SAS® Add-In 2.1 for Microsoft Office: Getting Started with Data Analysis

The correct bibliographic citation for this manual is as follows: SAS Institute Inc. 2007. *SAS® Add-In 2.1 for Microsoft Office: Getting Started with Data Analysis*. Cary, NC: SAS Institute Inc.

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ISBN 978-1-59994-086-1

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February 2007

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Contents

Chapter 1 △ Introduction to the SAS Add-In for Microsoft Office 1
What Is the SAS Add-In for Microsoft Office? **1**
Benefits to Using the SAS Add-In for Microsoft Office **1**
How to Use the SAS Add-In for Microsoft Office **2**
Accessibility Features of the SAS Add-In for Microsoft Office **3**

Chapter 2 △ Learning by Example: Analyzing and Reporting Using SAS 5
About the Scenario in This Book **5**
Prerequisites for This Scenario **6**
How to Get Help for the SAS Add-In for Microsoft Office **6**

Chapter 3 △ Opening a SAS Data Source in Microsoft Excel 7
About the Tasks That You Will Perform **7**
Open the Sales Data in an Excel Worksheet **7**
Save the Workbook **12**

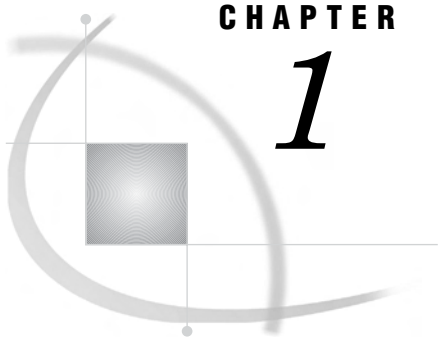
Chapter 4 △ Running SAS Tasks to Analyze the Data 13
About the Tasks That You Will Perform **13**
Compare Sales for Each Product **14**
Determine Average Sales, Inventory, and Returns for Each Product **20**
Determine Correlation between Sales, Inventory, and Returns **26**
Perform a Linear Regression Analysis **31**
Save the Workbook **35**

Chapter 5 △ Analyzing a SAS Data Source in a PivotTable Report 37
About the Tasks That You Will Perform **37**
Open the Sales Data into a PivotTable Report **38**
Create a PivotTable Report for the Sport Shoe Product Line **41**
Drilling Down on the Data for Asia in the PivotTable Report **42**
Save the Workbook **44**

Chapter 6 △ Next Steps: A Quick Look at Additional Features 45
Working with Published Documents **45**
Working with Favorites **47**
Sending Results to Microsoft Word or Microsoft PowerPoint **48**

Chapter 7 △ Recommended Reading 53
Recommended Reading **53**

Glossary 55



CHAPTER

1

Introduction to the SAS Add-In for Microsoft Office

What Is the SAS Add-In for Microsoft Office? 1
Benefits to Using the SAS Add-In for Microsoft Office 1
How to Use the SAS Add-In for Microsoft Office 2
Accessibility Features of the SAS Add-In for Microsoft Office 3

What Is the SAS Add-In for Microsoft Office?

The SAS Add-In for Microsoft Office extends the functionality of Microsoft Excel, Microsoft Word, and Microsoft PowerPoint by enabling you to access SAS analytics and SAS reporting functionality without any SAS programming experience. The SAS add-in is designed for users who are familiar with these Microsoft Office programs but who might be new to SAS.

The SAS add-in includes approximately 80 SAS tasks that enable you to perform a variety of analyses. Examples of analyses that you can perform include linear and nonlinear regressions, multivariate analyses, time series analyses, one-way frequencies, and summary statistics. The SAS add-in enables you to refresh these analyses so that your results include the most up-to-date information. You can also easily share the results with others at your site.

When the SAS add-in is installed on your computer, a SAS menu and the SAS Analysis Tools toolbar are automatically integrated into Excel, Word, and PowerPoint. (In Excel, the SAS Data Tools toolbar is also available.) The menu and toolbars enable you to access the SAS analytics and reporting functionality directly from these Microsoft Office programs without having to open a separate SAS interface.

Benefits to Using the SAS Add-In for Microsoft Office

Most of the SAS add-in functionality is identical in Excel, Word, and PowerPoint; for example, you can run analyses and reports in all three applications.

The SAS add-in extends the functionality in Excel, Word, and PowerPoint by enabling you to complete the following tasks:

- *Access SAS data sources as the input data for your analysis.* You can view any SAS data source or any data source available from your SAS server (including databases such as Oracle, Teradata, and DB2).
- *Perform more sophisticated analysis and computations than what is available in Microsoft Excel.* For example, one of the sophisticated analyses that SAS provides is the Canonical Correlation task. This task enables you to examine the relationship between a linear combination of a set of X variables and a linear

combination of a set of Y variables. You might run a canonical correlation analysis to determine the degree of correspondence between a set of job characteristics and a set of measures of employee satisfaction. This extends the correlation analysis that is available in Excel. You can run these sophisticated analyses and computations in Excel, Word, or PowerPoint.

- *Run custom analyses that were developed by others at your company.* Using the SAS add-in, you can also access programs, which are called SAS Stored Processes. These programs are customized SAS code that is developed by business analysts or your IT department. Running these programs enables you to quickly generate a custom report without writing any SAS code.
- *Refresh the content in the Excel worksheet, Word document, or PowerPoint presentation on demand or automatically at a specified time.* Scheduling when the content is refreshed enables you to have the most up-to-date data and reports when you need it.
- *Publish the results to a central location.* By publishing a document, you can share it with others without having to e-mail it. If you publish the document to a metadata repository, then you can perform an impact analysis on the document. Impact analysis enables you to see where a data source came from and the items that are dependent on this source. This analysis enables you to know how changing a data source might affect other documents.

Additional functionality is available in Excel. In Microsoft Excel, you can also complete the following tasks:

- *Access and view data sources that exceed the 65,536 record limitation in Excel.* The SAS add-in does its processing on the server, which enables it to by-pass the record limitation in Excel.
- *Copy data to a SAS server.* You can copy an Excel data source or a SAS data source to the SAS server. After a data source is copied to a SAS server, it becomes a SAS data set. This enables you to share Excel data with Word and PowerPoint users at your site. This functionality also enables Excel users to update information in a SAS data source and upload it to the SAS server.
- *Send the results from an analysis that you ran in Excel to a Word document or PowerPoint presentation.* For example, you ran analysis of your company's sales for this year, and now you need to give a presentation of the results. Using this functionality in Excel, you can select which results to include in a PowerPoint presentation. This saves you time because you only need to run the analysis once.

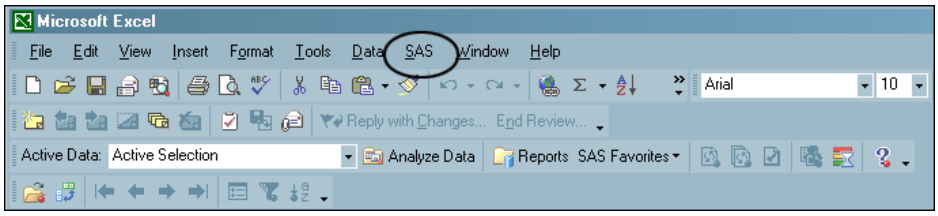
This book explores some of the basic tasks that you can perform in Excel.

