



Automating SAS AMO using VBA Programming

Scott Bass
Senior Information Analyst
Bupa Australia

AMO: An Opportunity for Transformation

- Business Case for Using AMO
- Old Approach
- New Approach
- DEMO
- Wrap Up

Business Case for Using AMO

- Data from several datasets joined and transformed
- Multiple (9) output datasets created from these joined datasets
- Output data loaded into Excel
- Extensive editing done in Excel (“hospital hmodelling”)
 - This editing is more an “art” than “science” and can’t be done programmatically (“Rubik’s Cube”)
- Final results are sent to external organisations for review
 - They don’t have SAS
- Conclusion: Excel is the proper tool for this job
- This process will be repeated for ~ 200 organisations over the next 18 months (as of 2013 Q1)

Old Approach

- Enterprise Guide (EG) project was used to join the datasets
- Data was filtered in EG by the external organisation ID, start date, and end date
- Filtering criteria was hard coded into the SQL queries
 - User knew SQL but unaware of EG prompting
- Multiple (9) CSV files created from the output datasets
- VBA macro used to import the CSV files into multiple worksheets
- CSV import problematic due to lack of data typing in CSV files

Issues:

1. EG project had to be re-edited and re-run every week or so to apply the filtering
2. Lots of manual editing to fix data incorrectly changed by Excel
3. 1 – 1.5 days spent in getting the data prepared in Excel before other work can begin

New Approach

- (New) EG project still used to join the datasets
- No filtering is done in EG, so the output datasets contain all organisations and dates
- SAS output datasets created instead of CSV files (SPDE engine)
- SAS AMO used to import the data into Excel directly from the server
- VBA programming used to set the filtering criteria from within Excel
- EG project only needs to be run every couple months as new claims data arrives

Results:

1. Data is correctly imported by AMO as it “knows” the data type
2. It’s a much easier process to initialise data for a new model (just click a button)
3. Process reduced from 1.5 days to 5 minutes to initiate a new model

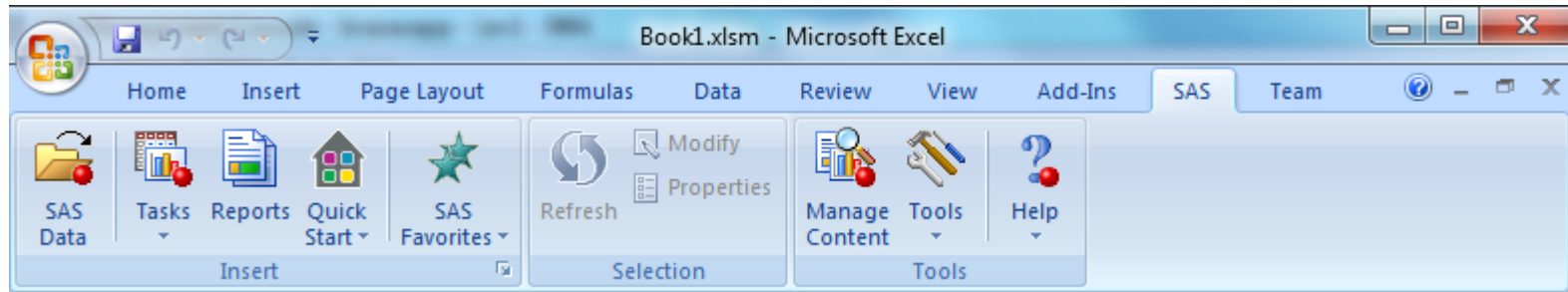
How did we achieve this Transformation?

DEMO...

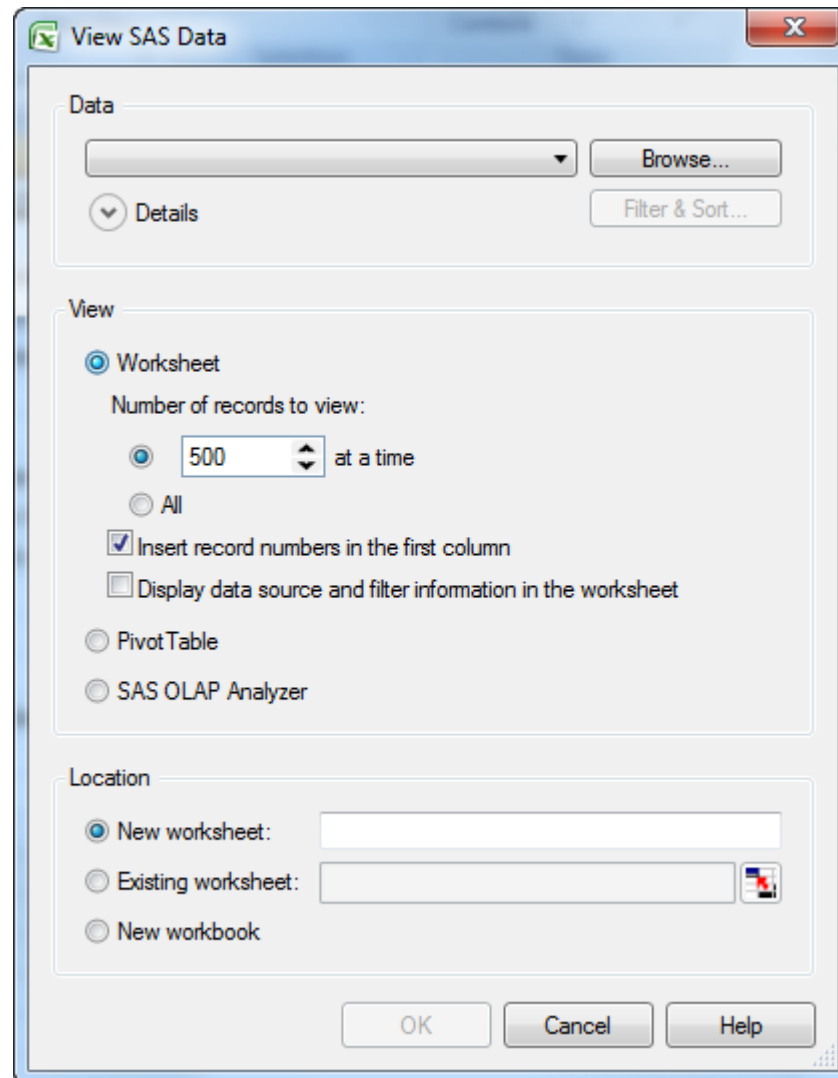
Book1 – Key Points:

- Open SAS dataset into Excel
- Demonstrate key AMO features
 - SAS Data
 - Tasks
 - Reports (Stored Processes)
 - Quick Start
 - SAS Favorites
 - Modify
 - Properties
 - Manage Content
 - Tools
 - Per View/View All
 - Begin Edit/Commit
 - Filter and Sort
 - Name Manager (Formulas Tab)

