomPct.% Zoom";
proc print data=sashelp.class noobs;
  where sex eq 'F';
  id name;
run;

ods excel options(sheet_name='Boys' tab_color='LightBlue');
title4 justify=left bold "Male Students - &SASenv ODS EXCEL -
ODS Style &ODSstyle - &ZoomPct.% Zoom";
proc print data=sashelp.class noobs;
  where sex eq 'M';
  id name;
run;

ods excel close; options obs=max;
```

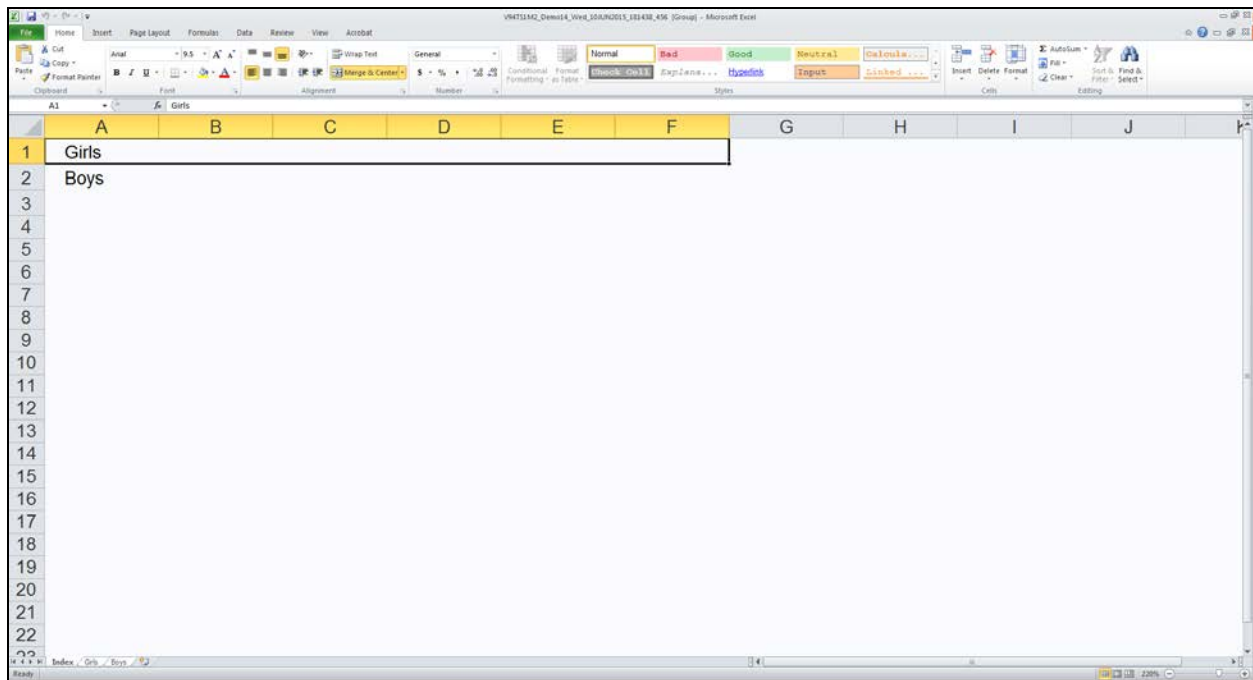




```

/* Empty worksheet has Girls and Boys companion worksheets */
/* For more than one empty sheet, your sheet_name= is ignored */
/* They will be named Sheet1, Sheet2, etc. */
%RunDayDateTime(RunDayDateTimeAsFileNameSuffix=YES);
%let SASenv = V94TS1M2;
%let Path = D:\! ! ! ODS Excel Destination\results\;
%let CodePath = D:\! ! ! ODS Excel Destination\code\;
%let ZoomPct = 220; /* want to fill the slide */
%let ODSstyle = HTMLblue; /* this is the shipped default */
%let N = 13; /* Demo Step */
footnote1 justify=left bold "Source Data: SASHELP.CLASS";
footnote2 justify=left bold "Code: &CodePath.Demo&N..sas";
footnote3 justify=left bold "Run on: &RunDayDateTime";
title1 ...; title2 ...;
ods noresults; ods _all_ close;
ods excel style=styles.&ODSstyle
    file="&Path.&SASenv._Demo&N._&FileNameDTsuffix..xlsx"
    options(embedded_titles='yes' embedded_footnotes='yes'
        title_footnote_width='10' absolute_row_height='14'
        sheet_interval='proc' zoom="&ZoomPct");
ods excel options(sheet_name='Girls');
title3 justify=left bold "Female Students - &SASenv ODS EXCEL -
ODS Style &ODSstyle - &ZoomPct.% Zoom";
proc print data=sashelp.class noobs;where sex eq 'F'; run;
ods excel options(blank_sheet='Custom Named Empty Sheet');
ods excel options(sheet_name='Boys');
title3 justify=left bold "Male Students ...";
proc print data=sashelp.class noobs; where sex eq 'M'; run;
ods excel close; options obs=max;

```

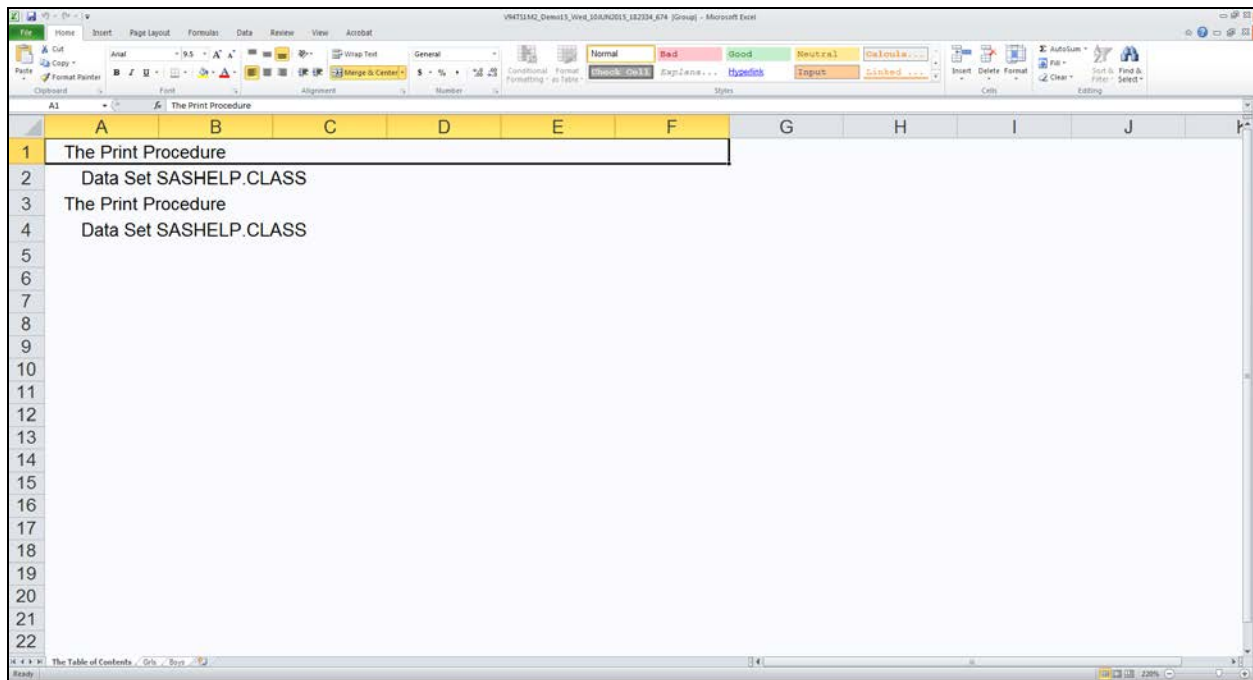