How to Use the SAS Add-In for Microsoft Office

When you open Microsoft Excel, Microsoft Word, or Microsoft PowerPoint, you should see a **SAS** menu item and the SAS Analysis Tools toolbar. (In Excel, the SAS Data Tools toolbar is also available.). You access the SAS add-in from the menu or from these toolbars.

Note: If you do not see a **SAS** menu item or the toolbars, then you might not have the SAS add-in installed. For help, contact the SAS administrator at your site. △

Display 1.1 Location of SAS Menu in Microsoft Excel



You can perform a variety of tasks using the SAS add-in. The following process briefly explains how you would run a SAS analysis:

1. Open Microsoft Excel, Microsoft Word, or Microsoft PowerPoint.
2. Select the analysis that you want to perform.

   Note: After you select the analysis, you are prompted to login to the SAS server if you have not previously logged in during the current session. You must be connected to a SAS server to run an analysis or to access a SAS data source. △
3. Select the data source that you want to use in the analysis. In Excel, you can use data in an existing Excel worksheet or in a SAS data source. If you select a SAS data source, you can choose to filter and sort the data before the analysis.
4. Select the options in the analysis that you want to use and then run the analysis.
5. Specify the location of the output. For example in Excel, you can choose to include the results in the existing worksheet, in a new worksheet, or in a new workbook.

The results automatically open in Excel, Word, or PowerPoint in the location that you chose.

Accessibility Features of the SAS Add-In for Microsoft Office

The SAS Add-In for Microsoft Office includes accessibility and compatibility features that improve usability of the product for users with disabilities. These features are related to accessibility standards for electronic information technology adopted by the U.S. Government under Section 508 of the U.S. Rehabilitation Act of 1973, as amended. For more information about the accessibility of the SAS Add-In for Microsoft, see the online Help.

If you have questions or concerns about the accessibility of SAS products, send e-mail to **`accessibility@sas.com`**.

CHAPTER

2

Learning by Example: Analyzing and Reporting Using SAS

About the Scenario in This Book **5**
Prerequistes for This Scenario **6**
How to Get Help for the SAS Add-In for Microsoft Office **6**

About the Scenario in This Book

This book is intended for Microsoft Excel users. Each topic in this book builds on the previous topic, so you must work through the chapters in sequence.

For the purpose of the scenario in this book, you are a data analyst for a company that sells men's and women's shoes worldwide. You have been asked to analyze the company's global sales for 2006. The data is saved as a SAS data source. Your company recently purchased the SAS Add-In for Microsoft Office, so you can now access SAS data sources from Excel. You are an experienced Excel user, but are new to SAS.

The next three chapters provide step-by-step instructions for analyzing a data source and creating an Excel workbook that can be shared with others at your site. During the first part of the scenario, you will open in an Excel worksheet the SAS data source that contains your company's 2006 sales data. Then you will run four SAS tasks to analyze the data. Running these SAS tasks will enable you to answer the following questions:

- Which product had the highest sales in 2006? Which product had the lowest sales?
- What are the average total sales, average total inventory, and average returns for each product?
- Is there a correlation between the total sales and inventory and returns for each product?
- Which parameters (inventory, returns, and number of stores) determine the total sales for a product?

After answering these questions, you are asked to analyze the sales for the product line with the lowest sales. During this second part of the scenario, you will open the SAS data source into a PivotTable report to answer the following questions:

- Which regions have sales less than $10,000?
- Which region has the lowest sales? What are the sales and inventory costs for each subsidiary in that region?

By the end of this scenario, you will have an Excel worksheet that you can publish to a common repository, so it can be viewed by other SAS add-in users at your site.

Prerequisites for This Scenario

By the time that you are ready to perform the tasks in this book, administrators at your site should have installed and configured all necessary components of the SAS Enterprise Intelligence Platform. You must also have the following:

- The 21AMO03 hotfix for the SAS Add-In 2.1 for Microsoft Office. This hotfix was released in the summer of 2006. Your site administrator can install this hotfix from **`http://www.sas.com/techsup/download/hotfix/amo21.html`**.

  Note: You need this hotfix only to perform the steps in Chapter 5, "Analyzing a SAS Data Source in a PivotTable Report," on page 37. You can perform the rest of the steps in this book without the hotfix. △

- Microsoft Office 2000, Microsoft Office XP, or Microsoft Office 2003 installed on your desktop.
- Permissions to access the SAS Metadata Server. Your site administrator sets these permissions. Contact your site administrator for the name and location of the SAS Metadata Server.
- A metadata configuration file to specify which SAS Metadata Server you will connect to by default. This file enables you to access SAS data sources on remote servers. For more information about setting up a metadata configuration file, see the online Help for the SAS add-in.
- Access to the SHOES data source that is available in the SASHELP library. This is the data source that you will be using during the analysis. The SASHELP library ships with the SAS Add-In for Microsoft Office. If you do not have access to this SAS library, contact your site administrator.

How to Get Help for the SAS Add-In for Microsoft Office

Use any of the following methods to get Help for the SAS Add-In for Microsoft Office:

- From the menu bar, select **SAS ▸ SAS Add-In for Microsoft Office Help**.
- Press F1 in most application windows and dialog boxes.

CHAPTER

3

Opening a SAS Data Source in Microsoft Excel

About the Tasks That You Will Perform 7
Open the Sales Data in an Excel Worksheet 7
Save the Workbook 12

About the Tasks That You Will Perform

To open and view the data that you will be using in the analysis, you will perform the following main tasks:

1 You will select the data source to open.

Note: In this scenario, you are accessing a SAS data source from the SAS server. However, you can use the SAS add-in to access data from a database, such as Oracle, Teradata, and DB2. In Excel, you can also use Excel worksheets as the data source. △

2 For the data source, you will select the following:

- the variables to include in the output
- how to sort the data
- the output location for the data

Open the Sales Data in an Excel Worksheet

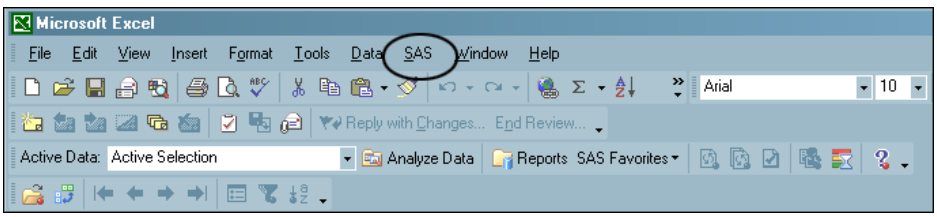
To open the SHOES data source (which is available in the SASHELP library) in Excel, complete the following steps:

1 Select **Start ▸ Programs ▸ Microsoft Office ▸ Microsoft Excel**.

Microsoft Excel opens. In the menu bar, you should see a **SAS** menu item. You access the SAS add-in from this menu.