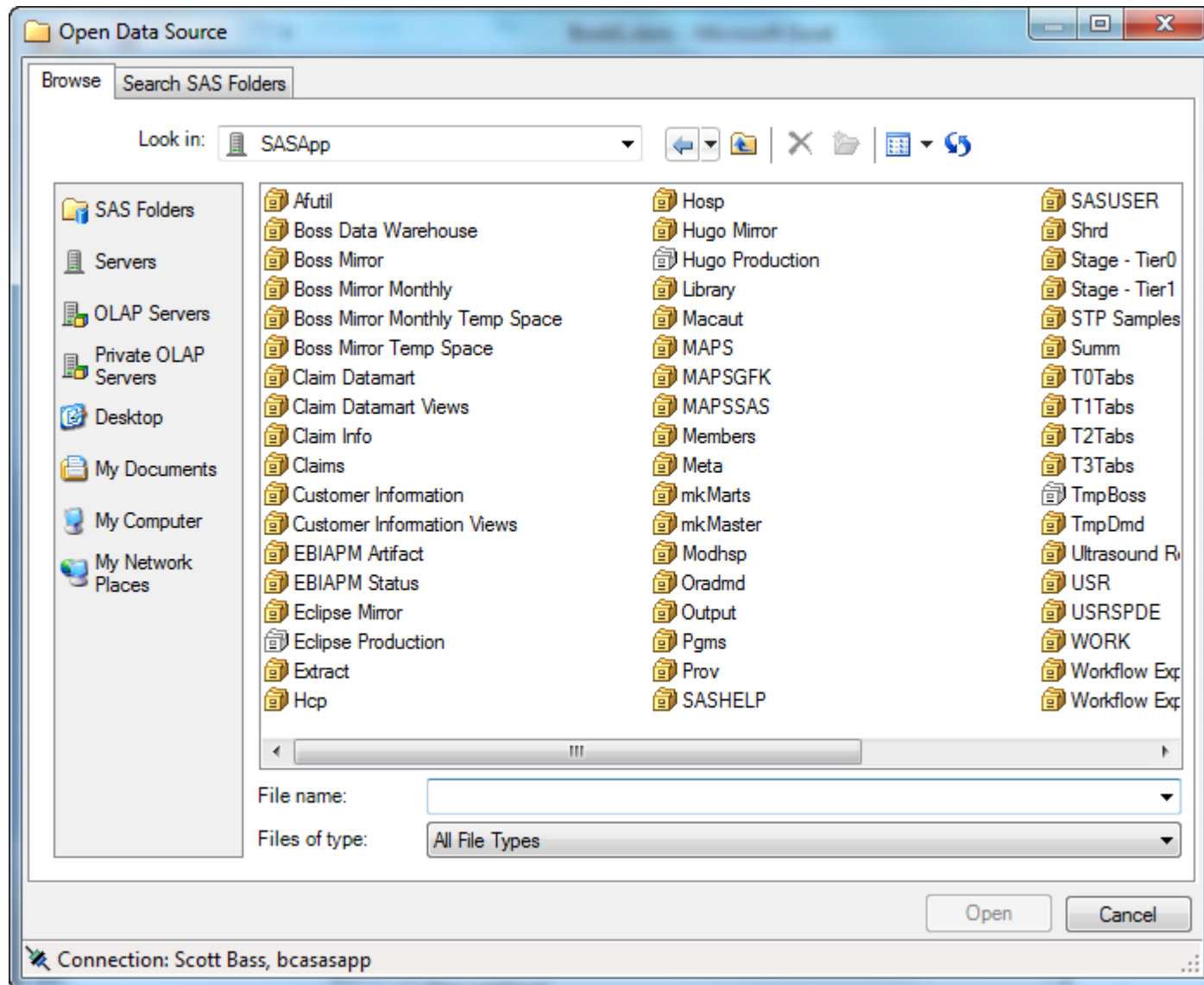
Book1 – SAS Menu Tab



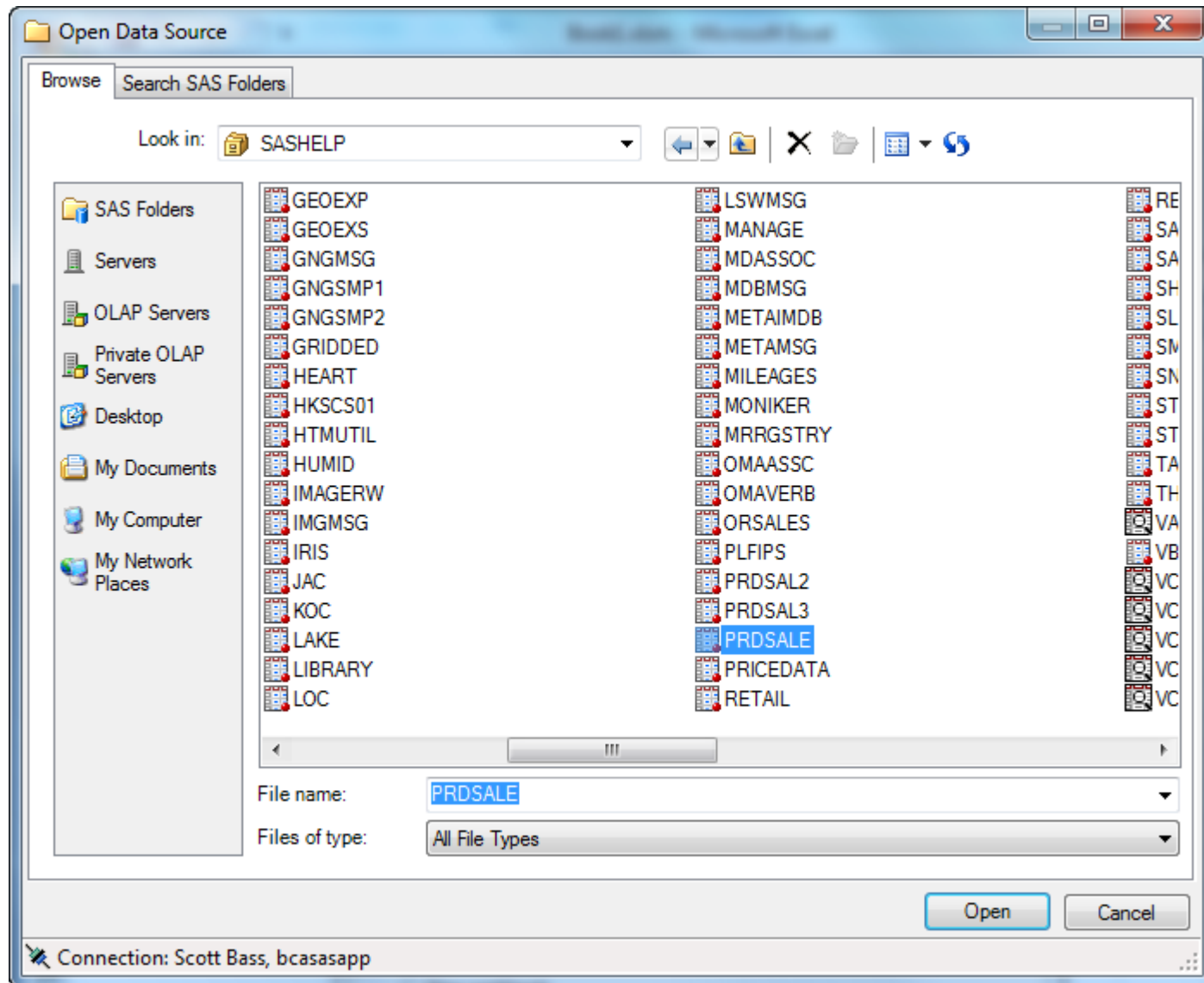
Book1 – SAS Data



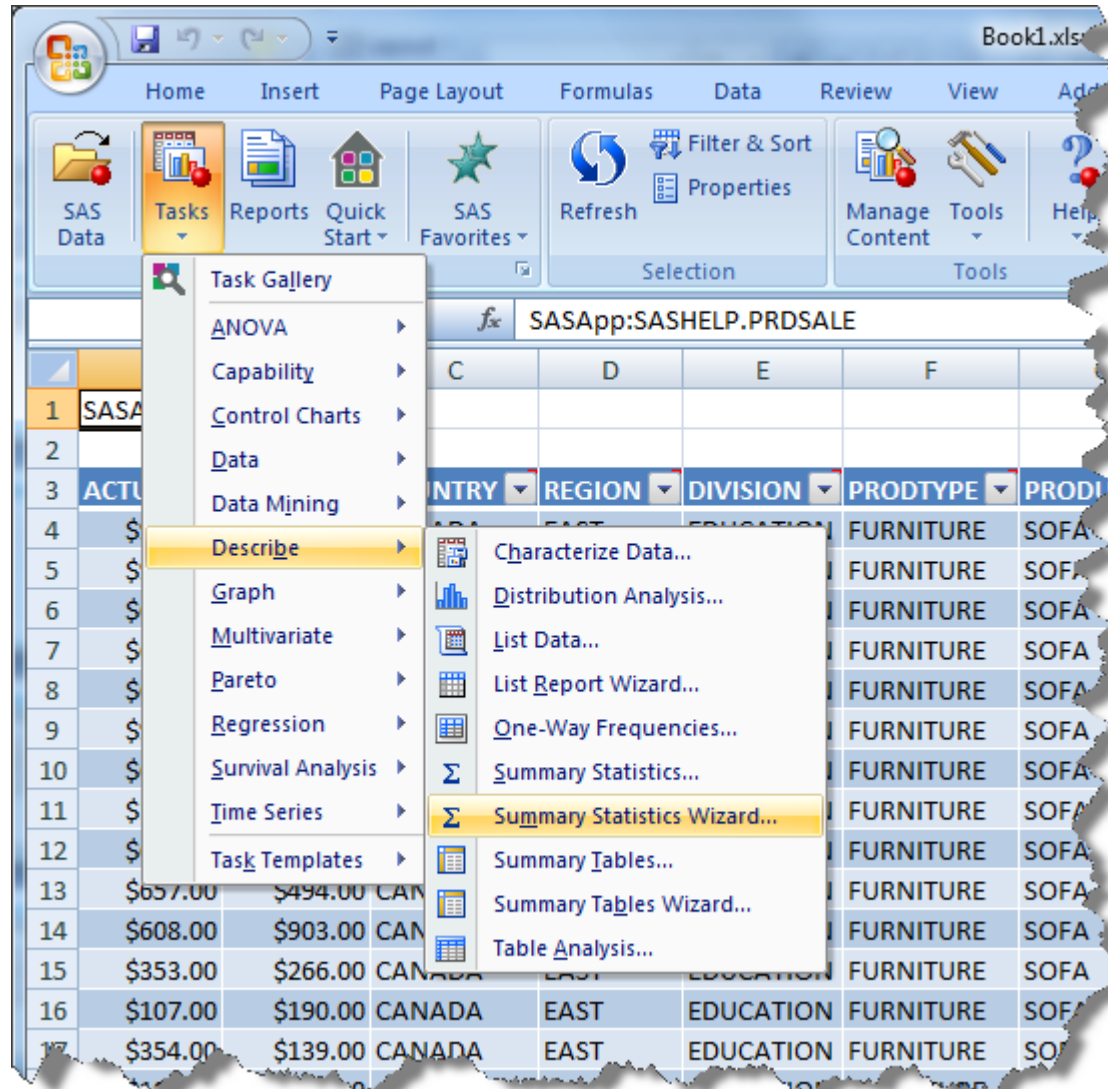
Book1 – SAS Data (cont)



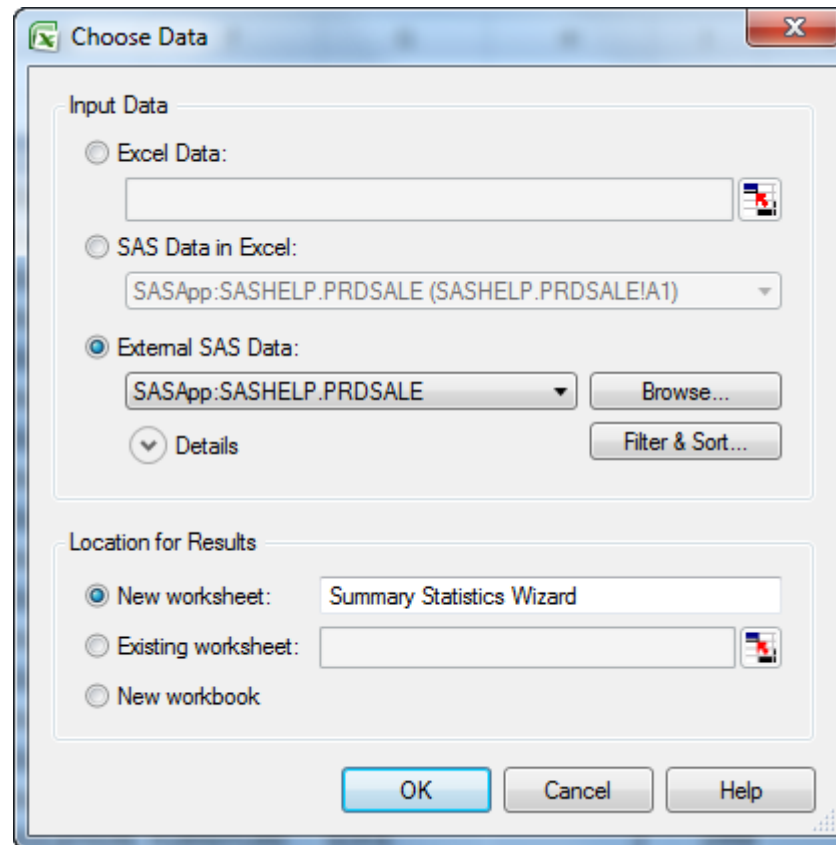
Book1 – SAS Data (cont)