```

/* Click on Girls or Boys. Index most useful for many sheets. */
%RunDayDateTime(RunDayDateTimeAsFileNameSuffix=YES);
%let SASenv = V94TS1M2;
%let Path = D:\! ! ! ODS Excel Destination\results\;
%let CodePath = D:\! ! ! ODS Excel Destination\code\;
%let ZoomPct = 220; /* want to fill the slide */
%let ODSstyle = HTMLblue; /* this is the shipped default */
%let N = 14; /* Demo Step */
footnote1 justify=left bold "Source Data: SASHELP.CLASS";
footnote2 justify=left bold "Code: &CodePath.Demo&N..sas";
footnote3 justify=left bold "Run on: &RunDayDateTime";
title1 justify=left bold color=red "WorkBook with an Index";
ods noresults;
ods _all_ close;
ods excel style=styles.&ODSstyle
    file="&Path.&SASenv._Demo&N._&FileNameDTsuffix..xlsx"
    options(embedded_titles='yes' embedded_footnotes='yes'
        title_footnote_width='10' absolute_row_height='14'
        zoom="&ZoomPct" sheet_interval='proc' index='yes');
ods excel options(sheet_name='Girls');
title2 justify=left bold "Female Students - &SASenv ODS EXCEL -
ODS Style &ODSstyle - &ZoomPct.% Zoom";
proc print data=sashelp.class noobs; where sex eq 'F'; run;
ods excel options(sheet_name='Boys');
title2 justify=left bold "Male Students - &SASenv ODS EXCEL -
ODS Style &ODSstyle - &ZoomPct.% Zoom";
proc print data=sashelp.class noobs; where sex eq 'M'; run;
ods excel close;
options obs=max;

```

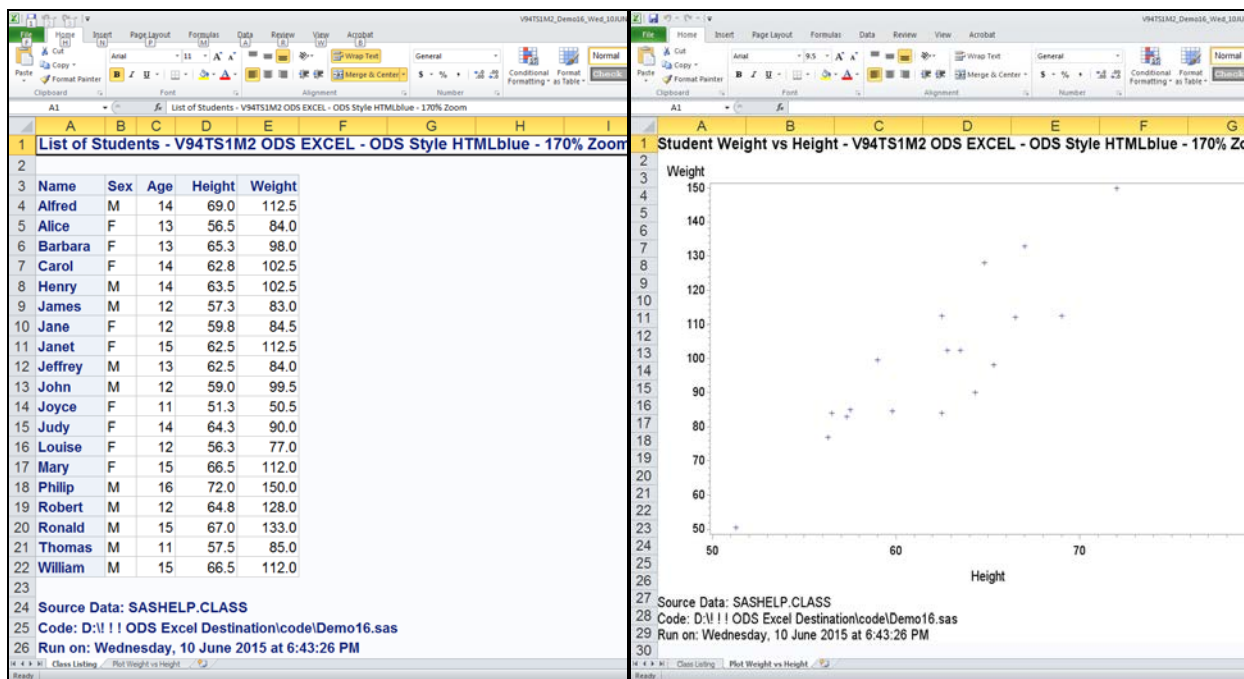




```

/* Table of Contents = TWO UNinformative links per worksheet */
%RunDayDateTime(RunDayDateTimeAsFileNameSuffix=YES);
%let SASenv = V94TS1M2;
%let Path = D:\!!! ODS Excel Destination\results\;
%let CodePath = D:\!!! ODS Excel Destination\code\;
%let ZoomPct = 220; /* want to fill the slide */
%let ZoomPct = 180; want to fill the slide */
%let ODSstyle = HTMLblue; /* this is the shipped default */
%let N = 15; /* Demo Step */
footnote1 justify=left bold "Source Data: SASHELP.CLASS";
footnote2 justify=left bold "Code: &CodePath.Demo&N..sas";
footnote3 justify=left bold "Run on: &RunDayDateTime";
title1 justify=left bold color=red "WorkBook with Table of
Contents (All Entries are Hyperlinks to Respective Sheets)";
title2 justify=left bold color=red "Entries are less informative
than those in an Index, and needless two per sheet.";
ods noresults; ods _all_ close;
ods excel style=styles.&ODSstyle
    file="&Path.&SASenv._Demo&N._&FileNameDTsuffix..xlsx"
    options(embedded_titles='yes' embedded_footnotes='yes'
        title_footnote_width='10' absolute_row_height='14'
        sheet_interval='proc' contents='yes' zoom="&ZoomPct");
ods excel options(sheet_name='Girls');
title3 justify=left bold "Female Students ...";
proc print data=sashelp.class noobs; where sex eq 'F'; run;
ods excel options(sheet_name='Boys');
title3 justify=left bold "Male Students ...";
proc print data=sashelp.class noobs; where sex eq 'M'; run;
ods excel close; options obs=max;