Note: If you do not see a **SAS** menu item, then you might not have the SAS add-in installed. For help, contact the SAS administrator at your site. △

Display 3.1 Location of SAS Menu in Microsoft Excel

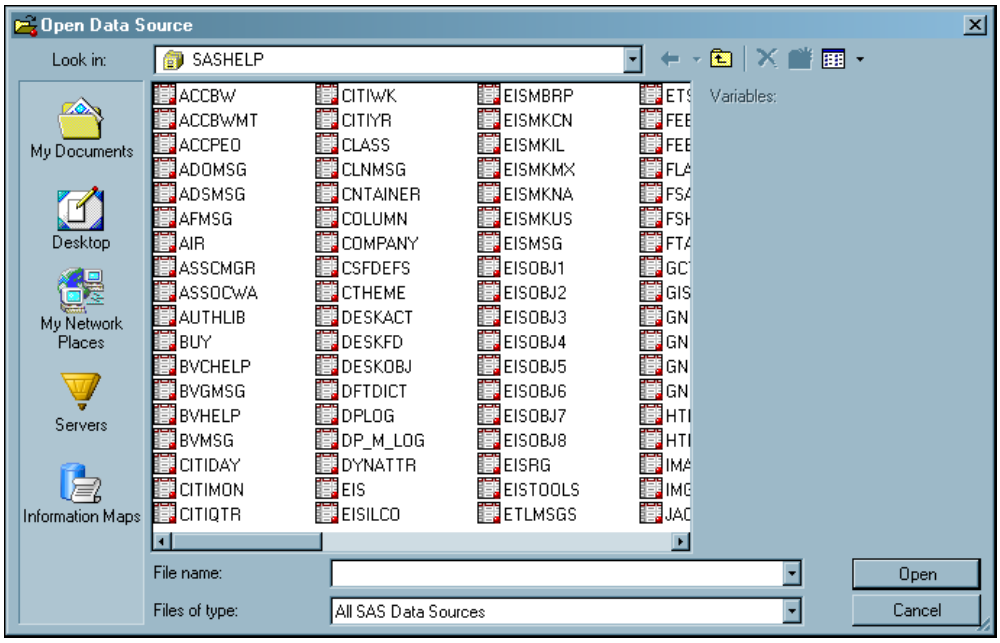


2 Select **SAS ▶ Open Data Source ▶ Into Worksheet**. The Open Data Source window opens.

3 Click

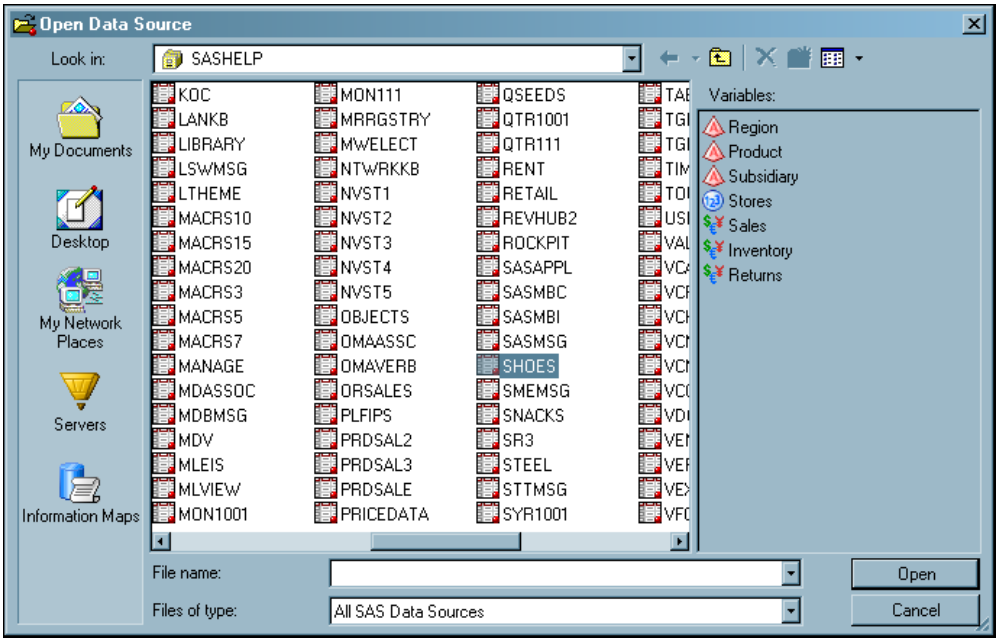
to select the SAS server that you want to use.

4 From the **Look in** drop-down list, select **SASHELP**. The Open Data Source window now displays the contents of the SASHELP library.

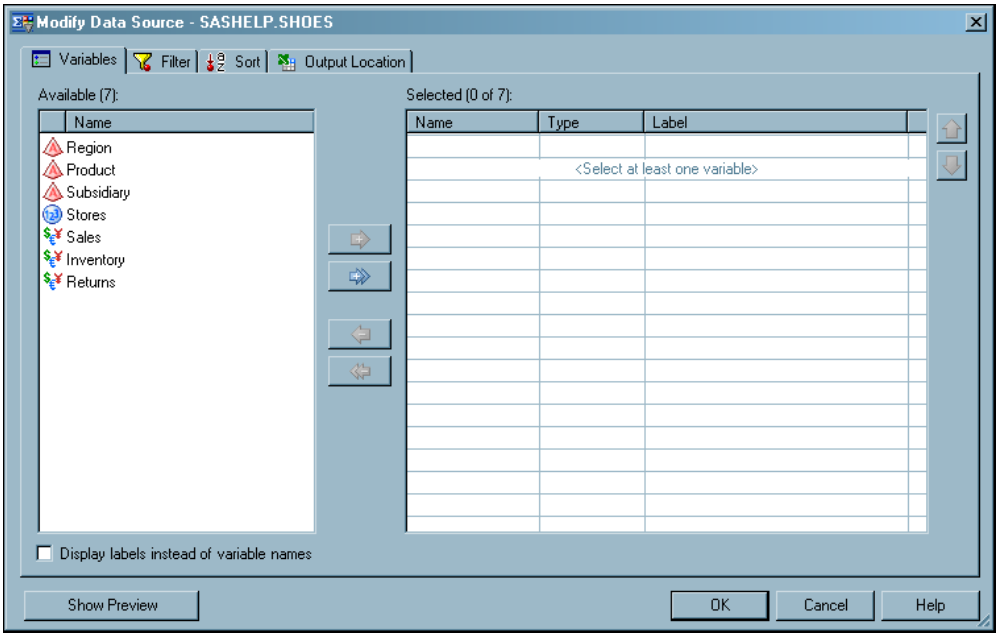


Note: The location of the SASHELP library is dependent on how SAS was installed at your site. If you cannot find the SASHELP library, contact the SAS administrator at your site. △

5 In the SASHELP library, select the **SHOES** data source. The variables in the SHOES data source automatically appear in the Variables pane.

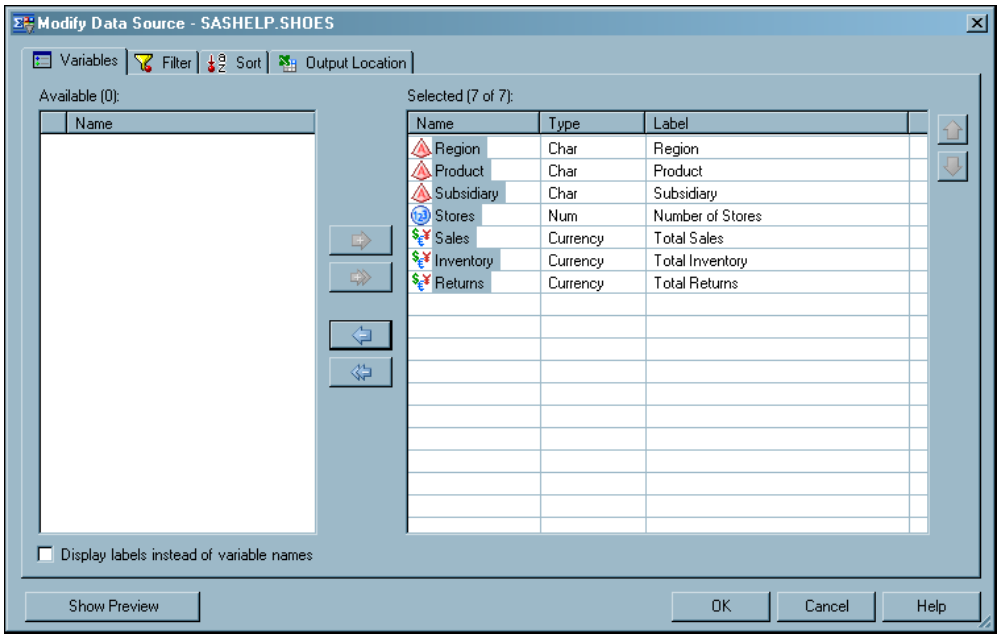


6 Click **Open**. The Modify Data Source window opens.



7 On the **Variables** tab, select the variables that you want to include in the final output. You can also specify the order of the variables.