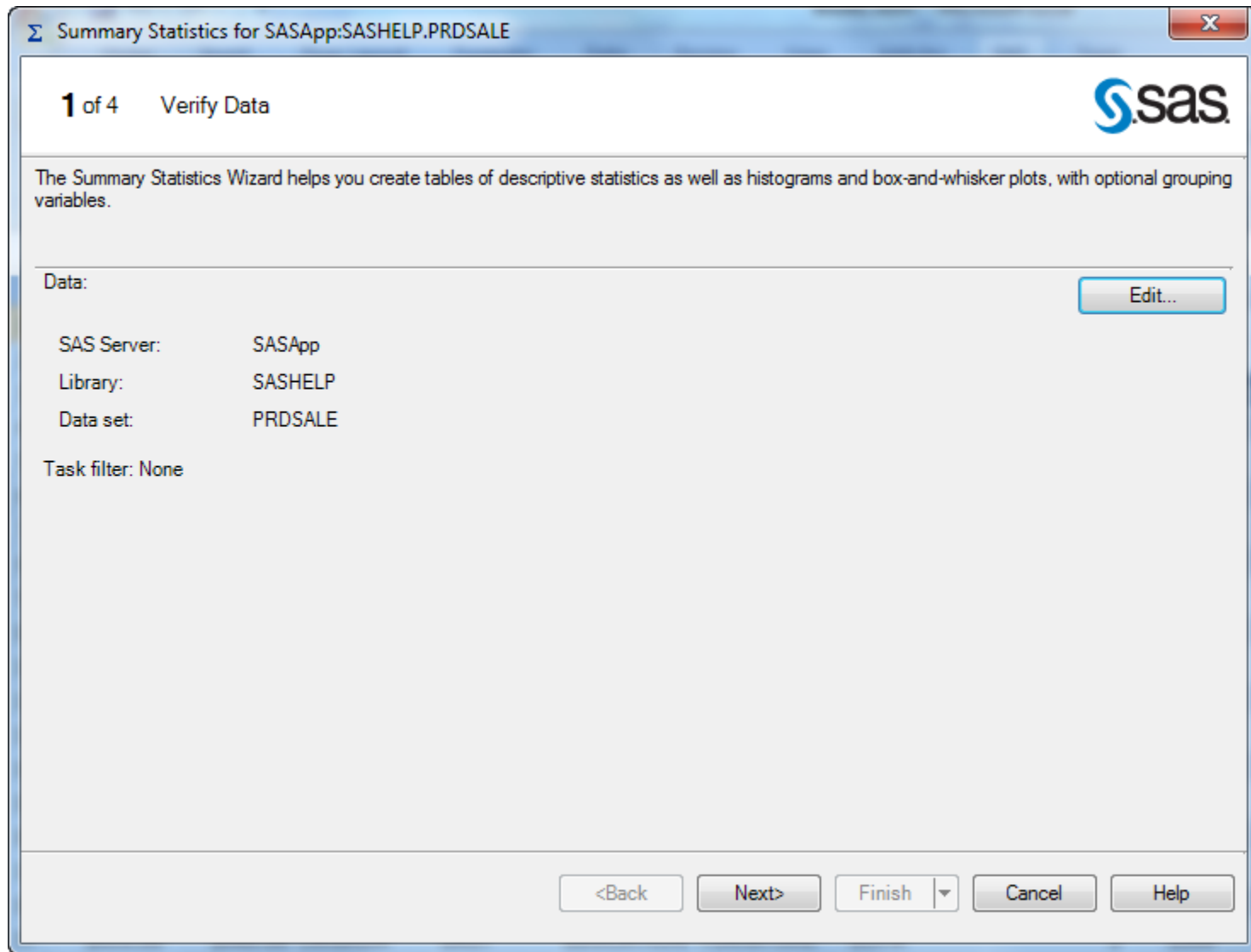
Book1 – Tasks



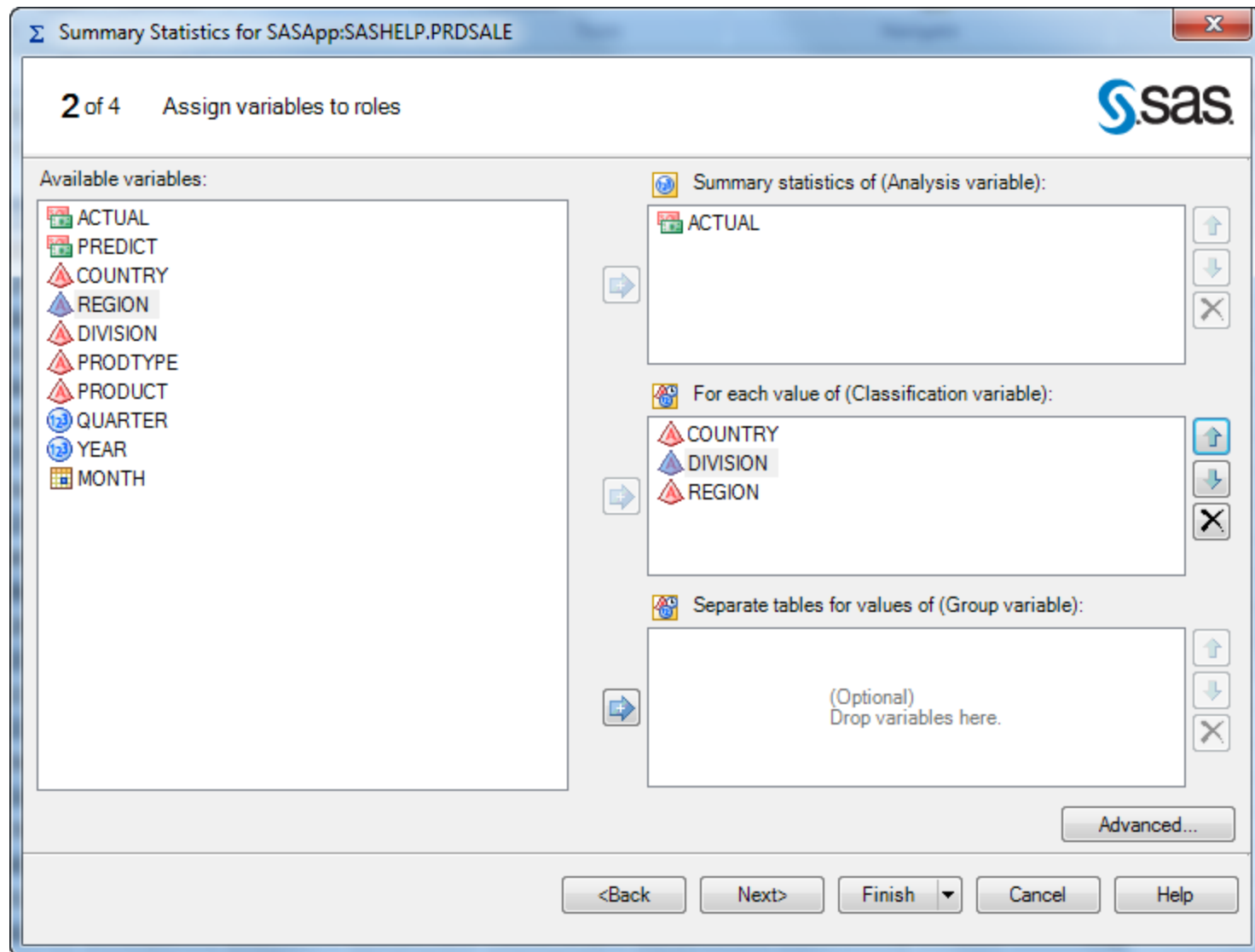
Book1 – Tasks (cont)



Book1 – Tasks (cont)



Book1 – Tasks (cont)



The screenshot shows the SAS Summary Statistics dialog box for the dataset SASHELP.PRDSALE. The window title is "Summary Statistics for SASApp:SASHELP.PRDSALE". The current step is "2 of 4 Assign variables to roles".

Available variables:

- ACTUAL
- PREDICT
- COUNTRY
- REGION
- DIVISION
- PRODTYPE
- PRODUCT
- QUARTER
- YEAR
- MONTH

Summary statistics of (Analysis variable):

- ACTUAL

For each value of (Classification variable):

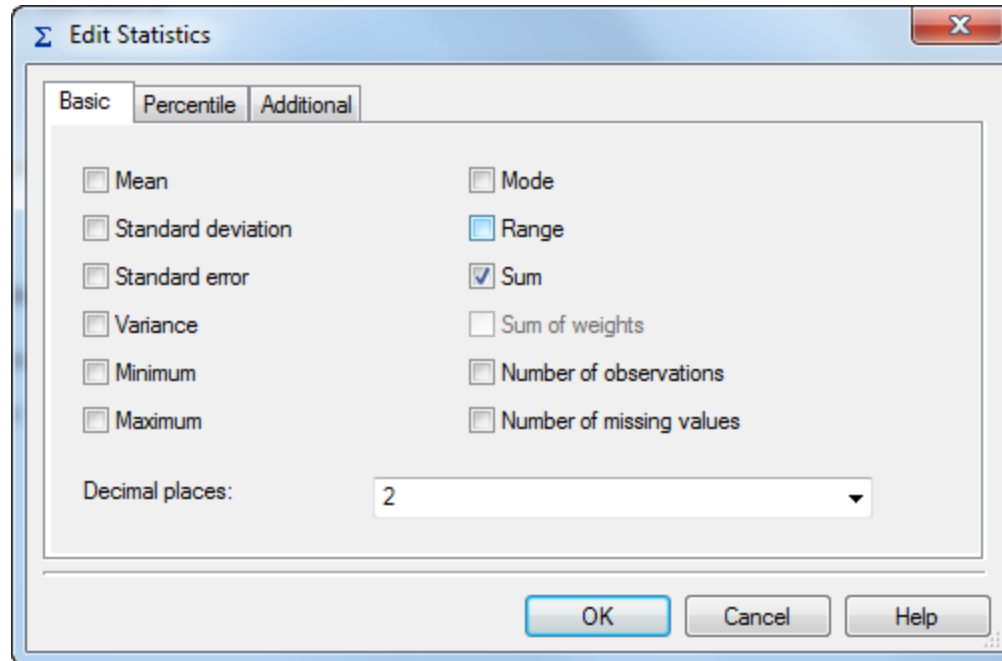
- COUNTRY
- DIVISION
- REGION

Separate tables for values of (Group variable):

(Optional)
Drop variables here.


Buttons: <Back, Next>, Finish, Cancel, Help, Advanced...

Book1 – Tasks (cont)



Book1 – Tasks (cont)

Σ Summary Statistics for SASApp:SASHELP.PRDSALE

4 of 4 Provide title and footnote 

Analysis:

Histogram:

Box and Whisker Plot:

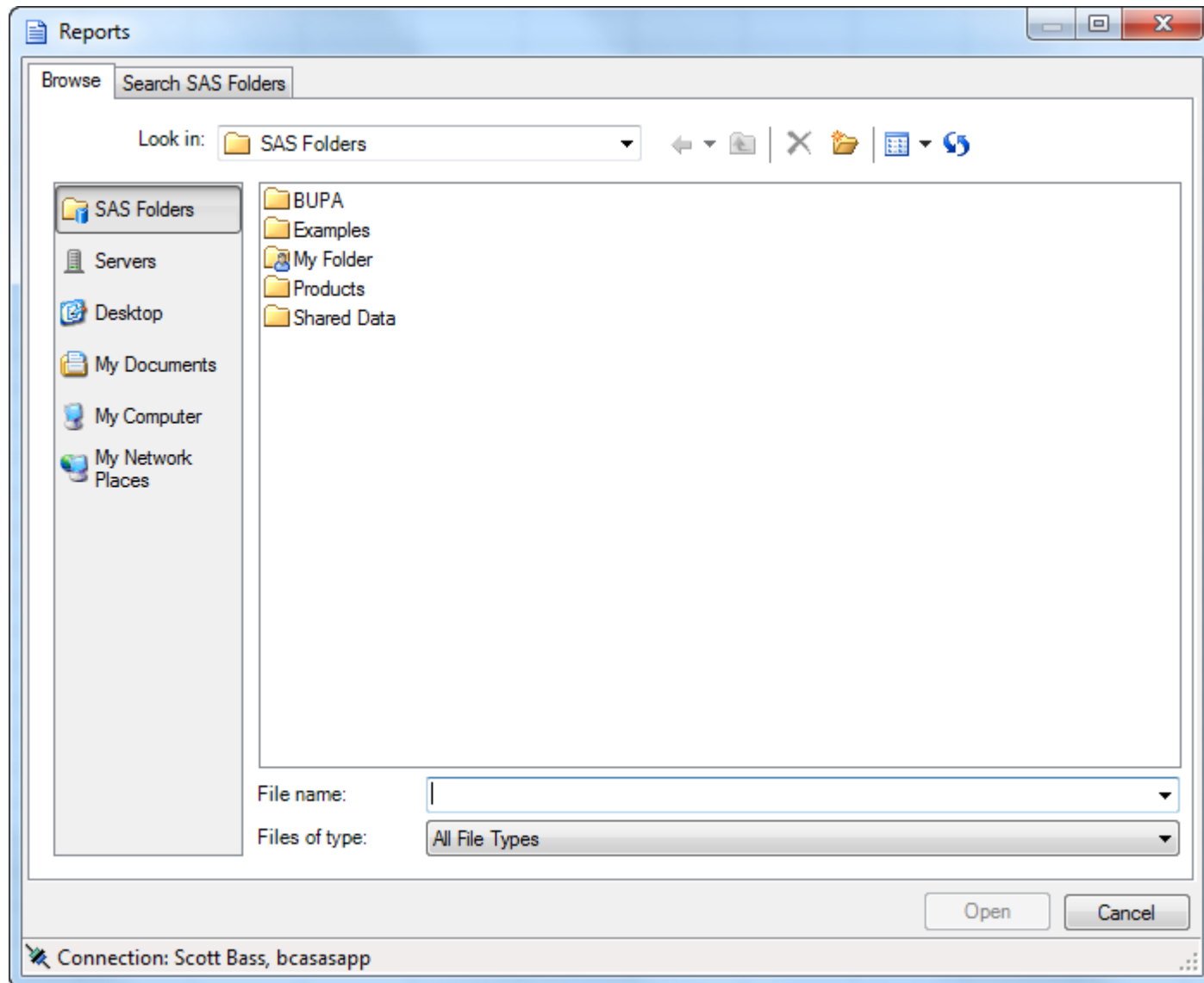
Footnote:

Book1 – Tasks (cont)