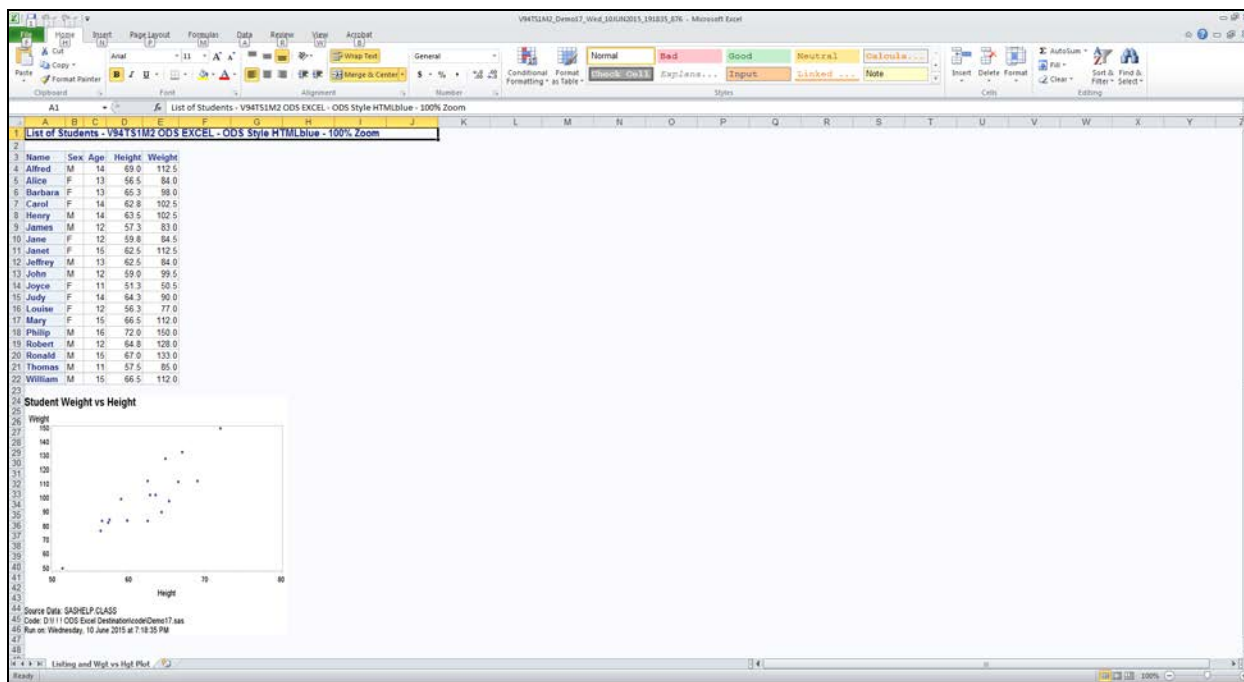
```



```

/* Listing and Plot on Separate Worksheets */
%RunDayDateTime(RunDayDateTimeAsFileNameSuffix=YES);
%let SASenv = V94TS1M2;
%let Path = D:\!!! ODS Excel Destination\results\;
%let CodePath = D:\!!! ODS Excel Destination\code\;
%let ZoomPct = 170; /* want to fill the slide */
%let ZoomPct = 180; /* want to fill the slide */
%let ODSstyle = HTMLblue; /* this is the shipped default */
%let N = 16; /* Demo Step */
footnote1 justify=left bold "Source Data: SASHELP.CLASS";
footnote2 justify=left bold "Code: &CodePath.Demo&N..sas";
footnote3 justify=left bold "Run on: &RunDayDateTime";
ods noresults; ods _all_ close;
ods excel style=styles.&ODSstyle
    file="&Path.&SASenv._Demo&N._&FileNameDTsuffix..xlsx"
    options(embedded_titles='yes' embedded_footnotes='yes'
        title_footnote_width='10' absolute_row_height='14'
        sheet_interval='proc' zoom="&ZoomPct");
ods excel options(sheet_name='Class Listing');
title1 justify=left bold "List of Students - &SASenv ODS EXCEL -
ODS Style &ODSstyle - &ZoomPct.% Zoom";
proc print data=sashelp.class noobs; run;
ods excel options(sheet_name='Plot Weight vs Height')
    gtitle gfootnote; /* so that text is in the image */
goptions xpixels=1000 ypixels=750;
title1 justify=left bold "Student Weight vs Height - &SASenv ODS
EXCEL - ODS Style &ODSstyle - &ZoomPct.% Zoom";
proc gplot data=sashelp.class; plot weight*height; run; quit;
ods excel close; options obs=max;

```



**/\* Listing & Plot on One WorkSheet. In omitted Demo18, ODS Excel Start\_At option could NOT move Plot to right of Listing \*/**

```

%RunDayDateTIme(RunDayDateTImeAsFileNameSuffix=YES);
%let SASenv = V94TS1M2;
%let Path = D:\! ! ! ODS Excel Destination\results\;
%let CodePath = D:\! ! ! ODS Excel Destination\code\;
%let ZoomPct = 100; /* want to fill the slide */
%let ODSstyle = HTMLblue; /* this is the shipped default */
%let N = 17; /* Demo Step */
ods noresults; ods _all_ close;
ods excel style=styles.&ODSstyle
  file="&Path.&SASenv._Demo&N._&FileNameDTsuffix..xlsx"
  options(embedded_titles='yes' embedded_footnotes='yes'
          title_footnote_width='10' absolute_row_height='14'
          zoom="&ZoomPct" sheet_interval='none'
          sheet_name='Listing and Wgt vs Hgt Plot');
title1 justify=left bold "List of Students - &SASenv ODS EXCEL -
ODS Style &ODSstyle - &ZoomPct.% Zoom";
footnote1;
proc print data=sashelp.class noobs; run;
ods excel gtitle gfootnote; /* so that text is in the image */
goptions xpixels=800 ypixels=600;
title1 justify=left bold "Student Weight vs Height";
footnote1 justify=left bold "Source Data: SASHELP.CLASS";
footnote2 justify=left bold "Code: &CodePath.Demo&N..sas";
footnote3 justify=left bold "Run on: &RunDayDateTIme";
proc gplot data=sashelp.class;
symbol value=dot; plot weight*height; run; quit;
ods excel close; options obs=max;

```

Variable: Weight

Moments			
N	19	Sum Weights	19
Mean	100.026316	Sum Observations	1900.5
Std Deviation	22.7739335	Variance	518.652047
Skewness	0.18335097	Kurtosis	0.68336484
Uncorrected SS	199435.75	Corrected SS	9335.73684
Coeff Variation	22.7679419	Std Error Mean	5.22469867

Source Data: SASHELP.CLASS  
Code: D:\!!! ODS Excel Destination\code\Demo19.sas  
Run on: Wednesday, 10 June 2015 at 7:38:01 PM

```

/* Five Outputs from PROC UNIVARIATE on Separate WorkSheets */
%RunDayDateTime(RunDayDateTimeAsFileNameSuffix=YES);
%let SASenv = V94TS1M2;
%let Path = D:\!!! ODS Excel Destination\results\;
%let CodePath = D:\!!! ODS Excel Destination\code\;
%let ZoomPct = 210; /* want to fill the slide */
%let ODSstyle = HTMLblue; /* this is the shipped default */
%let N = 19; /* Demo Step */
footnote1 justify=left bold "Source Data: SASHELP.CLASS";
footnote2 justify=left bold "Code: &CodePath.Demo&N..sas";
footnote3 justify=left bold "Run on: &RunDayDateTime";
ods noresults; ods _all_ close;
ods noproctitle;
ods excel style=styles.&ODSstyle
    file="&Path.&SASenv._Demo&N._&FileNameDTsuffix..xlsx"
    options(embedded_titles='yes' embedded_footnotes='yes'
        title_footnote_width='11' absolute_row_height='14'
        sheet_interval='output' zoom="&ZoomPct");
/* Presumably use of sheet_name= is impossible in this context,
or would deliver unintended consequences. I did not test it.
Your findings? */
title1 justify=left bold "Univariate Statistics for Student
Weight - &SASenv ODS EXCEL - ODS Style &ODSstyle - &ZoomPct.%
Zoom";
proc univariate data=sashelp.class;
var weight;
run;
ods excel close; options obs=max;

```

Univariate Statistics for Student Weight - V94TS1M2 ODS EXCEL - ODS Style HTMLblue - 85% Zoom

Variable: Weight

Moments	
N	19 Sam Weights
Mean	100.0263 Sum Observations 1900.5
Std Deviation	22.773825 Variance 518.652047
Skewness	0.1927097 Kurtosis 0.60336484
Uncorrected SS	19645.75 Corrected SS 9231.7464
Coeff Variation	22.7679419 Std Error Mean 5.22489867

Basic Statistical Measures			
Mean	Location	Std Deviation	Variability
100.0263	100.0263	22.77381	22.77381
Median	99.5000	Variance	518.65205
Mode	84.0000	Range	99.80000
	Interquartile Range		28.50000

the smallest of 4 modes with a count of 2.

Tests for Location: Mu=0			
Test	Statistic	p Value	
Student's t	T	19.1449 Pr >  T	<.0001
Sign	M	8.6 Pr >=  M	<.0001
Signed Rank	S	56 Pr >=  S	<.0001

Quantiles (Definition 5)	
Level	Quantile
100% Max	150.0
99%	150.0
95%	150.0
90%	150.0
75% Q3	125.0
50% Median	99.5
25% Q1	84.0
10%	77.0
5%	66.5
1% Min	50.5

Extreme Observations			
Lowest	Value	Obs	Highest
Value	Obs	Value	Obs
50.5	11	112.5	1
77.0	13	112.5	8
83.0	6	120.0	16
84.0	9	120.0	17
84.0	2	150.0	15

Source Data: SASHELP.CLASS  
Code: D:\1\ODS Excel Destination\code\Demo20.sas  
Run on: Wednesday, 19 June 2013 at 7:40:30 PM