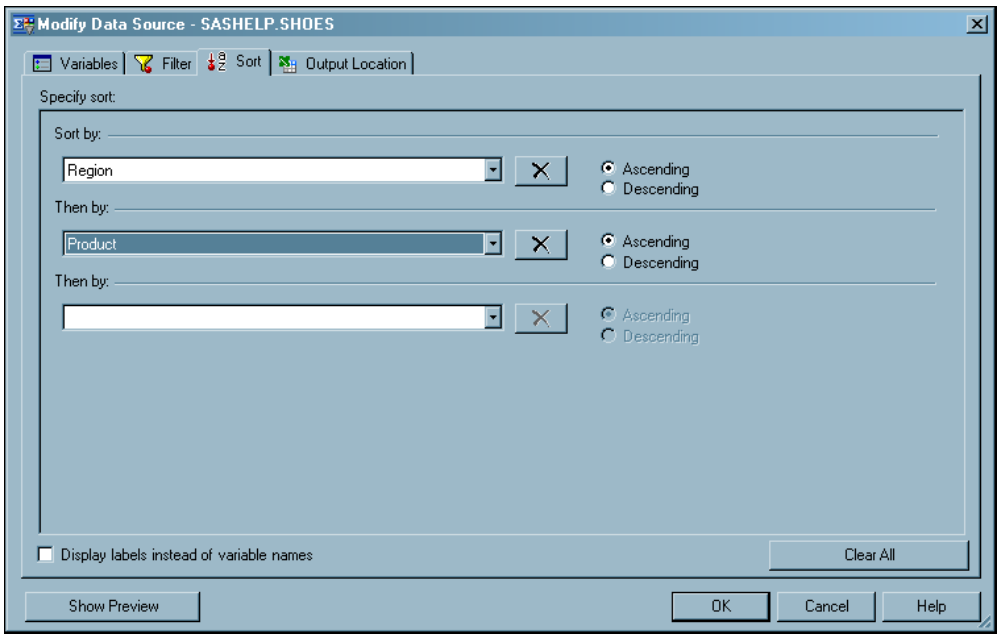
Click to move all the variables from the **Available** list box to the **Selected** list box. Select the variables so they appear in the following order:



Click the **Sort** tab to continue.

8 On the **Sort** tab, you can specify the order of the rows in the output.

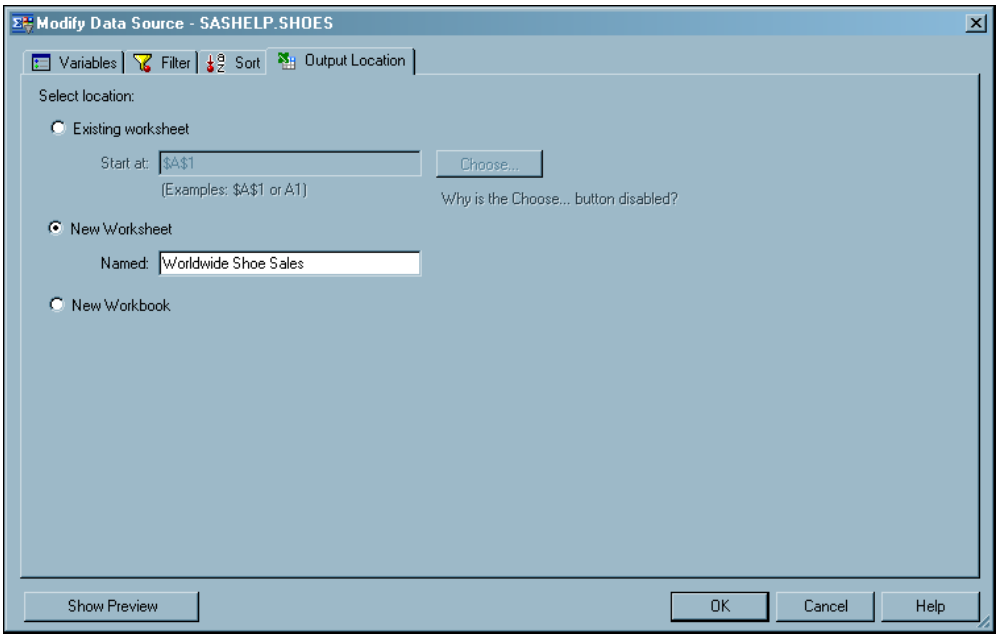
Use the drop-down lists to specify the following sort order:



Click the **Output Location** tab to continue.

9 On the **Output Location** tab, you can select the location for the final output.

By default, the data source is opened in a new worksheet. In the **Named** box, delete **SASHELP.SHOES** and type **Worldwide Shoe Sales**.



Click **OK**. The results open in a new worksheet called **Worldwide Shoe Sales**.

	A	B	C	D	E	F	G	H	I
1		Region	Product	Subsidiary	Stores	Sales	Inventory	Returns	
2	1	Africa	Boot	Algiers	21	$21,297	$73,737	$710	
3	2	Africa	Boot	Kinshasa	16	$13,921	$70,736	$553	
4	3	Africa	Boot	Cairo	20	$4,846	$18,965	$229	
5	4	Africa	Boot	Luanda	8	$6,081	$51,572	$325	
6	5	Africa	Boot	Khartoum	24	$19,282	$105,370	$700	
7	6	Africa	Boot	Addis Ababa	12	$29,761	$191,821	$769	
8	7	Africa	Boot	Nairobi	25	$16,282	$66,017	$844	
9	8	Africa	Boot	Johannesburg	14	$8,365	$33,011	$483	
10	9	Africa	Men's Casual	Algiers	4	$63,206	$100,982	$2,221	
11	10	Africa	Men's Casual	Addis Ababa	4	$67,242	$118,036	$2,284	
12	11	Africa	Men's Casual	Luanda	3	$62,893	$149,864	$1,701	
13	12	Africa	Men's Casual	Khartoum	1	$9,244	$16,230	$478	
14	13	Africa	Men's Casual	Cairo	25	$360,209	$1,063,251	$9,424	
15	14	Africa	Men's Dress	Algiers	13	$123,743	$428,575	$3,621	
16	15	Africa	Men's Dress	Khartoum	3	$18,053	$51,132	$1,177	
17	16	Africa	Men's Dress	Nairobi	1	$8,587	$20,877	$363	
18	17	Africa	Men's Dress	Addis Ababa	7	$76,793	$136,273	$2,433	
19	18	Africa	Men's Dress	Kinshasa	5	$57,691	$95,663	$1,699	
20	19	Africa	Men's Dress	Cairo	5	$4,051	$45,962	$97	
21	20	Africa	Men's Dress	Luanda	2	$29,582	$67,247	$705	
22	21	Africa	Sandal	Kinshasa	10	$16,662	$104,438	$611	
23	22	Africa	Sandal	Luanda	9	$11,145	$19,900	$657	
24	23	Africa	Sandal	Nairobi	19	$16,289	$47,406	$1,175	
25	24	Africa	Sandal	Khartoum	18	$26,427	$81,825	$1,281	
26	25	Africa	Sandal	Algiers	25	$29,198	$84,447	$1,530	
27	26	Africa	Sandal	Cairo	9	$10,532	$50,430	$598	
28	27	Africa	Sandal	Johannesburg	13	$17,337	$63,003	$809	
29	28	Africa	Sandal	Addis Ababa	10	$62,819	$204,284	$1,861	