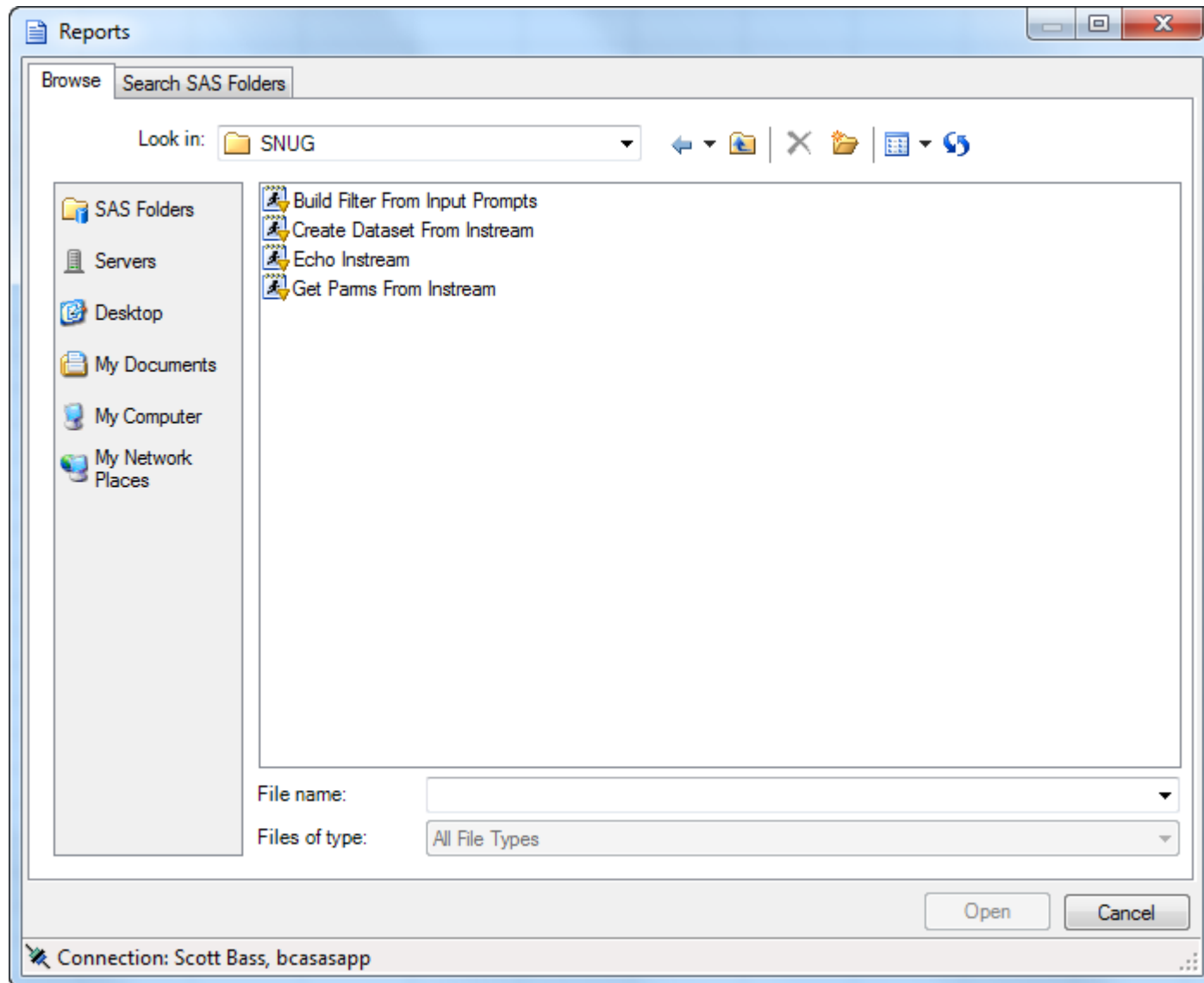
	A	B	C	D	E	F
1	Summary Statistics					
2						
3	Results					
4						
5	Analysis Variable : ACTUAL Actual Sales					
6	Country	Division	Region	Sum		
7	CANADA	CONSUMER	EAST	59696.00		
8			WEST	58288.00		
9		EDUCATION	EAST	67789.00		
10			WEST	61217.00		
11	GERMANY	CONSUMER	EAST	60286.00		
12			WEST	63560.00		
13		EDUCATION	EAST	64261.00		
14			WEST	57891.00		
15	U.S.A.	CONSUMER	EAST	61274.00		
16			WEST	59381.00		
17		EDUCATION	EAST	56955.00		
18			WEST	59739.00		
19						
20	Generated by SAS ('SASApp', X64_ES08R2) on July 13, 2013 at 12:19:12 PM					
21						

Notes SASHELP.PRDSALE Summary Statistics Wizard

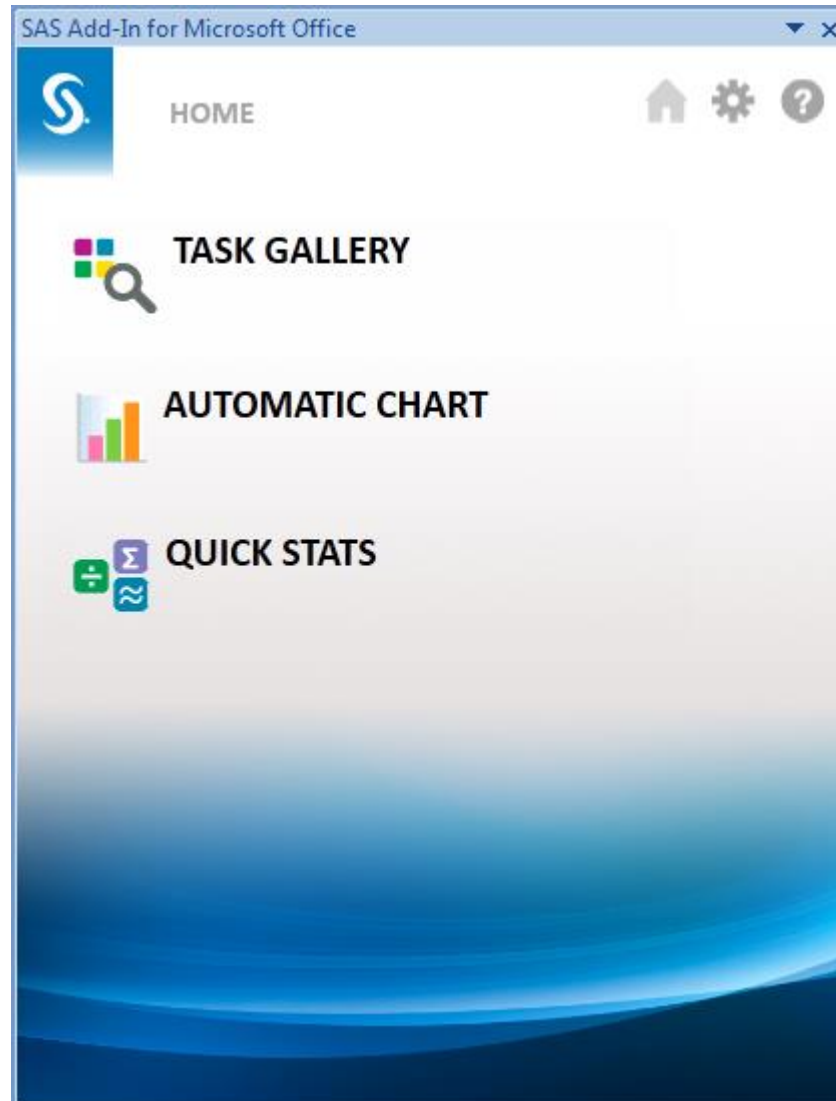
Book1 – Reports



Book1 – Reports (cont)



Book1 – Quick Start

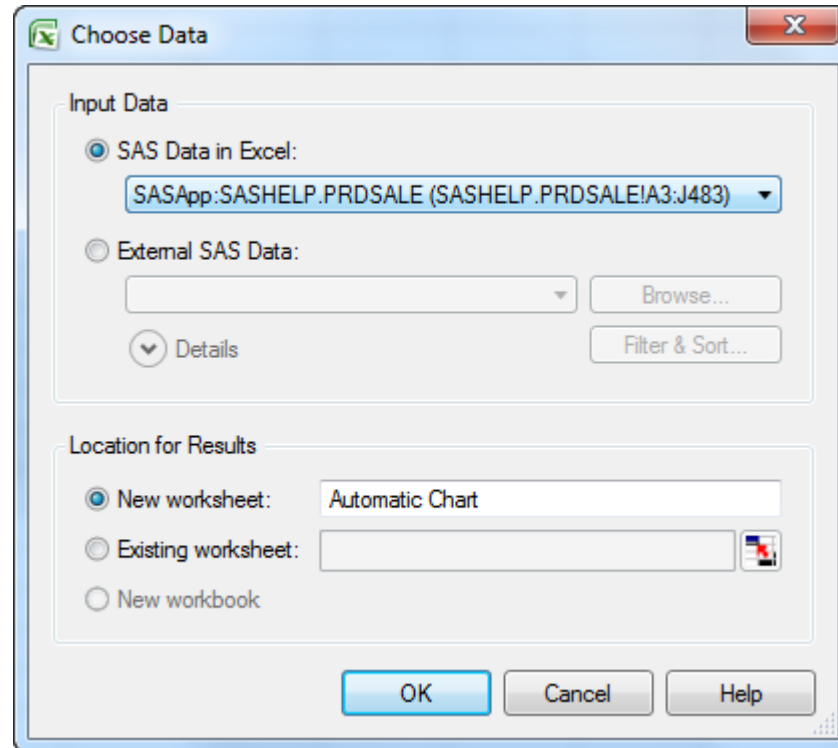


Book1 – Quick Start – Task Gallery

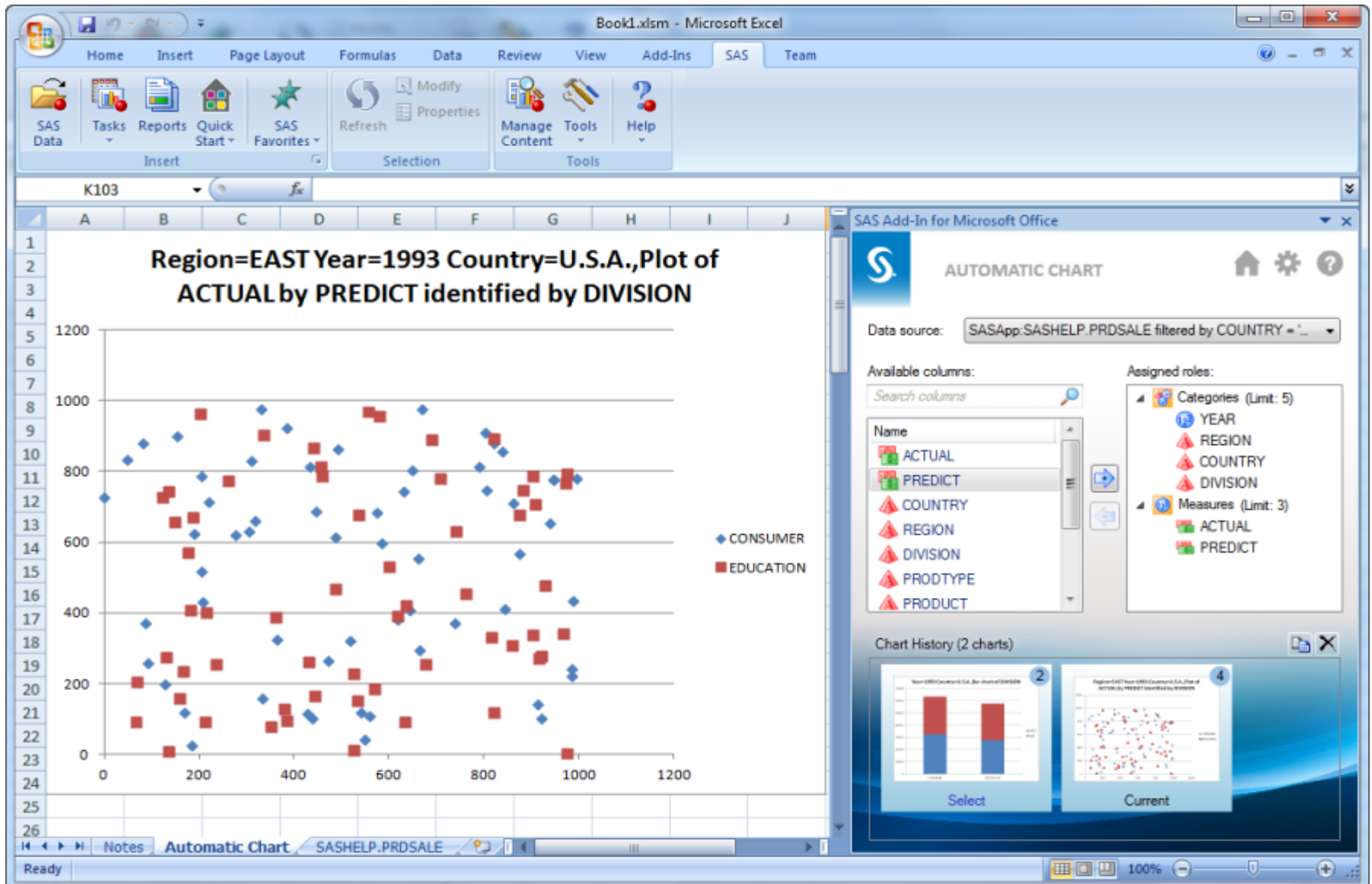
The screenshot displays the SAS Add-In for Microsoft Office Task Gallery. The window title is "SAS Add-In for Microsoft Office". The interface includes a SAS logo, the text "TASK GALLERY", and navigation icons for home, settings, and help. A search bar is labeled "Search tasks". Below it, a "Show categories" section shows "All None" and an "Icon" dropdown. A row of eight category icons is visible. The main area shows "77 tasks" with a "Medium" filter. Six task cards are displayed in a grid:

- Area Plot**: Shows a line graph with two areas (orange and green) over time. Includes "Open" and a help icon.
- ARIMA Modeling and For...**: Shows a complex interface with multiple plots and data tables. Includes "Open" and a help icon.
- Bar Chart**: Shows a bar chart with six bars of varying heights. Includes "Open" and a help icon.
- Bar Chart Wizard**: Shows a bar chart with six bars, similar to the previous one. Includes "Open" and a help icon.
- Bar-Line Chart**: Shows a bar chart with a line graph overlaid. Includes "Open" and a help icon.
- Basic Forecasting**: Shows a line graph with a trend line and data points. Includes "Open" and a help icon.