```

/* Five Outputs from PROC UNIVARIATE on Same WorkSheet */
%RunDayDateTime(RunDayDateTimeAsFileNameSuffix=YES);
%let SASenv = V94TS1M2;
%let Path = D:\!!! ODS Excel Destination\results\;
%let CodePath = D:\!!! ODS Excel Destination\code\;
%let ZoomPct = 85; /* shrink to fit display area */
%let ODSstyle = HTMLblue; /* this is the shipped default */
%let N = 20; /* Demo Step */
footnote1 justify=left bold "Source Data: SASHELP.CLASS";
footnote2 justify=left bold "Code: &CodePath.Demo&N..sas";
footnote3 justify=left bold "Run on: &RunDayDateTime";
ods noresults;
ods _all_ close;
ods noproctitle;
ods excel style=styles.&ODSstyle
    file="&Path.&SASenv._Demo&N._&FileNameDTsuffix..xlsx"
    options(embedded_titles='yes' embedded_footnotes='yes'
        title_footnote_width='7' absolute_row_height='14'
        zoom="&ZoomPct" sheet_interval='none'
        sheet_name='All Outputs On Same Sheet');
title1 justify=left bold "Univariate Statistics for Student
Weight - &SASenv ODS EXCEL - ODS Style &ODSstyle - &ZoomPct.%
Zoom";
proc univariate data=sashelp.class;
var weight;
run;
ods excel close;
options obs=max;

```

Actual Vs Predicted Sales By Country - V94TS1M2  
ODS EXCEL - ODS Style HTMLblue - 300% Zoom

	Predicted Sales	Actual Sales	Difference
Country			
CANADA	\$233,019	\$246,990	(\$13,971)
GERMANY	\$231,554	\$245,998	(\$14,444)
U.S.A.	\$241,722	\$237,349	\$4,373
	\$706,295	\$730,337	(\$24,042)

Source Data: SASHELP.PRDSALE  
Code: D:\!!! ODS Excel Destination\code\Demo21.sas  
Run on: Wednesday, 10 June 2015 at 7:59:25 PM

```

/* Using TAGATTR to apply static Microsoft numeric formats */
%RunDayDateTime(RunDayDateTimeAsFileNameSuffix=YES);
%let SASenv = V94TS1M2;
%let Path = D:\!!! ODS Excel Destination\results\;
%let CodePath = D:\!!! ODS Excel Destination\code\;
%let ZoomPct = 300; /* want to fill the slide */
%let ODSstyle = HTMLblue; /* this is the shipped default */
%let N = 21; /* Demo Step */
footnote1 justify=left bold "Source Data: SASHELP.PRDSALE";
footnote2 "..."; footnote3 "...";
data work.ToSummary;
set sashelp.prdsale; Difference = predict - actual; run;
proc summary data=work.ToSummary nway;
class country; var predict actual Difference;
output out=ToPrint sum=; run;
ods noresults; ods _all_ close;
ods excel style=styles.&ODSstyle
    file="&Path.&SASenv._Demo&N._&FileNameDTsuffix..xlsx"
    options(embedded_titles='yes' embedded_footnotes='yes'
        zoom="&ZoomPct" sheet_name='Using Tag Attributes');
title1 justify=left bold "Actual Vs Predicted ...";
proc print data=work.ToPrint noobs label; id country;
var predict actual /
    style={tagattr='format:$#,##0_};[Red]\($#,##0\)};
var difference /
    style={tagattr='format:$#,##0_};[Red]\($#,##0\)};
sum predict actual Difference /
    style={tagattr='format:$#,##0_};[Red]\($#,##0\)};
run; ods excel close; options obs=max;

```



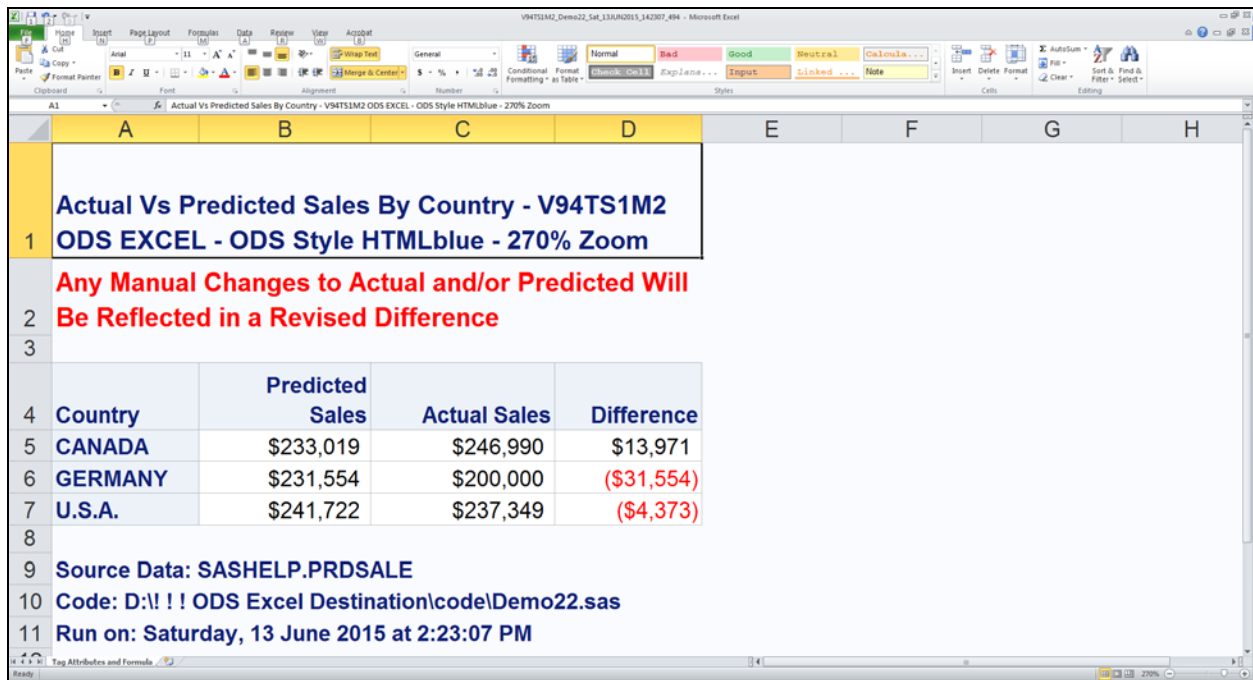
The screenshot shows an Excel spreadsheet with the following content:

	A	B	C	D	E	F	G	H
1	<b>Actual Vs Predicted Sales By Country - V94TS1M2</b>							
1	<b>ODS EXCEL - ODS Style HTMLblue - 270% Zoom</b>							
2	<b>Any Manual Changes to Actual and/or Predicted Will</b>							
2	<b>Be Reflected in a Revised Difference</b>							
3								
4	<b>Country</b>	<b>Predicted Sales</b>	<b>Actual Sales</b>	<b>Difference</b>				
5	CANADA	\$233,019	\$246,990	\$13,971				
6	GERMANY	\$231,554	\$245,998	\$14,444				
7	U.S.A.	\$241,722	\$237,349	(\$4,373)				
8								
9	Source Data: SASHELP.PRDSALE							
10	Code: D:\!!! ODS Excel Destination\code\Demo22.sas							
11	Run on: Saturday, 13 June 2015 at 2:23:07 PM							

```

/* Using TAGATTR to apply a dynamic Microsoft numeric format */
/* See next page for result of changing Germany Actual Sales */
%RunDayDateTime(RunDayDateTimeAsFileNameSuffix=YES);
%let SASenv = V94TS1M2;
%let Path = D:\!!! ODS Excel Destination\results\;
%let CodePath = D:\!!! ODS Excel Destination\code\;
%let ZoomPct = 270; /* want to fill the slide */
%let ODSstyle = HTMLblue; /* this is the shipped default */
%let N = 22; /* Demo Step */
footnote1 justify=left bold "Source Data: SASHELP.PRDSALE";
footnote2 ...; footnote3 ...;
data work.ToSummary;
set sashelp.prdsale; Difference = predict - actual; run;
proc summary data=work.ToSummary nway;
class country; var predict actual Difference;
output out=ToPrint sum=; run;
ods noresults; ods _all_ close;
ods excel style=styles.&ODSstyle
    file="&Path.&SASenv._Demo&N._&FileNameDTsuffix..xlsx"
    options(embedded_titles='yes' embedded_footnotes='yes'
        sheet_name='Tag Attributes and Formula' zoom="&ZoomPct");
title1 justify=left bold "Actual Vs Predicted Sales ...";
title2 justify=left bold color=red "Any Manual Changes to Actual
and/or Predicted Will Be Reflected in a Revised Difference";
proc print data=work.ToPrint noobs label; id country;
var predict actual /
    style={tagattr='format:$#,##0_');[Red]\($#,##0\)'};
var Difference / style={tagattr='format:$#,##0_');[Red]\($#,##0\)
    formula:RC[-1]-RC[-2]'};
run; ods excel close; options obs=max;

```