Sheet1 | Worldwide Shoe Sales | Sheet2 | Sheet3

Tip: By default, the SAS add-in displays the variable names in the first row of the Excel worksheet. If a variable name has a label, a red triangle appears in the

upper right corner of the cell that contains the variable name. To view the label, place your mouse over the triangle. In this example, the Stores, Sales, Inventory, and Returns variables have labels.

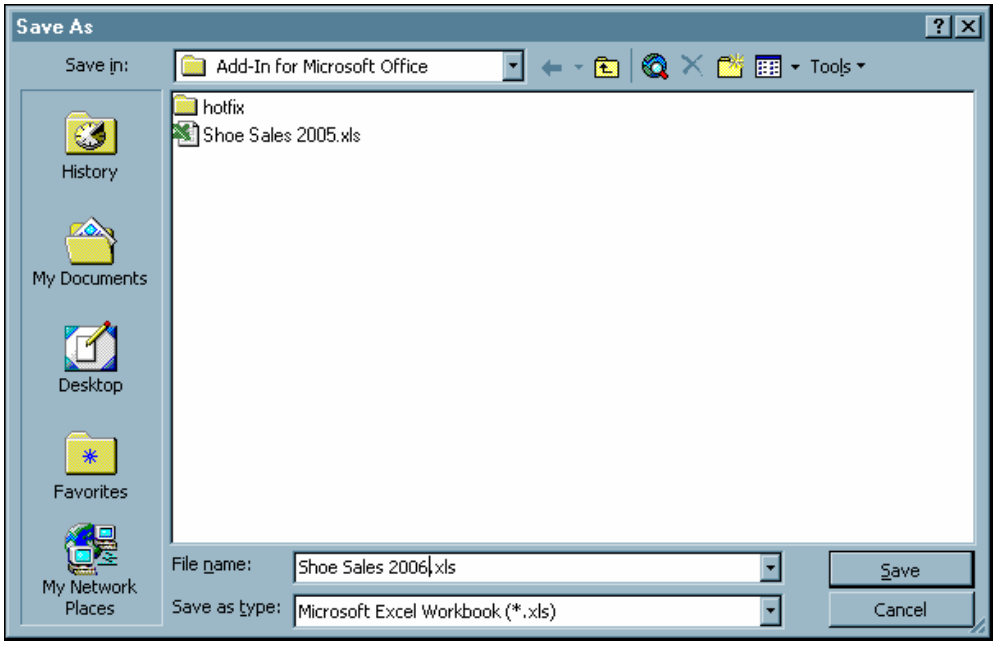
As you scroll through the data, you will see the following:

- Ten regions are represented: Africa, Asia, Canada, Central America/Caribbean, Eastern Europe, Middle East, Pacific, South America, United States, and Western Europe.
- There are eight product types: Boot, Men's Casual, Men's Dress, Sandal, Slipper, Sport Shoe, Women's Casual, and Women's Dress.
- For each Region, the data is divided into product and subsidiary.
- For each subsidiary, the data contains the number of stores that sell each product, the total sales, total inventory, and total returns for the product.

Save the Workbook

To save the workbook, complete the following steps:

1. Select **File ▸ Save As**. The Save As dialog box opens.
2. From the **Save in** drop-down list, select **C:\Program Files\SAS\Add-In for Microsoft Office**.
3. Type **Shoe Sales 2006** in the **File name** box.



4. Click **Save** to save the workbook.

You are now ready to analyze the data source. For the next steps, see Chapter 4, "Running SAS Tasks to Analyze the Data," on page 13.

CHAPTER

4

Running SAS Tasks to Analyze the Data

About the Tasks That You Will Perform **13**
Compare Sales for Each Product **14**
Determine Average Sales, Inventory, and Returns for Each Product **20**
Determine Correlation between Sales, Inventory, and Returns **26**
Perform a Linear Regression Analysis **31**
Save the Workbook **35**

About the Tasks That You Will Perform

These tasks assume that you have the SHOES data source open in a Microsoft Excel worksheet. For these steps, see Chapter 3, "Opening a SAS Data Source in Microsoft Excel," on page 7.

To analyze the data, you will perform the following main tasks:

1. You will create a bar chart to compare the sales of each product and to determine which products have the highest and lowest sales.
2. You will use summary statistics to determine the average total sales, average total inventory, and average returns for each product.
3. You will determine if there is any correlation between the total sales and total inventory and total returns for each product.
4. You will use a linear regression to determine if the parameter estimates for inventory, returns, and number of stores should be included in a linear regression model of sales.

Compare Sales for Each Product

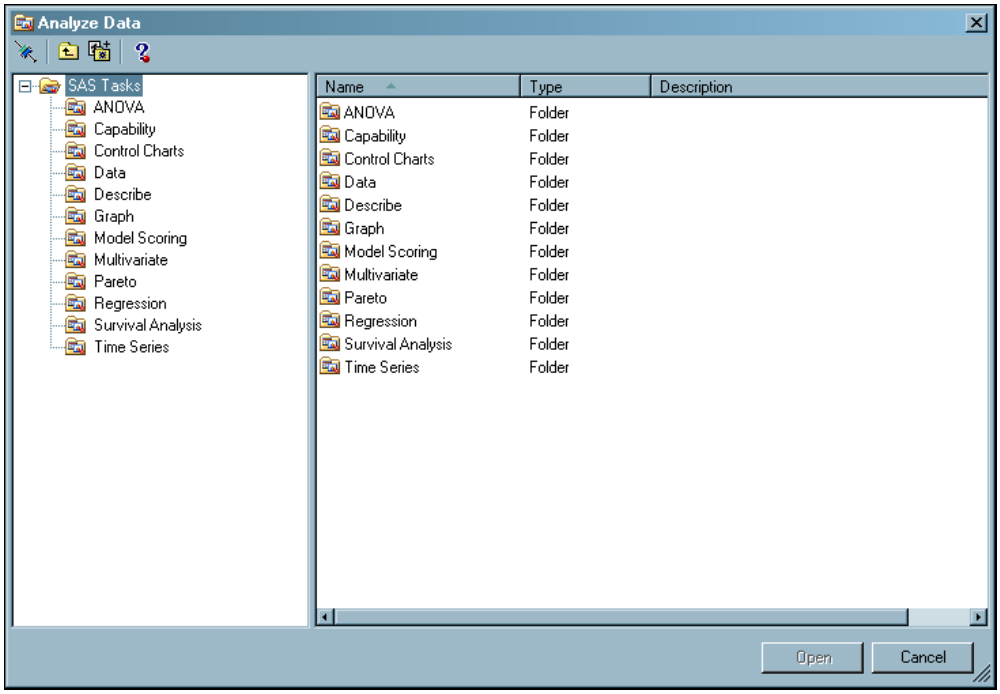
To create a bar chart that shows the sales for each product, complete the following steps:

1 From the **`Active Data`** drop-down list on the SAS Data Analysis toolbar, verify that SASHELP.SHOES is the active data source that you opened in the previous chapter.