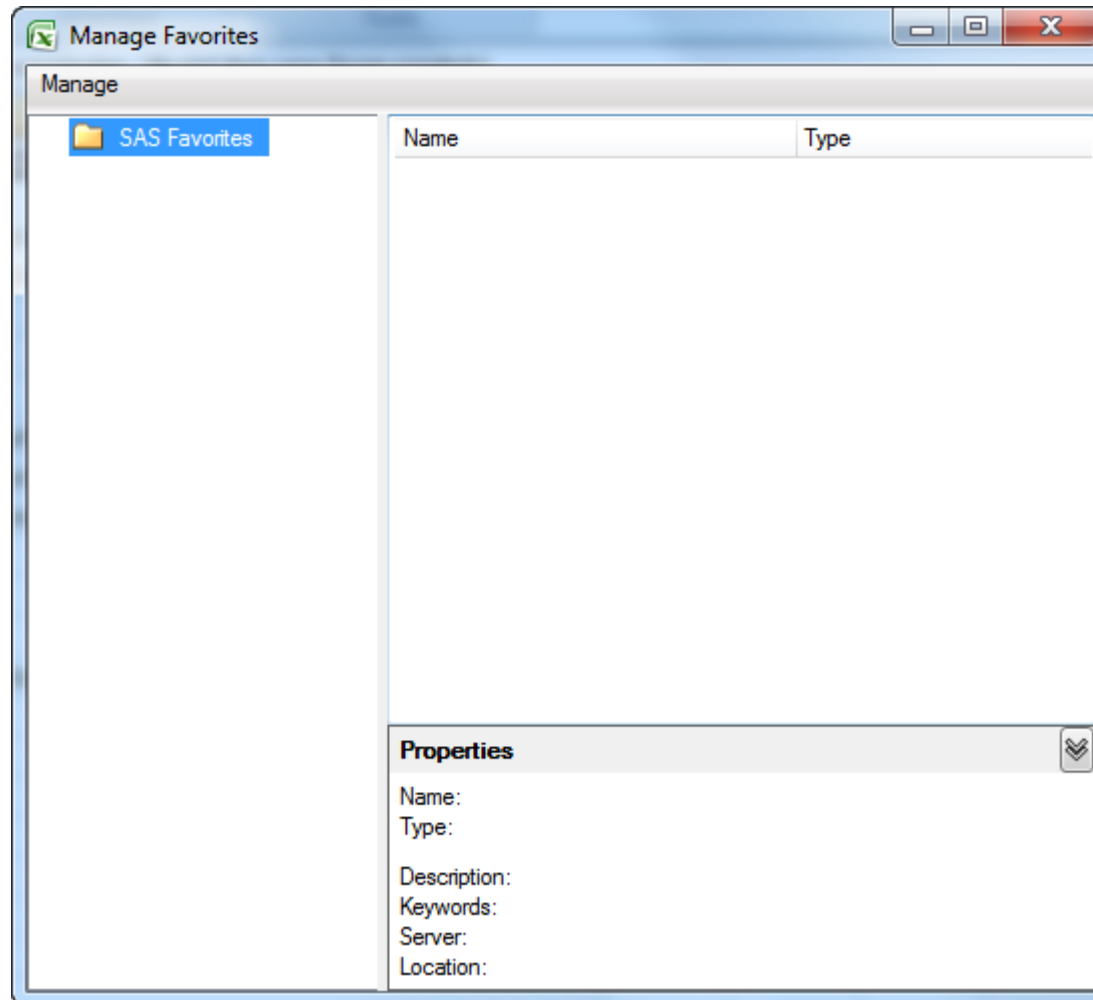
Book1 – Quick Start – Automatic Chart



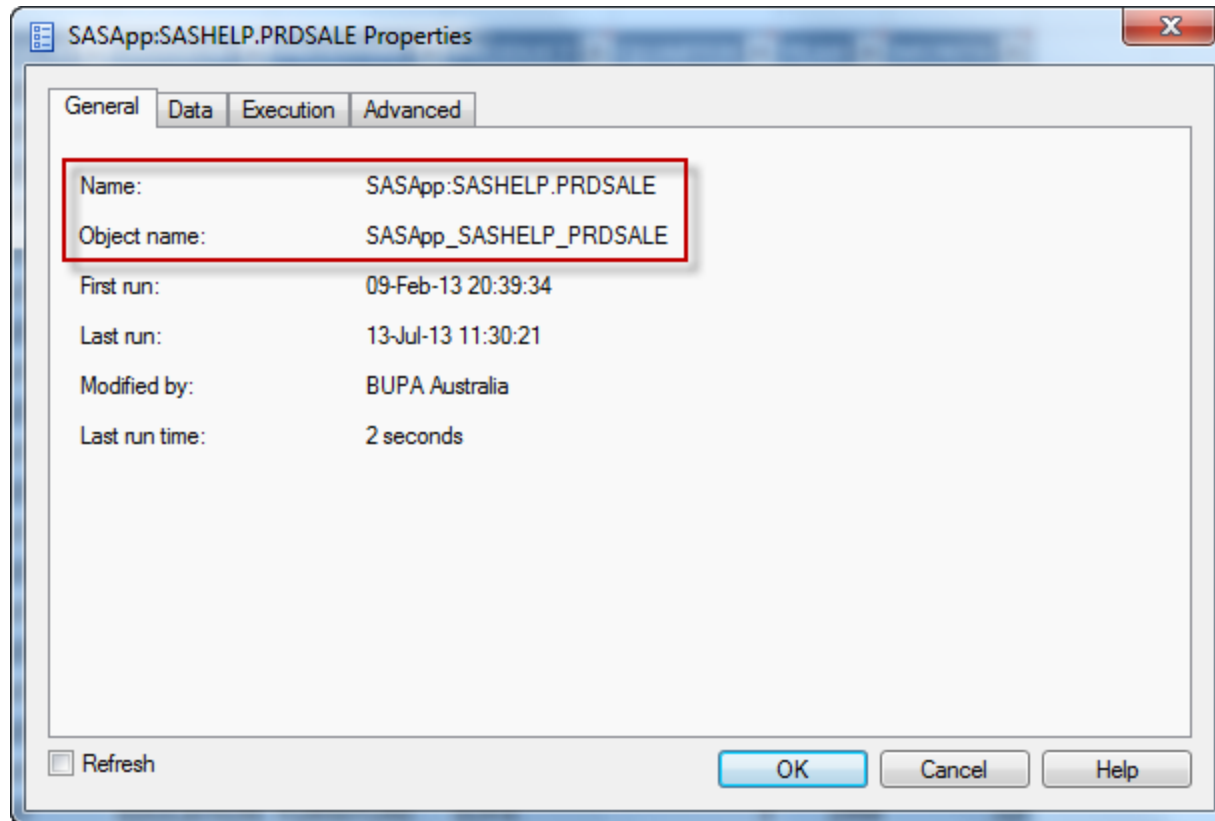
Book1 – Quick Start – Automatic Chart (cont)