```

/* Using TAGATTR to apply a dynamic Microsoft numeric format */
/* New difference value after changing Germany Actual Sales */

```



## Microsoft Excel Charts Directly From SAS

An interesting new capability in TS1M3 is the ability to use ODS Excel and the new PROC MSCHART to create Excel charts directly from SAS.

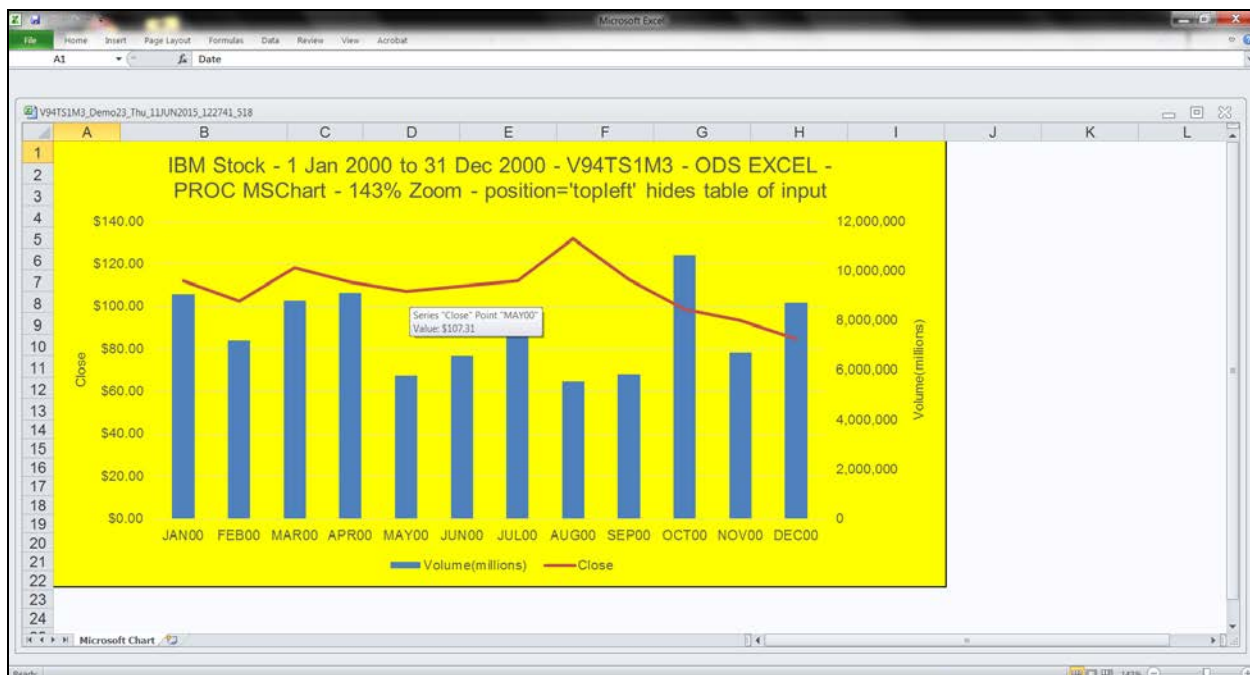
The most frequent graphic destination for data prepared with SAS has probably been Excel charts. Though SAS/GRAPH and ODS Graphics have always been far superior from a features and functions standpoint, many users are inclined to rely on a tool which might be easier for them to learn and to use. Not everyone is as fussy as I am in what I want to achieve graphically. In TS1M3, this capability is still in experimental status, but what you can do is shown on the next two pages. PROC MSCHART requires ODS Excel, and is not a part of SAS/GRAPH or ODS Graphics. It does not require Excel to be installed on the machine where SAS is running, which could be MVS, Unix, Linux, or Windows.

The first Excel chart is modeled on a SAS Global Forum 2015 examples handout, which did not provide all of the code needed, and which did not get into the broader story that is shown on the second Excel chart. Until I learned that the data needed to be pre-sorted by date (which was not revealed in the handout), I was baffled by the chart being drawn backwards.

Note that both charts are automatically web-enabled with “data tips”. No coding is required to request that.

The table of chart input data is always created. If the chart is positioned at top left, it hides the table, IF the table is short enough. When the chart is positioned at top right, the table is always apparent. The developer is contemplating providing an option to suppress the table, but the user will have the option to retain the table.

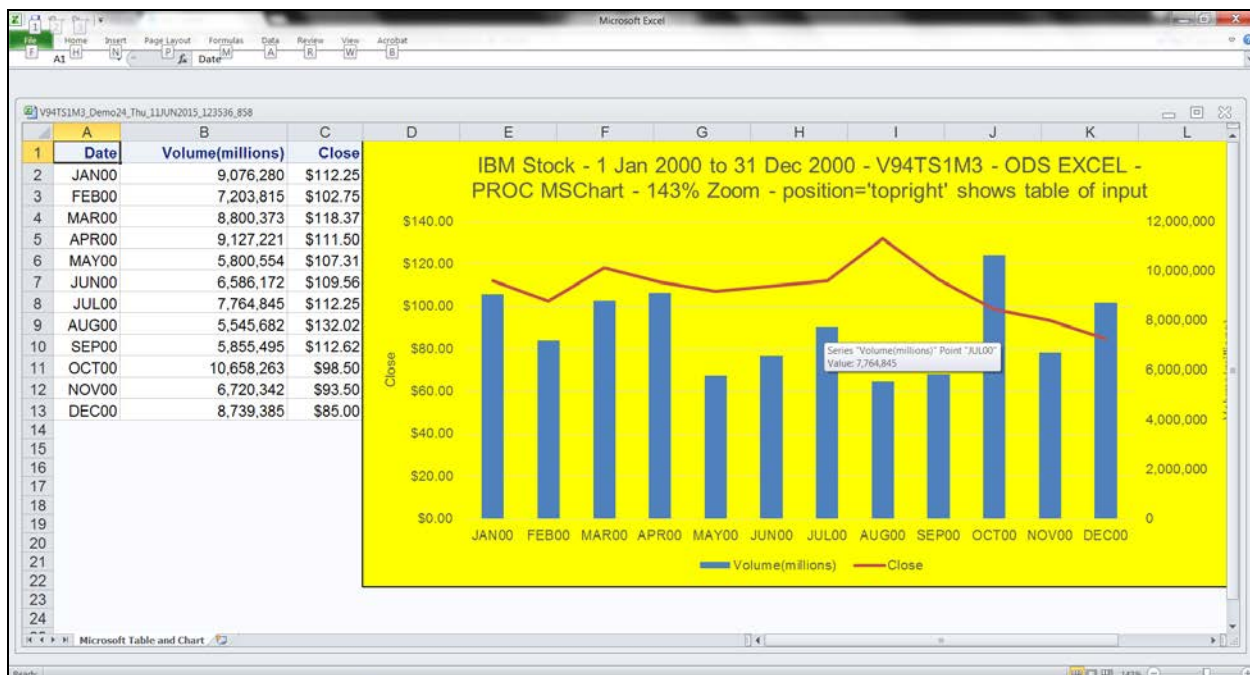
I like the table. As an advocate for and creator of communication-effective graphs, I have long said: **Image + Precise Numbers = quick, easy inference + reliable inference**. It's more convenient to have the chart and table side-by-side than to use hyperlinks to toggle between a chart and a table. Guessing the y-value (or x-value) of a plot, or the value of a bar end, by estimating where it lines up with tick mark values on an axis is an unreliable substitute for a table. Data tips are nice, but they disappear when you move the mouse. If you want to compare different points or bars with precision, you need to transcribe the information from pop-up boxes.