Note: In the **`Active Data`** drop-down list, the name of the SAS server appears before the name of the data source. The name of the server depends on the SAS server at your site. △

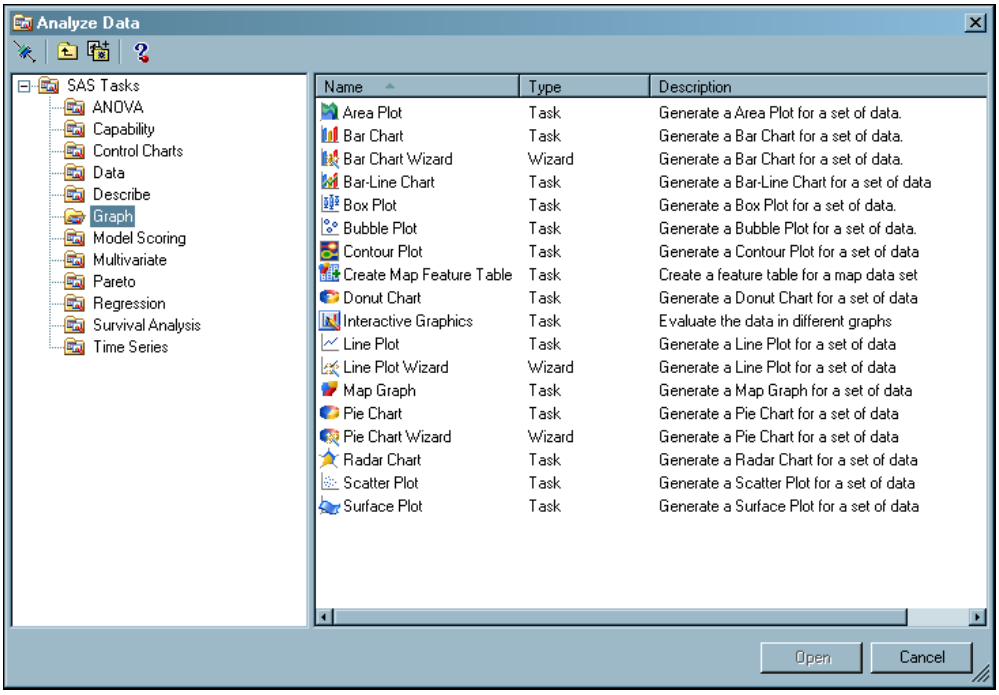
Tip: In Excel, data sources that are open are at the top of the list and have an exclamation point (!) before the name. The current selection is the active data source by default. Therefore, depending on where your cursor is in a worksheet, you might have a different active data source.

2 Select **SAS ▸ Analyze Data** from the main menu. The Analyze Data window opens.



Tip: You can also open the Analyze Data window by clicking in the SAS Data Analysis toolbar.

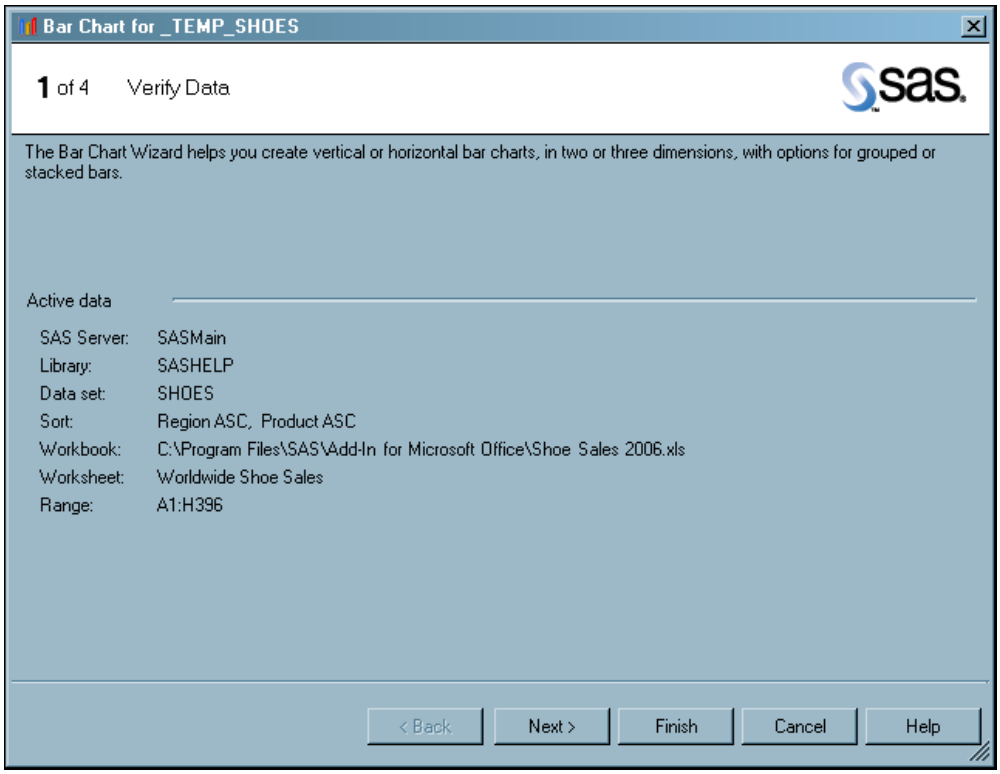
3 In the left pane, select **Graph**. The list of available graph tasks appears in the right pane.



4 Select **Bar Chart Wizard** and click **Open**. The Bar Chart Wizard opens.

5 In step 1 of the wizard, you can verify that you have selected the data source that you want to use, but you cannot change the data source after you have opened a SAS task.