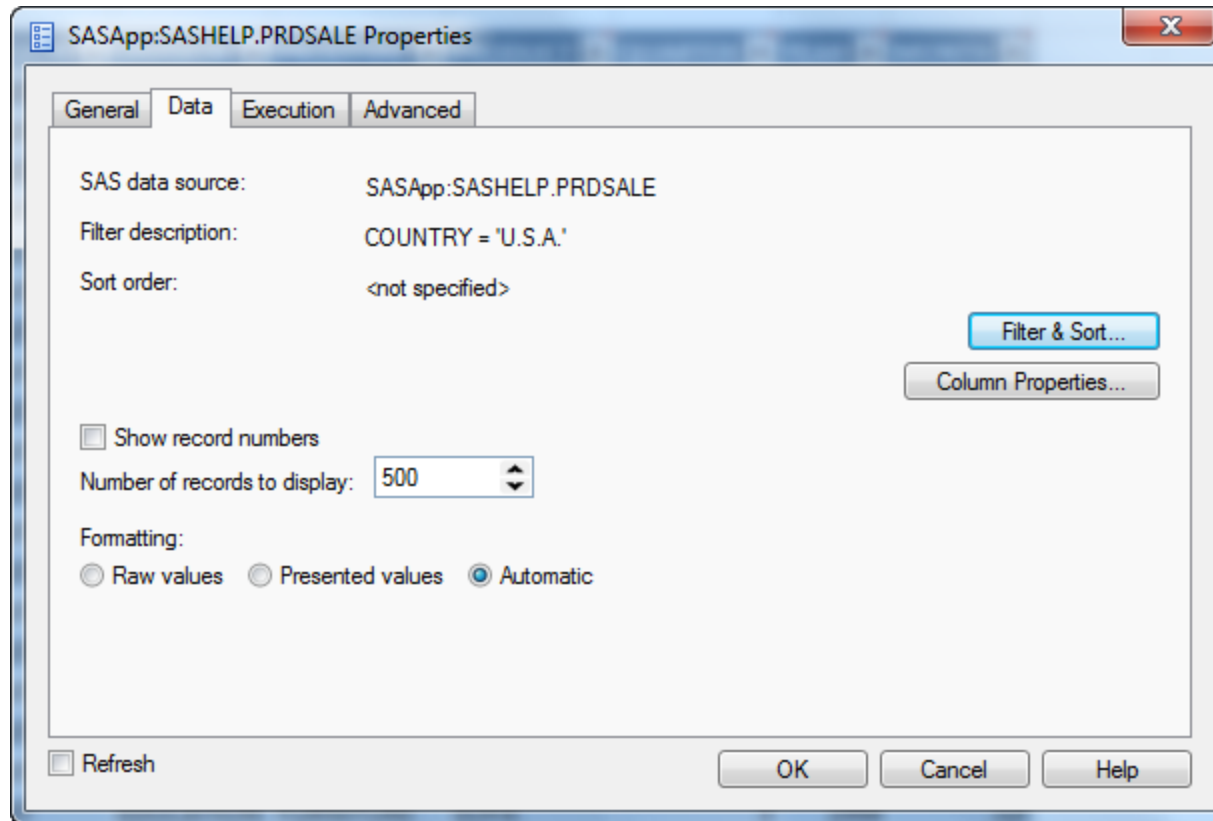
Book1 – Favorites



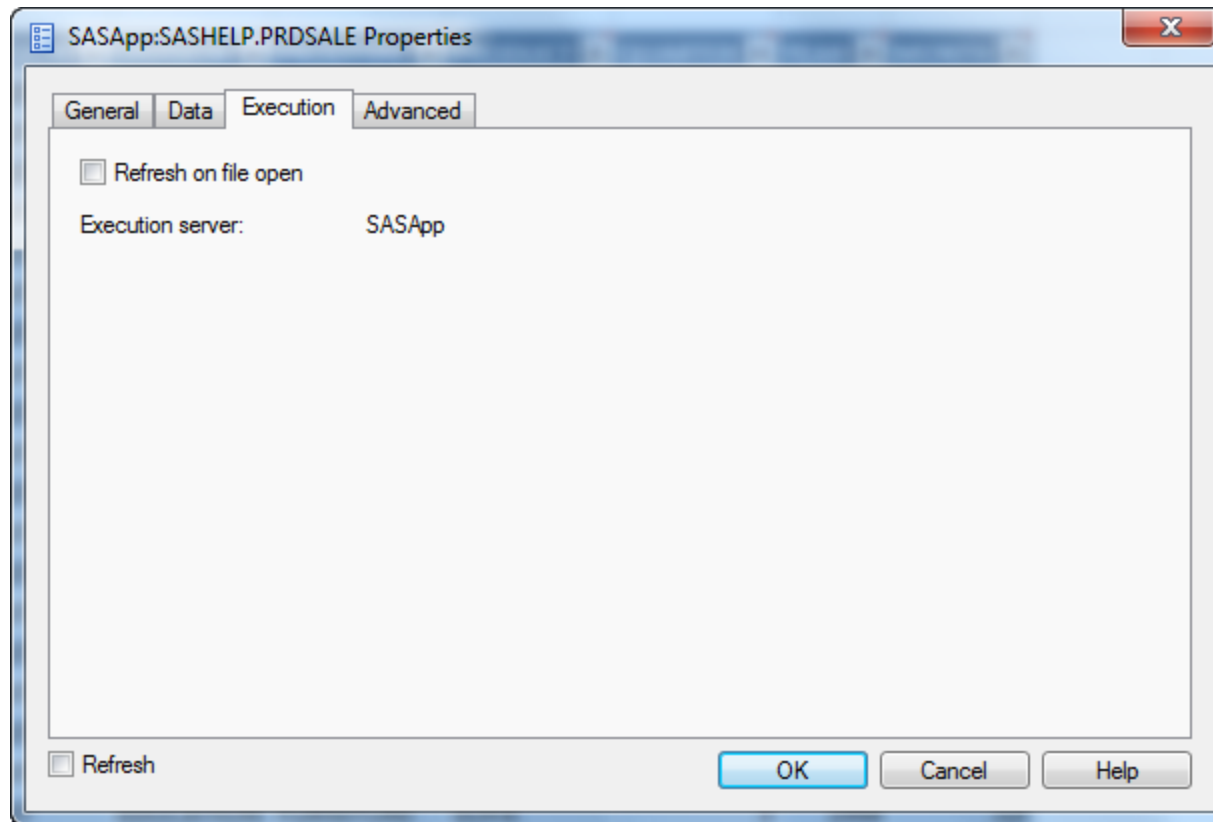
Book1 – Properties



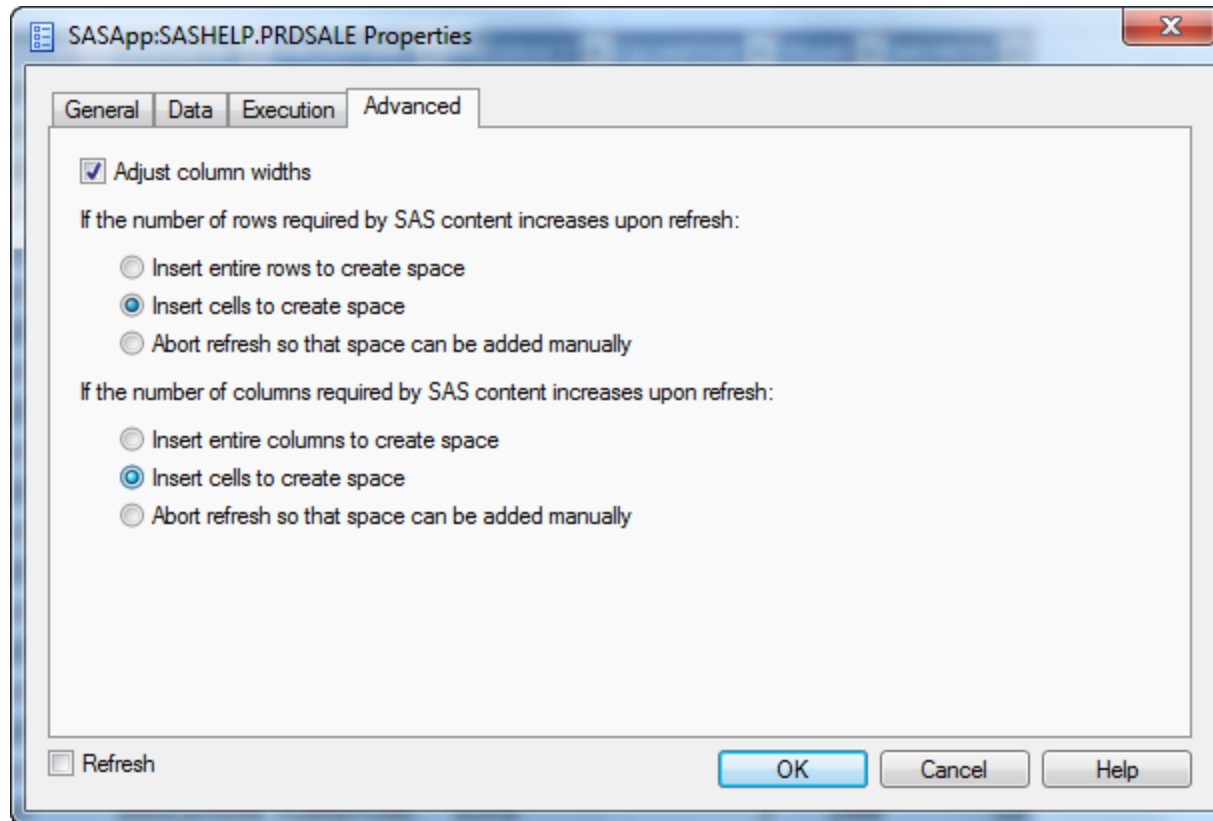
Book1 – Properties (cont)



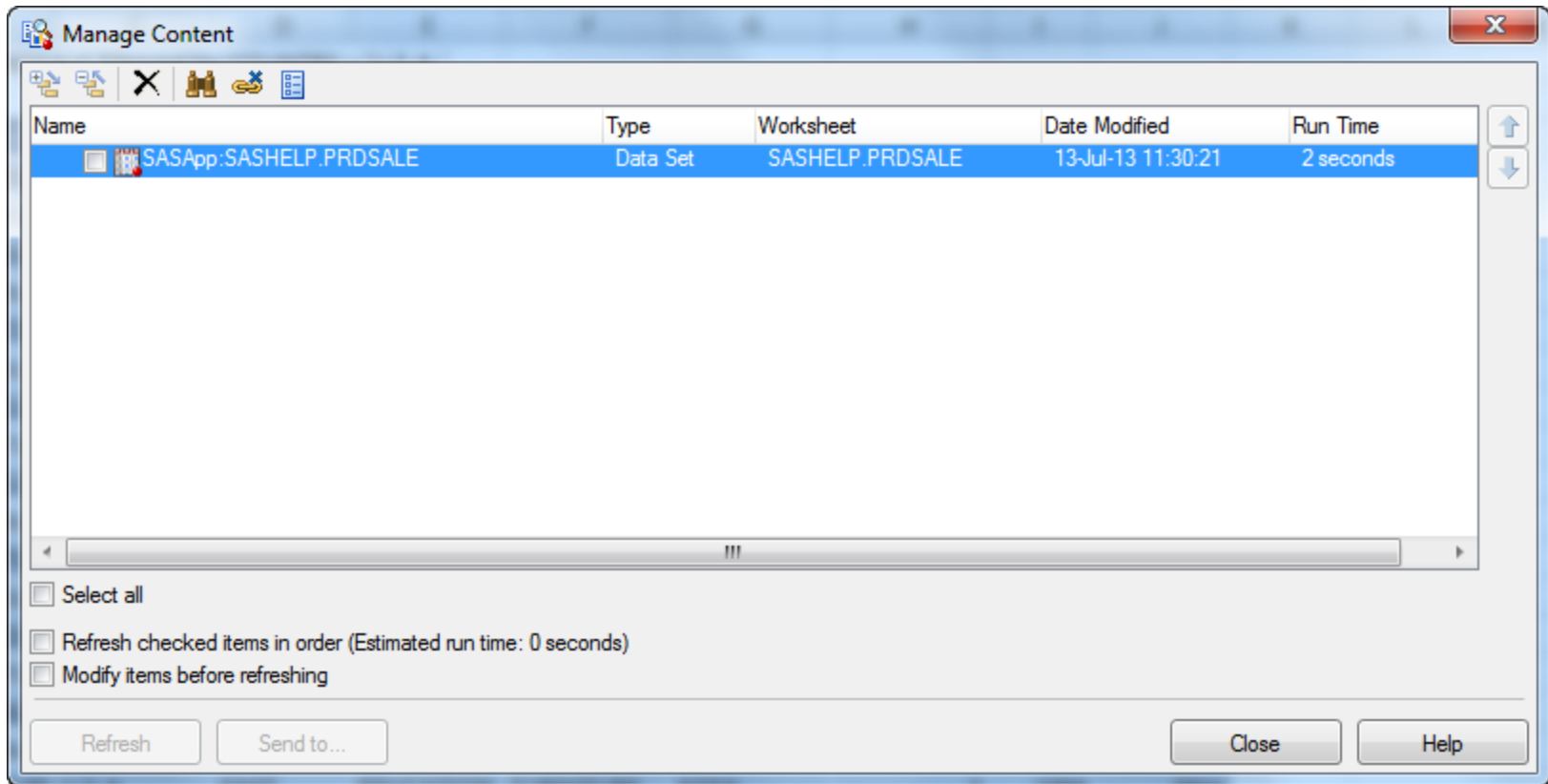
Book1 – Properties (cont)



Book1 – Properties (cont)



Book1 – Manage Content



Book1 – Tools

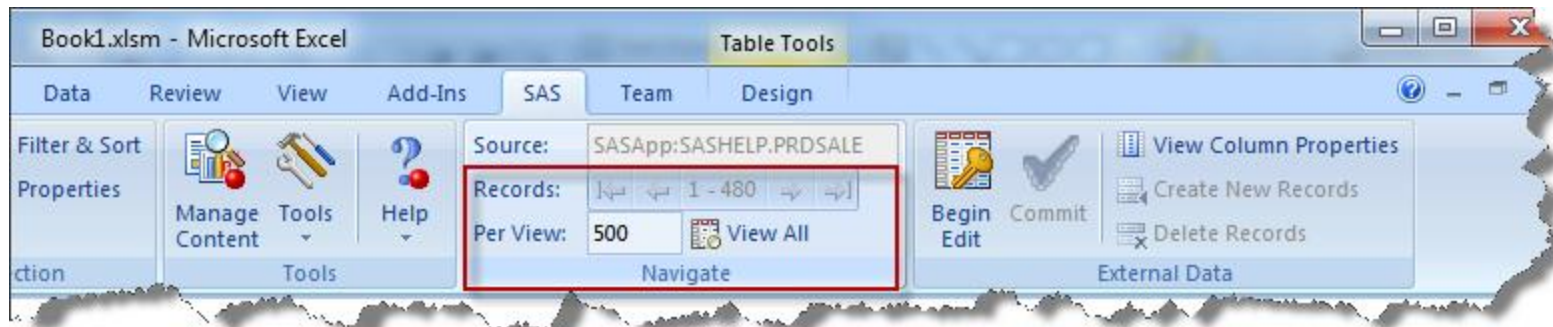
The screenshot shows the Microsoft Excel interface with the 'SAS' ribbon selected. The 'Tools' button in the 'Table Tools' group is open, displaying a context menu with the following options:

- Open from SAS Folders
- Save to SAS Folders
- Create Schedule...
- Connections...
- Status
- Style Manager...
- View Input Data
- Replicate SAS Content
- Restore Content
- Options