```

/* PROC MSCHART with chart position="topleft" */
/* >>> If data is not pre-sorted, chart is drawn backwards! */
%RunDayDateTime(RunDayDateTimeAsFileNameSuffix=YES);
%let SASenv = V94TS1M3;
%let Path = /folders/myfolders/!!! ODS Excel
Destination/results/;
%let CodePath = /folders/myfolders/!!! ODS Excel
Destination/code/;
%let ZoomPct = 143;
%let N = 23; /* Demo Step */
proc sort out=work.stocks data=sashelp.stocks
  (where=((stock="IBM") and ('01Jan00'd LE date LE '31dec00'd)));
by date; run;
ods noresults; ods _all_ close;
ods excel file="%Path.&SASenv._Demo&N._&FileNameDTsuffix..xlsx"
  options(zoom="%&ZoomPct" sheet_name='Microsoft Chart');
title "IBM Stock - 1 Jan 2000 to 31 Dec 2000 - &SASenv - ODS
EXCEL - PROC MSCHART - &ZoomPct% Zoom - position='topleft' hides
table of input";
proc mschart data=work.stocks category=date
  width=8in height=4in position="topleft";
chartattrs borderattrs =(type=solid solid_color=black)
  backfillattrs=(type=solid solid_color=yellow) nowall;
line close; vcolumn volume / secondary;
categoryaxis type=date;
primaryaxis title; secondaryaxis title;
format date monyy5.;
label close = 'Close'; label volume = 'Volume(millions)';
run;
ods excel close;

```



```

/* PROC MSCHART with chart position="topright" */
/* >>> If data is not pre-sorted, chart is drawn backwards! */
%RunDayDateTime(RunDayDateTimeAsFileNameSuffix=YES);
%let SASenv = V94TS1M3;
%let Path = /folders/myfolders/!!! ODS Excel
Destination/results/;
%let CodePath = /folders/myfolders/!!! ODS Excel
Destination/code/;
%let ZoomPct = 143;
%let N = 24; /* Demo Step */
proc sort out=work.stocks data=sashelp.stocks
  (where=((stock="IBM") and ('01Jan00'd LE date LE '31dec00'd)));
by date; run;
ods noresults; ods _all_ close;
ods excel file="%Path.&SASenv._Demo&N._FileNameDTsuffix..xlsx"
options(zoom="%ZoomPct" sheet_name='Microsoft Table and Chart');
title1 "IBM Stock - 1 Jan 2000 to 31 Dec 2000 - &SASenv - ODS
EXCEL - PROC MSCHART - &ZoomPct% Zoom - position='topright'
shows table of input";
proc mschart data=work.stocks category=date
  width=8in height=4in position="topright";
chartattrs borderattrs =(type=solid solid_color=black)
  backfillattrs=(type=solid solid_color=yellow) nowall;
line close; vcolumn volume / secondary;
categoryaxis type=date;
primaryaxis title; secondaryaxis title;
format date monyy5.;
label close = 'Close'; label volume = 'Volume(millions)';
run;
ods excel close;

```

## Alternative to an Index

From time to time I encounter an Excel workbook that has so many tabs that it's difficult to find the sheet I'm looking for. In fact, an index sheet is a solution. But then, once I'm in a worksheet far enough to the right, the index tab is no longer within view, and I need to remember to find the full scroll left arrow. I don't like complicated workbooks. I think that a workbook should have all tabs in view at the same time, and their labels should all be readable. I like the simpler solution shown below. It's not an example substitute for the extreme case that I am objecting to because there are only ten plus one spreadsheets, but I have used it, In Real Life, where the number of spreadsheets was much, much larger. The code is on the following pages.

Region	Sales
Africa	\$2,342,588
Asia	\$460,231
Canada	\$4,255,712
CentralAmerica_Caribbean	\$3,657,753
EasternEurope	\$2,394,940
MiddleEast	\$5,631,779
Pacific	\$2,296,794
SouthAmerica	\$2,434,783
UnitedStates	\$5,503,986
WesternEurope	\$4,873,000

Source Data: SASHELP.SHOES  
Code: D:\! !! ODS Excel Destination\code\Demo25.sas  
Run on: Sunday, 14 June 2015 at 5:15:30 AM

After clicking on UnitedStates (note the link back to the summary workbook):

Region	Product	Sales
UnitedStates	Boot	\$448,296
UnitedStates	Men's Casual	\$1,372,527
UnitedStates	Men's Dress	\$969,271
UnitedStates	Sandal	\$12,039
UnitedStates	Slipper	\$967,927
UnitedStates	Sport Shoe	\$104,403
UnitedStates	Women's Casual	\$541,536
UnitedStates	Women's Dress	\$1,087,987

Source Data: SASHELP.SHOES  
Code: D:\! !! ODS Excel Destination\code\Demo25.sas  
Run on: Sunday, 14 June 2015 at 5:15:30 AM

```

%RunDayDateTime(RunDayDateTimeAsFileNameSuffix=YES);

%let SASenv = V94TS1M2;
%let Path = D:\! ! ! ODS Excel Destination\results\;
%let CodePath = D:\! ! ! ODS Excel Destination\code\;
%let ZoomPct = 250; /* want to fill the slide */
%let ODSstyle = HTMLblue; /* this is the shipped default */
%let N = 25; /* Demo Step */

data work.ShoesWithRevisedRgnNames;
set sashelp.shoes;
Region = compress(Region, ' ');
Region = translate(Region, '_', '/');
run;

proc summary data=work.ShoesWithRevisedRgnNames;
class Region Product;
var sales;
output out=SalesSummary(drop=_freq_ where=( _type_ IN (2,3)))
      sum=;
run;

data work.SalesByRegion(drop=Product _type_)
work.SalesByProductWithInRegion;
set SalesSummary;
if _type_ EQ 2
then output work.SalesByRegion;
else output work.SalesByProductWithInRegion;
run;

proc sort data=work.SalesByRegion(keep=Region)
      out=work.Regions nodupkey;
by Region;
run;

data ToFormat(drop=Region RegionFileName);
length fmtname $ 7 type $ 1 Start $ 25 Label $ 256;
retain fmtname 'LnkXLSX' type 'C';
set work.Regions;
Start = left(Region);
Label = "&Path." || trim(left(Region)) ||
      "_&SASenv._Demo&N._&FileNameDTsuffix..xlsx";
run;

proc format lib=work cntlin=ToFormat;
run;
quit;

```

```

data _null_;
set Regions end=LastOne;
call symput('Region' || trim(left(_N_)), trim(left(Region)));
if LastOne;
call symput('RegionCount', _N_);
run;

footnote1 justify=left bold "Source Data: SASHELP.SHOES";
footnote2 justify=left bold "Code: &CodePath.Demo&N..sas";
footnote3 justify=left bold "Run on: &RunDayDateTime";

ods noresults;
ods _all_ close;

%macro RegionSalesDetail;

%do i = 1 %to &RegionCount %by 1;

ods excel style=styles.&ODSstyle
file=
"&Path.&&Region&i.._&SASenv._Demo&N._&FileNameDTsuffix..xlsx"
options(embedded_titles='yes' embedded_footnotes='yes'
zoom="&ZoomPct"
sheet_name='Sales This Region By Product'
title_footnote_width='8' absolute_row_height='14');
title1 justify=left bold "&&Region&i Shoe Sales - &SASenv ODS
EXCEL - ODS Style &ODSstyle - &ZoomPct.% Zoom";
title2 justify=left bold color=blue underlin=1
link="&Path.&SASenv._Demo&N._&FileNameDTsuffix..xlsx"
'Click here to get back to By Region Sales Summary';
proc print data=work.SalesByProductWithInRegion noobs;
where Region EQ "&&Region&i";
id Region;
var Product Sales;
run;
ods excel close;

%end;

%mend RegionSalesDetail;

%RegionSalesDetail;

ods excel style=styles.&ODSstyle
file="&Path.&SASenv._Demo&N._&FileNameDTsuffix..xlsx"
options(embedded_titles='yes' embedded_footnotes='yes'
zoom="&ZoomPct"
sheet_name='Sales By Region'

```