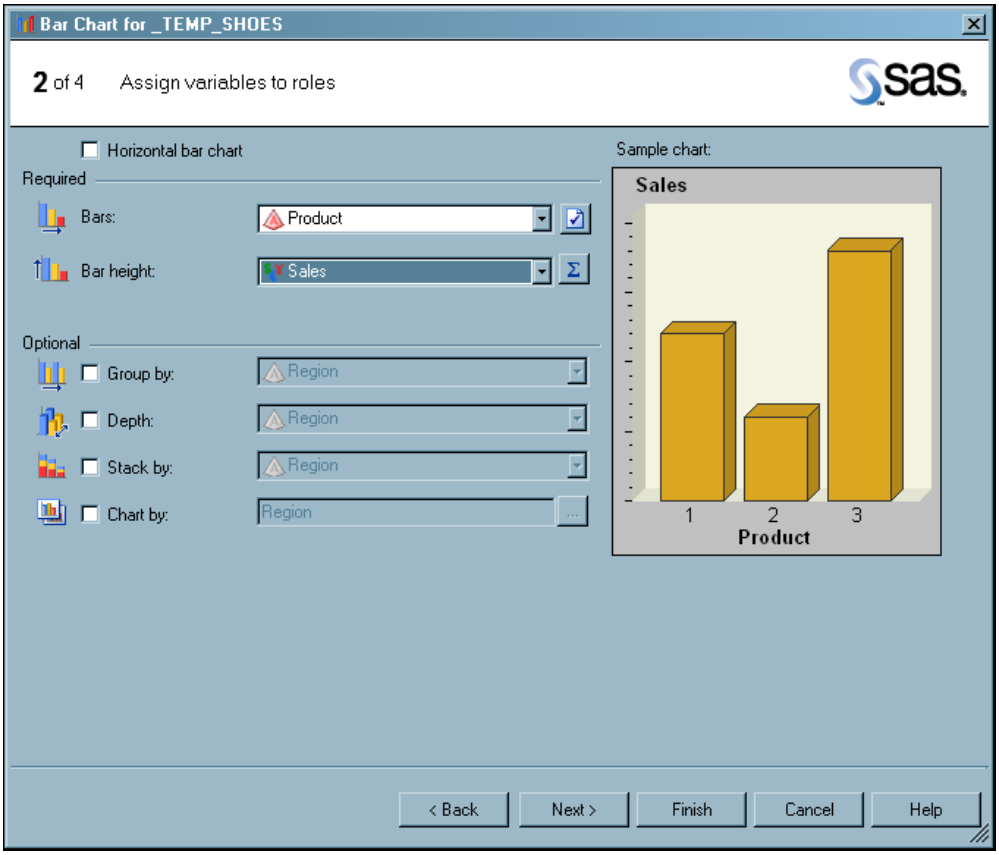
For this example, you should have the SHOES data source as the active data. Click **Next** to continue.



6 In step 2 of the wizard, you can assign variables from the data to roles. You can also specify whether to create a horizontal bar chart. By default, the Bar Chart Wizard creates vertical bar charts.

In the second step, specify the following options:

- From the **Bars** drop-down list, select **Product**.
- From the **Bar height** drop-down list, select **Sales**.

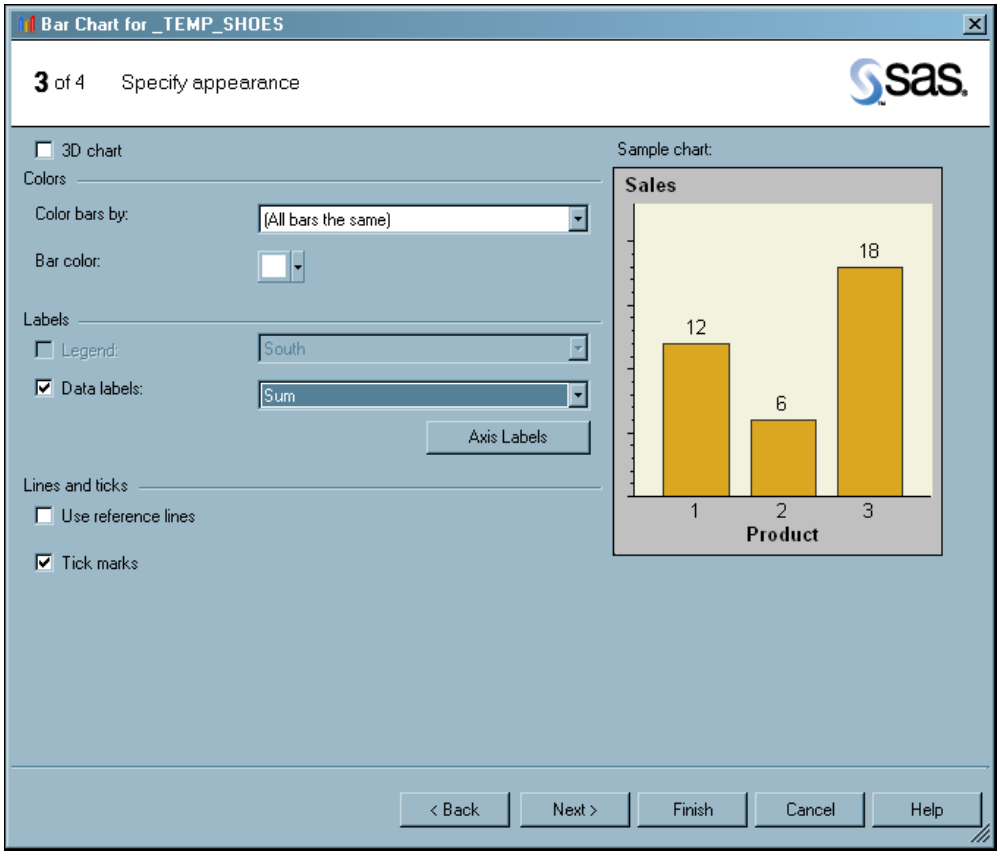


Click **Next** to continue.

7 In step 3 of the wizard, you can specify the appearance of the chart.

In the third step, specify the following options:

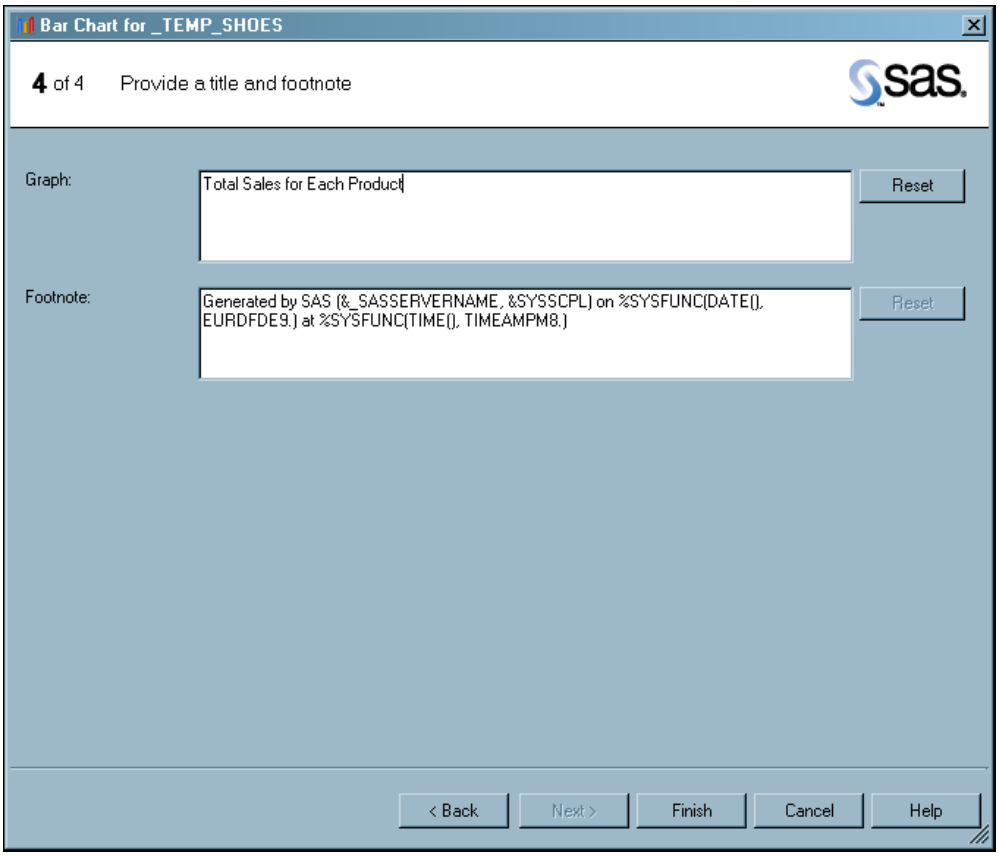
- Clear the **3D chart** check box.
- Select the **Data labels** check box, and then select **Sum** from the drop-down list.