The background data table is as follows:

	ACTUAL	PREDICT	COUNTRY	REGION	DIVISION	PRODT		YEAR	MONTH	
1	SASApp:SASHELP.PRDSALE filtered by COUNTRY = 'U.S.A.'									
2										
3										
4	\$4.00	\$975.00	U.S.A.	EAST	EDUCATION	FURNIT		1	1993	Jan
5	\$813.00	\$455.00	U.S.A.	EAST	EDUCATION	FURNIT		1	1993	Feb
6	\$773.00	\$260.00	U.S.A.	EAST	EDUCATION	FURNIT		1	1993	Mar
7	\$205.00	\$69.00	U.S.A.	EAST	EDUCATION	FURNIT		2	1993	Apr
8	\$657.00	\$147.00	U.S.A.	EAST	EDUCATION	FURNIT		2	1993	May
9	\$154.00	\$533.00	U.S.A.	EAST	EDUCATION	FURNITURE	SOFA	2	1993	Jun
10	\$747.00	\$881.00	U.S.A.	EAST	EDUCATION	FURNITURE	SOFA	3	1993	Jul
11	\$787.00	\$457.00	U.S.A.	EAST	EDUCATION	FURNITURE	SOFA	3	1993	Aug
12	\$867.00	\$441.00	U.S.A.	EAST	EDUCATION	FURNITURE	SOFA	3	1993	Sep
13	\$307.00	\$859.00	U.S.A.	EAST	EDUCATION	FURNITURE	SOFA	4	1993	Oct
14	\$571.00	\$177.00	U.S.A.	EAST	EDUCATION	FURNITURE	SOFA	4	1993	Nov
15	\$92.00	\$633.00	U.S.A.	EAST	EDUCATION	FURNITURE	SOFA	4	1993	Dec

Book1 – Per View/View All



Book1 – Edit Mode

The screenshot shows Microsoft Excel with a data table and a dialog box. The data table has columns for ACTUAL, PREDICT, COUNTRY, and REGION. The dialog box is titled "SAS Add-In" and contains the following text:

You are about to switch to edit mode

Please note that changes made to the data view while in edit mode will be applied directly to the data source when committed and cannot be undone. Also, note that entering edit mode will cause any changes you have made to the data view while not in edit mode to be lost.

Buttons: Switch to Edit Mode, Cancel

	A	B	C	D
1	SASApp:SASHELP.PRDSALE			
2				
3	ACTUAL	PREDICT	COUNTRY	REGION
4	\$925.00	\$850.00	CANADA	EAST
5	\$999.00	\$297.00	CANADA	EAST
6	\$608.00	\$846.00	CANADA	EAST
7	\$642.00	\$533.00	CANADA	EAST
8	\$656.00	\$646.00	CANADA	EAST
9	\$948.00	\$486.00	CANADA	EAST
10	\$612.00	\$717.00	CANADA	EAST
11	\$114.00	\$564.00	CANADA	EAST
12	\$685.00	\$230.00	CANADA	EAST
13	\$657.00	\$494.00	CANADA	EAST
14	\$608.00	\$903.00	CANADA	EAST
15	\$353.00			

Book1 – Commit

The screenshot shows the Microsoft Excel interface with the SAS Add-In 5.1 ribbon. The 'Commit' button, represented by a green checkmark, is highlighted with a red box. A tooltip is displayed over the 'Commit' button, containing the following text:

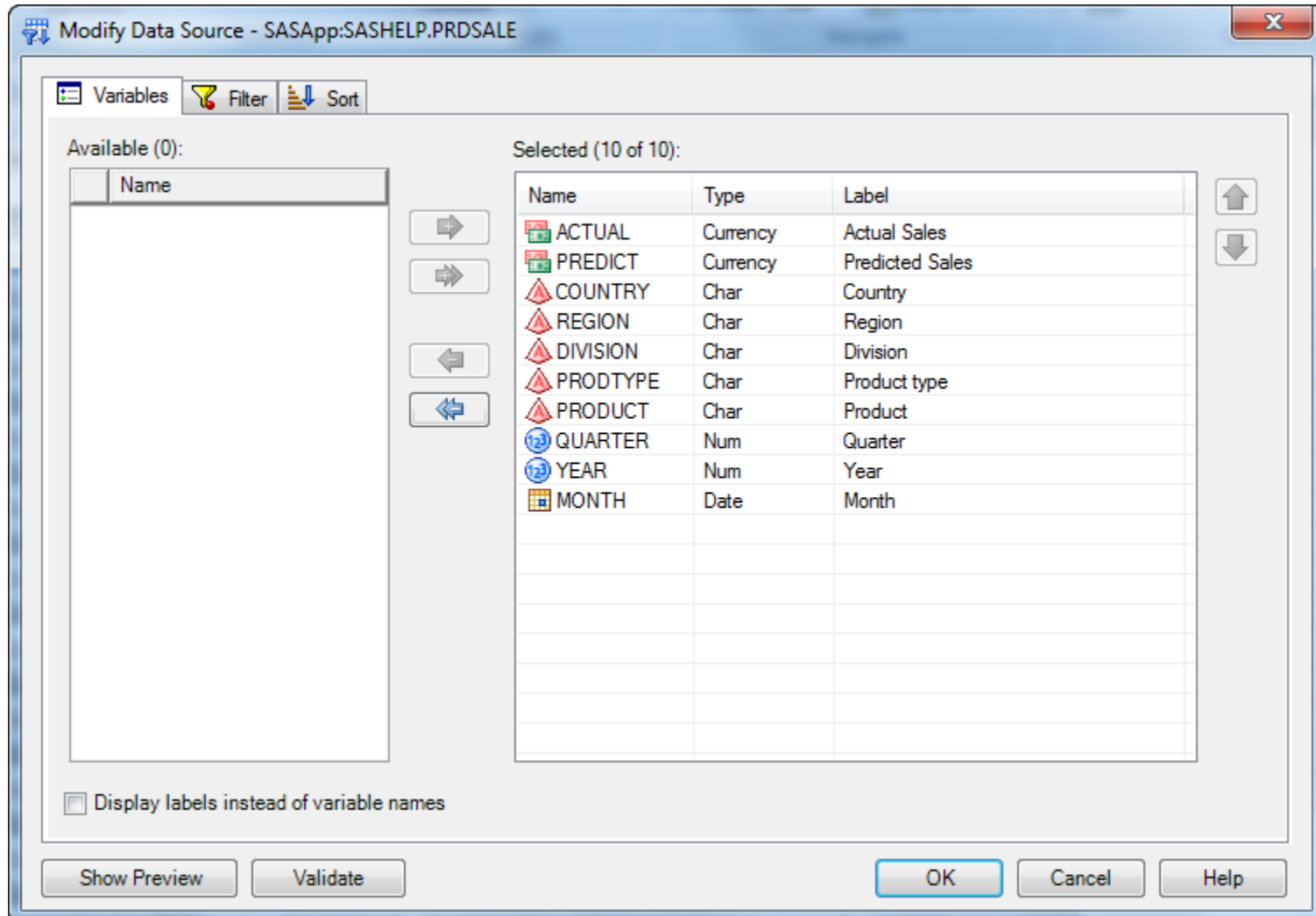
Commit changes to the server
 Saves any changes to the data set. After saving your changes, you can continue editing the data set.

SAS Add-In 5.1 for Microsoft Office
 Press F1 for more help.

The spreadsheet data is as follows:

	ACTUAL	PREDICT	COUNTRY	REGION	DIVISION	PRODTYPE	PRODUCT	QUARTER	YEAR	MONTH
1	SASApp:SASHELP.PRDSALE									
2										
3										
4	\$12,345.00	\$850.00	CANADA	EAST	EDUCATION	FURNITURE	SOFA	1	1993	Jan
5	\$999.00	\$297.00	CANADA	EAST	EDUCATION	FURNITURE	SOFA	1	1993	Feb
6	\$608.00	\$846.00	CANADA	EAST	EDUCATION	FURNITURE	SOFA	1	1993	Mar
7	\$642.00	\$533.00	CANADA	EAST	EDUCATION	FURNITURE	SOFA	2	1993	Apr
8	\$656.00	\$646.00	CANADA	EAST	EDUCATION	FURNITURE	SOFA	2	1993	May
9	\$948.00	\$486.00	CANADA	EAST	EDUCATION	FURNITURE	SOFA	2	1993	Jun
10	\$612.00	\$717.00	CANADA	EAST	EDUCATION	FURNITURE	SOFA	3	1993	Jul
11	\$114.00	\$564.00	CANADA	EAST	EDUCATION	FURNITURE	SOFA	3	1993	Aug
12	\$685.00	\$230.00	CANADA	EAST	EDUCATION	FURNITURE	SOFA	3	1993	Sep
13	\$657.00	\$494.00	CANADA	EAST	EDUCATION	FURNITURE	SOFA	4	1993	Oct
14	\$608.00	\$903.00	CANADA	EAST	EDUCATION	FURNITURE	SOFA	4	1993	Nov

Book1 – Filter & Sort



Book1 – Filter & Sort (cont)

The screenshot shows the 'Modify Data Source' dialog box in SAS. The title bar reads 'Modify Data Source - SASApp:SASHELP.PRDSALE'. The dialog has three tabs: 'Variables', 'Filter', and 'Sort'. The 'Filter' tab is active. A callout bubble points to the 'Filter' icon, stating: 'Gets values from the source dataset for the selected variable.'

Under 'Filter description:', there is a dropdown menu set to 'COUNTRY', followed by 'Equal to', and an empty text input field. To the right of the input field is a three-dot menu icon. A callout bubble points to this icon, stating: 'Can also "hand edit" a more complex filter'.

A pop-up dialog titled 'Select a single value:' is open over the three-dot menu. It contains a table with two columns: 'Values' and 'Formatted Values'. The table lists 'CANADA', 'GERMANY', and 'U.S.A.', with 'U.S.A.' selected. Below the table is a 'More Values' button and 'OK' and 'Cancel' buttons.

At the bottom of the main dialog, there is a checkbox labeled 'Display labels instead of variable names'. To its right are 'Advanced Edit...' and 'Clear All' buttons. At the very bottom are 'Show Preview', 'Validate', 'OK', 'Cancel', and 'Help' buttons.

Book1 – Filter & Sort (cont)

Modify Data Source - SASApp:SASHELP.PRDSALE

Variables Filter Sort

Specify sort:

Sort by: _____
REGION [X] Ascending
 Descending

Then by: _____
COUNTRY [X] Ascending
 Descending

Then by: _____
DIVISION [X] Ascending
 Descending

Then by: _____
YEAR [X] Ascending
 Descending

Then by: _____
MONTH [X] Ascending
 Descending

Then by: _____
[X] Ascending
 Descending

Display labels instead of variable names Clear All

Show Preview Validate OK Cancel Help

Book1 – Name Manager

The screenshot shows the Microsoft Excel interface with the 'Formulas' ribbon selected. The 'Name Manager' button is highlighted with a red box. The 'Name Manager' dialog box is open, displaying a table of defined names. The table has the following data:

Name	Value	Refers To	Scope	Comment
Table1	{\"\$925.00\", \"\$850.00\", ...}	=SASHELP.PRDSALE!\$A\$4:\$J\$503	Workbook	

Below the table, the 'Refers to:' field is empty, and there are 'X' and '✓' icons next to it. The 'Close' button is at the bottom right of the dialog box.