```

        title_footnote_width='8' absolute_row_height='14');
title1 justify=left bold "Shoe Sales By Region - &SASenv ODS
EXCEL - ODS Style &ODSstyle - &ZoomPct.% Zoom";
title2 justify=left bold
    "Click on any Region to get to its By Product Sales";
proc print data=work.SalesByRegion noobs;
id Region / style = {URL=$LnkXLSX.};
var Sales;
run;
ods excel close;

options obs=max;

```

**NOTE:** Among my disappointments with the old ODS tagset solutions was the fact that a tagset I needed for a certain feature did not support the use of hyperlinks in the worksheet table cells.

The disadvantage of this solution is that it creates multiple files. If they can be used in situ, then there is no inconvenience. But if you want to share results via email, you need to send the whole collection, either as eleven file attachments, or as an attached zipfile (probably the better choice).



## Revisiting the ODS Excel Index

Well, I decided to see what the result would look like, for THIS CASE of only ten detail worksheets plus their corresponding summary worksheet. It's OK. All eleven worksheet tabs are in view, as you can verify if you use your Acrobat Reader magnifier. See results below.

Index Sheet:

	A	B	C	D	E	F	G	H	I
1	Sales By Region								
2	Africa								
3	Asia								
4	Canada								
5	CentralAmerica_Caribbean								
6	EasternEurope								
7	MiddleEast								
8	Pacific								
9	SouthAmerica								
10	UnitedStates								
11	WesternEurope								
12									
13									
14									
15									
16									
17									
18									

After Clicking on Sales By Region tab:

	A	B	C	D	E	F	G
1	Shoe Sales By Region - V94TS1M2 ODS EXCEL - ODS Style HTMLblue - 250% Zoom						
2							
3	Region		Sales				
4	Africa		\$2,342,588				
5	Asia		\$460,231				
6	Canada		\$4,255,712				
7	CentralAmerica_Caribbean		\$3,657,753				
8	EasternEurope		\$2,394,940				
9	MiddleEast		\$5,631,779				
10	Pacific		\$2,296,794				
11	SouthAmerica		\$2,434,783				
12	UnitedStates		\$5,503,986				
13	WesternEurope		\$4,873,000				
14							
15	Source Data: SASHELP.SHOES						
16	Code: D:\ !! ODS Excel Destination\code\Demo26.sas						
17	Run on: Sunday, 14 June 2015 at 2:17:53 PM						
18							

After Clicking on United States tab:

	A	B	C	D	E	F	G	H
1	UnitedStates Shoe Sales - V94TS1M2 ODS EXCEL - ODS Style HTMLblue - 250% Zoom							
2								
3	Region	Product	Sales					
4	UnitedStates	Boot	\$448,296					
5	UnitedStates	Men's Casual	\$1,372,527					
6	UnitedStates	Men's Dress	\$969,271					
7	UnitedStates	Sandal	\$12,039					
8	UnitedStates	Slipper	\$967,927					
9	UnitedStates	Sport Shoe	\$104,403					
10	UnitedStates	Women's Casual	\$541,536					
11	UnitedStates	Women's Dress	\$1,087,987					
12								
13	Source Data: SASHELP.SHOES							
14	Code: D:\ !! ODS Excel Destination\code\Demo26.sas							
15	Run on: Sunday, 14 June 2015 at 2:17:53 PM							
16								
17								
18								

Code is on the following pages.



```

%RunDayDateTime(RunDayDateTimeAsFileNameSuffix=YES);

%let SASenv = V94TS1M2;
%let Path = D:\! ! ! ODS Excel Destination\results\;
%let CodePath = D:\! ! ! ODS Excel Destination\code\;
%let ZoomPct = 250; /* want to fill the slide */
%let ODSstyle = HTMLblue; /* this is the shipped default */
%let N = 26; /* Demo Step */

data work.ShoesWithRevisedRgnNames;
set sashelp.shoes;
Region = compress(Region, ' ');
Region = translate(Region, '_', '/');
run;

proc summary data=work.ShoesWithRevisedRgnNames;
class Region Product;
var sales;
output out=SalesSummary(drop=_freq_ where=( _type_ IN (2,3)))
sum=;
run;

data work.SalesByRegion(drop=Product)
work.SalesByProductWithInRegion;
set SalesSummary;
drop _type_;
if _type_ EQ 2
then output work.SalesByRegion;
else output work.SalesByProductWithInRegion;
run;

proc sort data=work.SalesByRegion(keep=Region) out=work.Regions
nodupkey;
by Region;
run;

data _null_;
set Regions end=LastOne;
call symput('Region' || trim(left(_N_)), trim(left(Region)));
if LastOne;
call symput('RegionCount', _N_);
run;

footnote1 justify=left bold "Source Data: SASHELP.SHOES";
footnote2 justify=left bold "Code: &CodePath.Demo&N..sas";
footnote3 justify=left bold "Run on: &RunDayDateTime";

ods noresults; ods _all_ close;

```

```

%macro RegionSalesDetail;

%do i = 1 %to &RegionCount %by 1;

ods excel options(sheet_name="&&Region&i");
title1 justify=left bold "&&Region&i Shoe Sales - &SASenv ODS
EXCEL - ODS Style &ODSstyle - &ZoomPct.% Zoom";
proc print data=work.SalesByProductWithInRegion noobs;
where Region EQ "&&Region&i";
id Region;
var Product Sales;
run;

%end;

%mend RegionSalesDetail;

ods excel style=styles.&ODSstyle
file="&Path.&SASenv._Demo&N._&FileNameDTsuffix..xlsx"
options(embedded_titles='yes' embedded_footnotes='yes'
zoom="&ZoomPct"
sheet_interval='proc' 'index='yes'
title_footnote_width='8' absolute_row_height='14');
ods excel options(sheet_name='Sales By Region');
title1 justify=left bold "Shoe Sales By Region - &SASenv ODS
EXCEL - ODS Style &ODSstyle - &ZoomPct.% Zoom";
proc print data=work.SalesByRegion noobs;
id Region;
var Sales;
run;

%RegionSalesDetail;

ods excel close;

options obs=max;

```

## Options Demonstrated In This Paper

autofilter  
contents (Table of Contents)  
embedded\_titles, embedded\_footnotes  
frozen\_headers, frozen\_rowheaders  
hidden\_columns, hidden\_rows  
index (better choice than Table of Contents)  
sheet\_interval  
sheet\_label  
sheet\_name  
start\_at /\* assignable values are different in TS1M2 vs TS1M3 \*/  
suppress\_byline  
tab\_color  
title\_footnote\_nobreak /\* TS1M3 \*/  
title\_footnote\_height, title\_footnote\_width  
zoom, blank\_sheet  
PROC MSCHART requires ODS Excel (TS1M3)  
use of tagattr in style= on var statements  
creating a hyperlink in a worksheet subtitle

## Options Not Demonstrated In This Paper

absolute\_column\_width  
absolute\_row\_height  
embed\_titles\_once  
embed\_footnotes\_once  
formulas  
msg\_level  
row\_heights

## Printing Options (None Were Demonstrated In This Paper)

center\_horizontal  
center\_vertical  
column\_repeat  
blackandwhite  
dpi  
draftquality  
fittopage  
gridlines  
orientation  
page\_order\_across  
pages\_fitheight  
pages\_fitwidth  
print\_area /\* TS1M3 \*/  
print\_footer  
print\_footer\_margin

```
print_header
print_header_margin
rowbreaks_count /* TS1M3 */
rowbreaks_interval /* TS1M3 */
rowcolheadings
row_repeat
scale
```

## Options Not Retained From ExcelXP