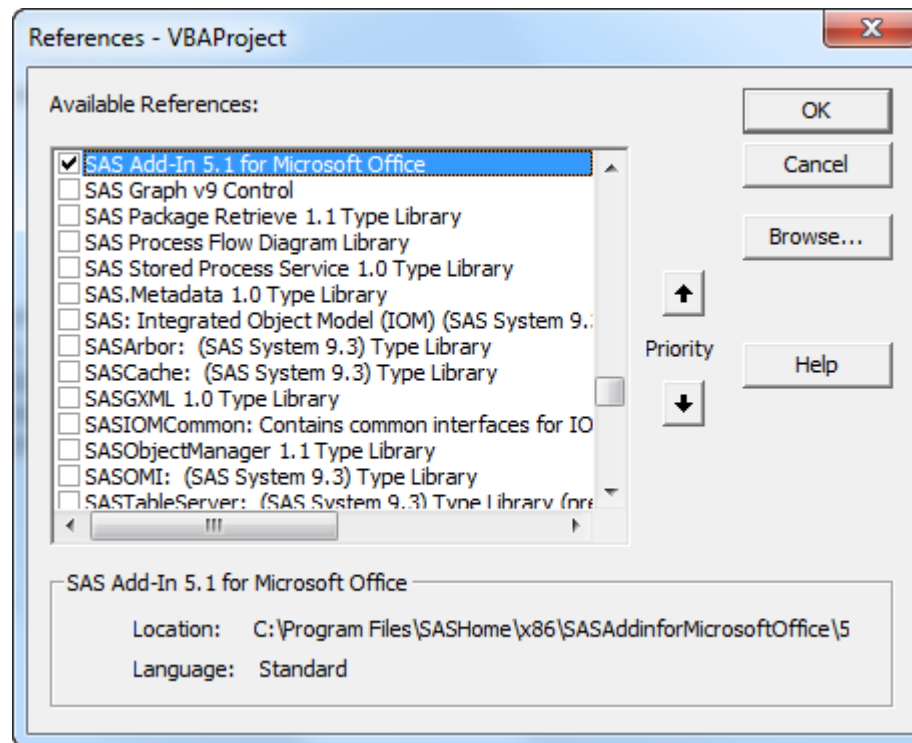
Book2 – Key Points:

- Simple VBA programming to change object properties (filter) and execute methods (refresh)
- Add reference to SAS AMO plugin in VBA project (Tools → References)
- Insert module to contain VBA code (Insert → Module)
- Show Object Browser
- Create SAS Data filter string using VBA
- Refresh SAS Data object using VBA
- Create and Use Named Ranges in VBA programs for easier maintenance

Book2 – Add Reference to SAS AMO Plugin

Visual Basic Editor (Alt-F11) → Tools → References:

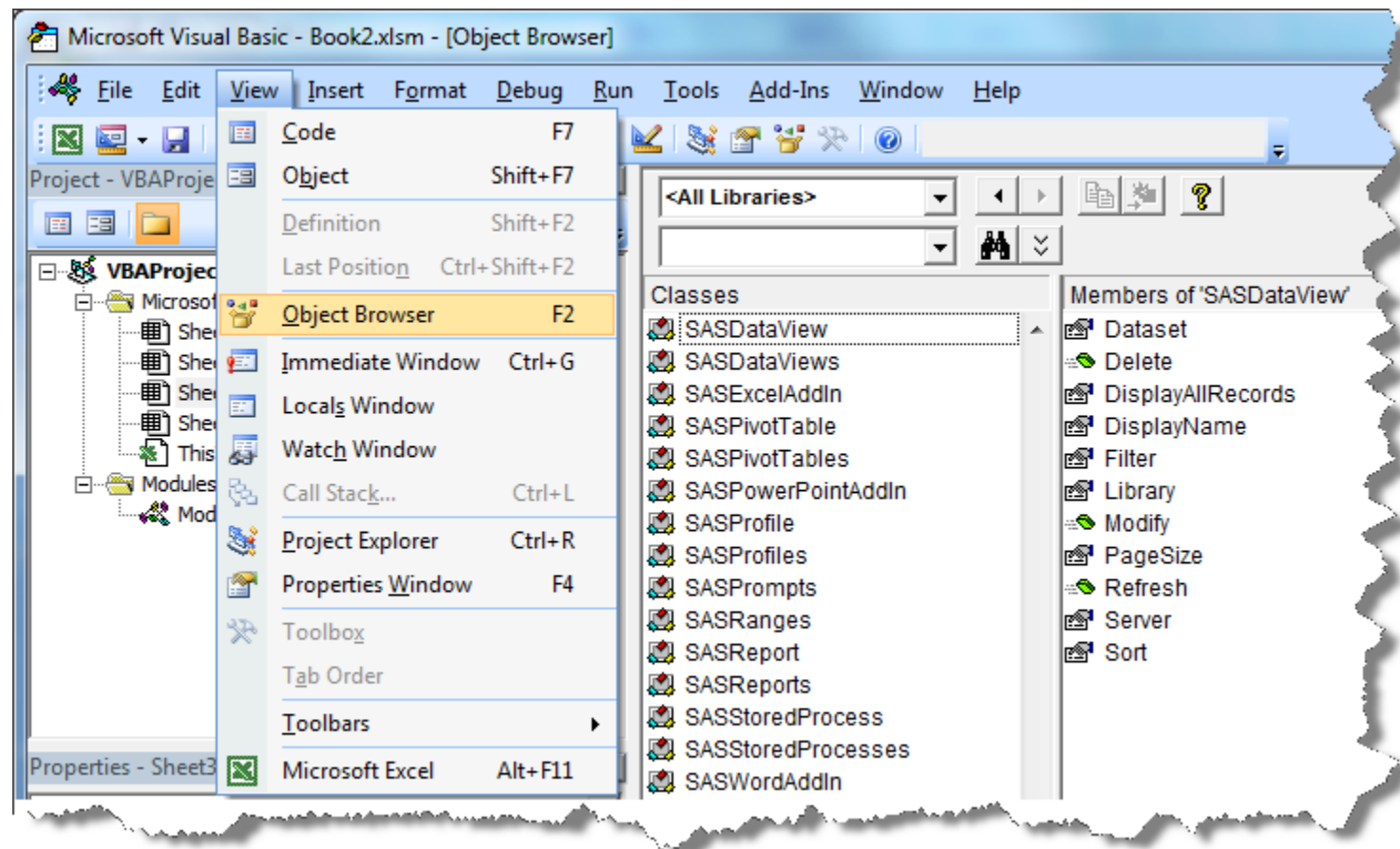
Select the SAS Add-In ## for Microsoft Office



Book2 – Object Browser

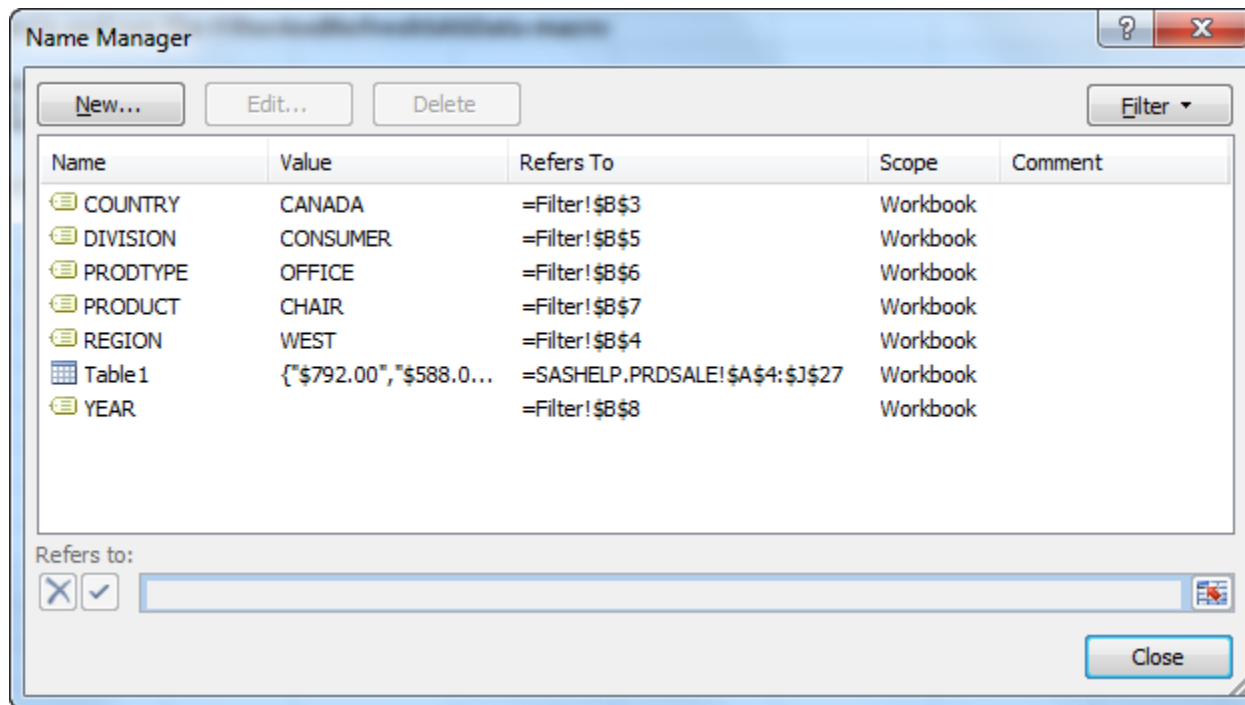
Visual Basic Editor (Alt-F11) → View → Object Browser (F2):

Can be interesting to see the Properties and Methods of available Classes



Book2 – Named Ranges

Create and Use Named Ranges for easier and more maintainable coding



Book3 – Key Points:

- Using more generic VBA code to update all SAS data objects
- Update multiple SAS data objects specifying a single filter in Excel
- Demonstrate that SAS objects are deleted when a worksheet is deleted

Book4 – Key Points:

- Using a Named Range for Input Prompts
- Demonstrating event processing each time a prompt value is changed

Book5 – Key Points:

- Adding a button to a worksheet
- Binding a macro to that button
- Refreshing SAS content using that button

Book6 – Key Points:

- Using Stored Processes (called "Reports") in Excel
- Binding an Input Stream to a Named Range
- Display the XML stream sent to SAS

Book7 – Key Points:

- Demonstrate a generic approach to passing name/value pairs (macro variables) from Excel to a Stored Process
- Use those name/value pairs to filter the output dataset
- Use the Style Manager to format the output
- No VBA code used, just built-in AMO functionality and the Refresh button

Book8 – Key Points:

- Binding Stored Process input and output prompts to Excel cells

Book9 – Key Points:

- Using VBA to refresh Stored Process
- Show the online help

Book9 – Online Help

Help for the SAS Add-In For Microsoft Office

Hide Back Print

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 - ⊕ SASPowerPointAddIn Object
 - ? SASProfile Object
 - ⊕ SASProfiles Object
 - ⊕ SASPrompts Object
 - ⊕ SASReport Object
 - ⊕ SASReports Object

SASDataView Object

Description

The SASDataView object manages an open view of a SAS data set in Microsoft Excel.

Methods

Delete	Deletes the data view from Microsoft Excel.
Modify	Opens the Modify Data Source window. From this window, you can select the variables to include in the results, create a filter, and sort the information in the data view. When you click OK in the Modify Data Source window, the SAS add-in uses the new settings to refresh the data view.
Refresh	Refreshes the data view by using the current settings.

Properties

Dataset	The name of the data set in the data view.
DisplayAllRecords	A Boolean value that specifies whether to display all records. When this property is set to true, it overrides the PageSize property.
DisplayName	The display name of the data view.
Filter	The filter that is applied to the data view.
Library	The library where the data set is saved. For data that is not saved in a library, this value is an empty string.
PageSize	The number of records to view at one time.
Server	The server where the data set is saved. For data that is not saved on a server, this value is an empty string.
Sort	How the data view is sorted.

Summary

- If the “landing zone” for your data is Excel, think AMO
- Data can be communicated between Excel and the remote SAS Session
- VBA is available to “drive” SAS AMO
- You don’t need to be an expert VBA programmer

References

Tips and Techniques for Automating the SAS® Add-In for Microsoft Office with Visual Basic for Applications

Tim Beese, SAS Institute Inc., Cary, NC

<http://support.sas.com/resources/papers/proceedings11/012-2011.pdf>

Excelling with Excel

Tim Beese and Greg Granger, SAS Institute Inc., Cary, NC

<http://support.sas.com/resources/papers/proceedings12/036-2012.pdf>

Help for the SAS Add-In for Microsoft Office

(Accessible from the SAS AMO Help button)

See especially “Automating the SAS Add-In with Visual Basic Code” chapter

Contact:

<http://www.linkedin.com/in/scottbass>



Questions?