```
ascii_dotsautofilter_table
autofit_height
auto_subtotals
contents_workbook
convert_percentages
currency_format
currency_symbol
decimal_separator
default_column_width
merge_titles_footnotes
minimize_style
missing_align
numeric_test_format
pagebreaks
row_height_fudge
skip_space
thousands_separator
width_fudge
width_points
wraptext
configuration_name
configuration_file
```

## Conclusion

**NOTE:** Be sure to see Appendix A for documentation of ALL of the ODS Excel options available in TS1M3. Almost all are in release TS1M2 of SAS V9.4, but some require TS1M3.

ODS Excel is a definite improvement on all the SAS non-DDE tools to create highly formatted reports that can be opened in Excel. For me, its only significant limitations at this point are no support for Pivot Tables and no support for creating a horizontal panel of tables, graphs, or mixed tables and graphs across a worksheet. The latter unmet capability is most useful if you want to deliver a graph with its supporting input detail next to it on the same worksheet. As an advocate for and creator of communication-effective graphs, I have long said:

**Image + Precise Numbers = quick, easy inference + reliable inference**

## References

1. Bessler, LeRoy (2012), “Give Them Exactly What They Want with SAS-to-Excel Via Automation with Dynamic Data Exchange (DDE)”, *Proceedings of the Summer 2012 Wisconsin Illinois SAS Users Conference*, Milwaukee, WI, USA: Software User Services, Inc. See [http://www.wiisu.org/igfsljdkjfngrsel9883/SUSNov2012/Proceedings/Papers/Bessler%20-%20Give%20Them%20Exactly%20What%20They%20Want%20with%20SAS-to-Excel%20Via%20Automation%20with%20Dynamic%20Data%20Exchange%20\(DDE\).pdf](http://www.wiisu.org/igfsljdkjfngrsel9883/SUSNov2012/Proceedings/Papers/Bessler%20-%20Give%20Them%20Exactly%20What%20They%20Want%20with%20SAS-to-Excel%20Via%20Automation%20with%20Dynamic%20Data%20Exchange%20(DDE).pdf)
2. Eberhardt, Peter and Kong, Louanna (2012), “The Armchair Quarterback: Writing SAS Code for the Perfect Pivot (Table, That Is)”, *Proceedings of SAS Global Forum 2012*, Cary, NC, USA: SAS Institute Inc. See <http://support.sas.com/resources/papers/proceedings12/146-2012.pdf>
3. Bessler, LeRoy (2009), “Using SAS to Manage, Monitor, and Control the SAS BI Server: User-Developed Custom Tools for the SAS Server Administrator, User, or Manager”, *Proceedings of SAS Global Forum 2009*, Cary, NC, USA: SAS Institute Inc. See <http://support.sas.com/resources/papers/proceedings09/274-2009.pdf>
4. Bessler, LeRoy (2015), “Twelve Ways to Better Graphs”, *Proceedings of SAS Global Forum 2015*, Cary, NC, USA: SAS Institute Inc. See <http://support.sas.com/resources/papers/proceedings15/3518-2015.pdf>
5. Bessler, LeRoy (2010), “The Most Communication-Effective and Most Usable Information Delivery”, *Proceedings of SAS Global Forum 2010*, Cary, NC, USA: SAS Institute Inc. See <http://support.sas.com/resources/papers/proceedings10/231-2010.pdf>

## Author Information

Your questions, comments, suggestions, and alternate solutions are always welcome.

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## Appendix A. ODS Excel Documentation

ODS Excel Options Received from SAS Developer Wayne Hester  
Reformatted and With Added Comments by LeRoy Bessler  
(Any errors, typos, or confusion are the responsibility of LeRB.)

### Basic Syntax:

```
ods noresults; /* avoid opening result in SAS session */
ods _all_ close;
ods excel file="AnyPath\AnyFileName.xlsx"
           options(name1='value1' name2='value2' ... );
< SAS code goes here >
ods _all_ close;
```

### Comments By LeRB:

The information below is documentation.

For each option is listed:

the **type** of value to be assigned;

if **type='word'**, the list of valid values is given, as **value=**;

the **default** for that option; and

the description of the option as **summary=** .

The assigned value to any option must be quoted.

Since, in the ExcelXP Tip Sheet of March 2015 (document no. 1130598\_0315),  
which is NOT documentation for ODS Excel,

Boolean choices (for **type='bool'**) are usually 'yes' | 'no' | 'on' | 'off',

but sometimes 'yes' | 'no' | 'true' | 'false',

I conclude that the safest rule of thumb is to always use either 'yes' or 'no'.

**type='number\_bool'** means that the valid choices are either 'yes' | 'no' or a 'number'

**type='number\_list'** means that the valid choice is a comma-separated list of numbers

**type='number\_list\_range'** means that the valid choices are either a number, or a  
comma-separated list of numbers, or a numeric range of the form numberJ-numberK

### Common Options

```
absolute_column_width={type='number_list',default=nil,summary='L
ist of widths to use for columns instead of measured widths'}
```

```
absolute_row_height={type='number_list',default=nil,summary='Lis
t of heights to use for rows instead of measured heights'}
```

```

autofilter={type='range',default='none',summary='Turn all
filtering for data sections of tables in the worksheet'}

blank_sheet={type='string',default=nil,summary='Create a blank
worksheet with the given name'}

contents={type='bool',default='no',summary='Create a worksheet
that contains the table of contents'} /* LeRB: more verbose,
less informative than index */

embedded_titles={type='bool',default='no',summary='Embed titles
in the worksheet'}

embedded_footnotes={type='bool',default='no',summary='Embed
footnotes in the worksheet'}

embed_titles_once={type='bool',default='no',summary='Embed
titles only at the top of the worksheet'}

embed_footnotes_once={type='bool',default='no',summary='Embed
footnotes only at the bottom of the worksheet'}

formulas={type='bool',default='yes',summary='Data values that
begin with a "=" will become formulas'}

frozen_headers={type='number_bool',default='no',summary='Prevent
headers from scrolling with scrollbar'}

frozen_rowheaders={type='number_bool',default='no',summary='Prev
ent row headers from scrolling with scrollbar'}

hidden_columns={type='number_list_range',default=nil,summary='Ra
nge or list of columns to hide'}

hidden_rows={type='number_list_range',default=nil,summary='Range
or list of rows to hide'}

index={type='bool',default='no',summary='Create a worksheet that
contains an index of all worksheets'}

msg_level={type='string',default='no',summary='Suppress messages
from Excel tagset'}

row_heights={type='number_list',default=nil,summary='Positional
array of row heights values to use as over rides'}

```



```
sheet_interval={type='word',values={'output','table','page','bygroup',
'bygroups','proc','none'},default='output',summary='Specifies how often a new worksheet is created'}
```

```
sheet_label={type='string',default=nil,summary='Specifies a prefix for the worksheet name'}
```

```
sheet_name={type='string',default=nil,summary='Specifies the name for the next worksheet'}
```

```
start_at={type='string',default='1,1',summary='Specify the starting position for the report'} /* column-row assignment protocol differs in TS1M2 vs TS1M3. In TS1M2, Column 3 Row 2 is assigned with Start_At=(C2). In TS1M3, Column 3 Row 2 is assigned with Start_At=(3,2). */
```

```
suppress_bylines={type='bool',default='no',summary='Suppress bylines in the worksheet'}
```

```
tab_color={type='string',default=nil,summary='Specifies the color for the next worksheet tab'}
```

```
title_footnote_nobreak={type='bool',default='no',summary='Do not allow titles and footnotes to wrap across lines'} /* TS1M3 */
```

```
title_footnote_width={type='number',default='0',summary='The number of columns titles and footnotes span'},
```

```
zoom={type='number',default='100',summary='Indicates the initial zoom level on the worksheet'}
```

## Printing Options

```
center_horizontal={type='bool',default='no',summary='Centers worksheet horizontally when printing'}
```

```
center_vertical={type='bool',default='no',summary='Centers worksheet vertically when printing'}
```

```
column_repeat={type='string',default=nil,summary='Columns to repeat across page when printing'}
```

```
blackandwhite={type='bool',default='no',summary='Prints the worksheet in black and white'}
```

```
dpi={type='number',default='300',summary='Print resolution'}
```

```

draftquality={type='bool',default='no',summary='Indicates that
draft quality should be used for printing'}

fittopage={type='bool',default='no',summary='Fit worksheet to
the page when printing'}

gridlines={type='bool',default='no',summary='Enables grid lines
when printing'}

orientation={type='word',values={'portrait','landscape'},default
='portrait',summary='Print orientation for the worksheet'}

page_order_across={type='bool',default='no',summary='Set the
page print order to across and then down'}

pages_fitheight={type='number',summary='The number of pages down
to fit the worksheet when printing'}

pages_fitwidth={type='number',summary='The number of pages
across to fit the worksheet when printing'}

print_area={type='text_list',default=nil,summary='Description of
the printed area, as start column, start row, end column, end
row'} /* TS1M3 */

print_footer={type='string',summary='The footer text to be used
when printing'}

print_footer_margin={type='number',summary='The footer margin as
set in the page setup dialog'}

print_header={type='string',summary='The header text to be used
when printing'}

print_header_margin={type='number',summary='The header margin as
set in the page setup dialog'}

rowbreaks_count={type='number',default=nil,summary='Inserts a
print page break every number of data rows'} /* TS1M3 */

rowbreaks_interval={type='word',values={'output','proc'},default
='none',summary='Inserts a print page break between each
interval'} /* TS1M3 */

rowcolheadings={type='bool',default='no',summary='Specifies
whether or not row and column headings should be printed'}

```

```
row_repeat={type='string',default=nil,summary='Rows to repeat  
across page when printing'}
```

```
scale={type='number',default='100',summary='Indicates the scale  
level for printing'}
```