Click **Next** to continue.

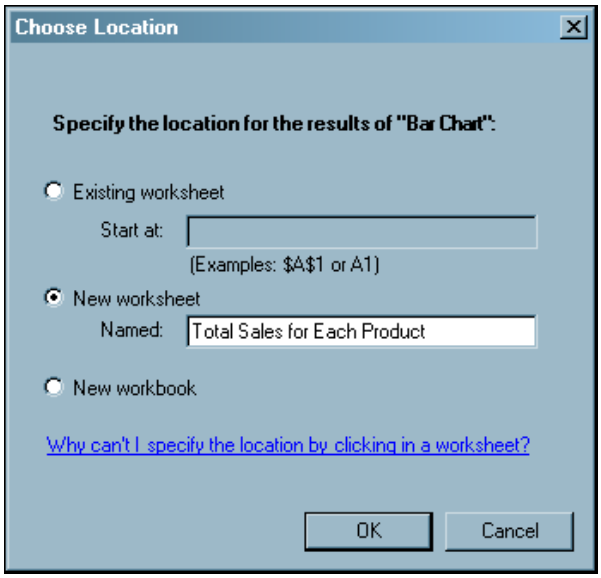
8 In step 4 of the wizard, you can customize the title and footnote for the chart. The Bar Chart Wizard provides a default title and footnote.

In the **Graph** box, delete **Bar Chart** and type **Total Sales for Each Product**.

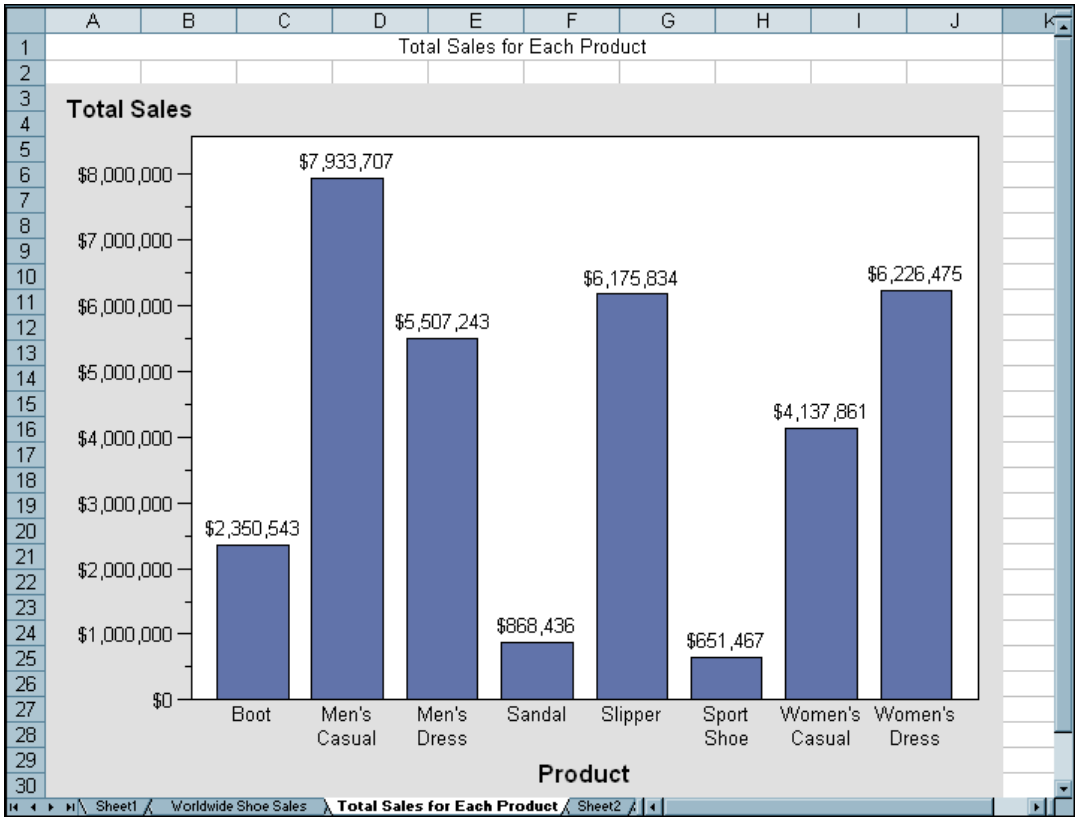


Click **Finish**. The Choose Location dialog box opens.

9 From the Choose Location dialog box, select **New worksheet** and in the **Named** box, type **Total Sales for Each Product**.



Click **OK**.The results open in a new worksheet called **Total Sales for Each Product**.



The bar chart shows the following:

- Men's Casual shoes had the highest sales with $7,933,707.
- Sport Shoes had the lowest sales with $651,467.

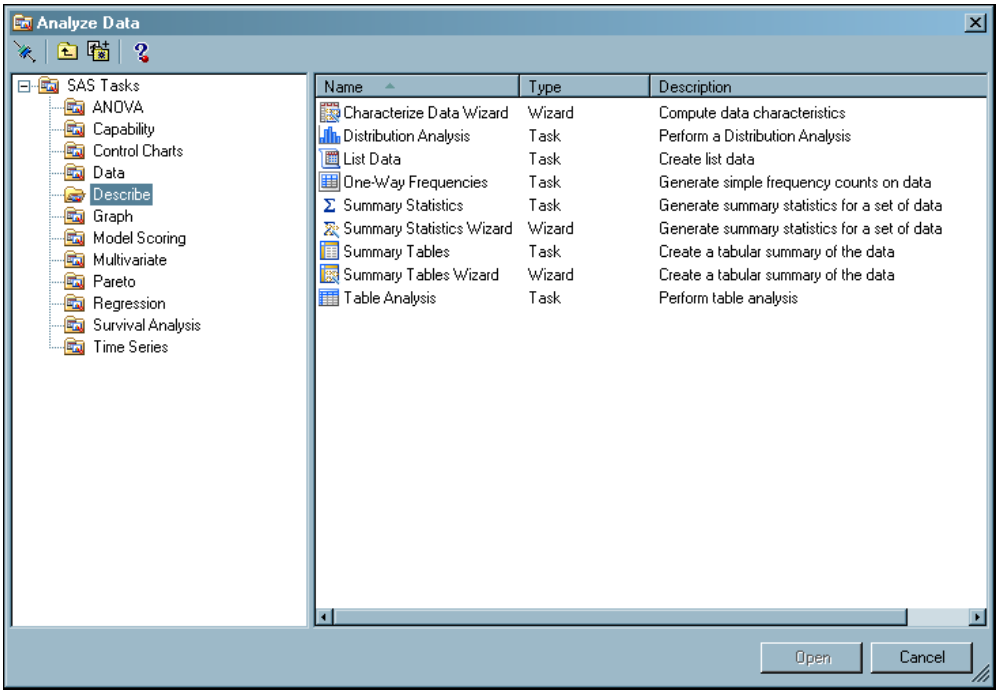
Determine Average Sales, Inventory, and Returns for Each Product

To create an analysis that shows the average sales, inventory, and returns for each product, complete the following steps:

1. From the **Active Data** drop-down list on the SAS Data Analysis toolbar, verify that SASHELP.SHOES is the active data source.

2. Select **SAS ▸ Analyze Data** from the main menu. The Analyze Data window opens.

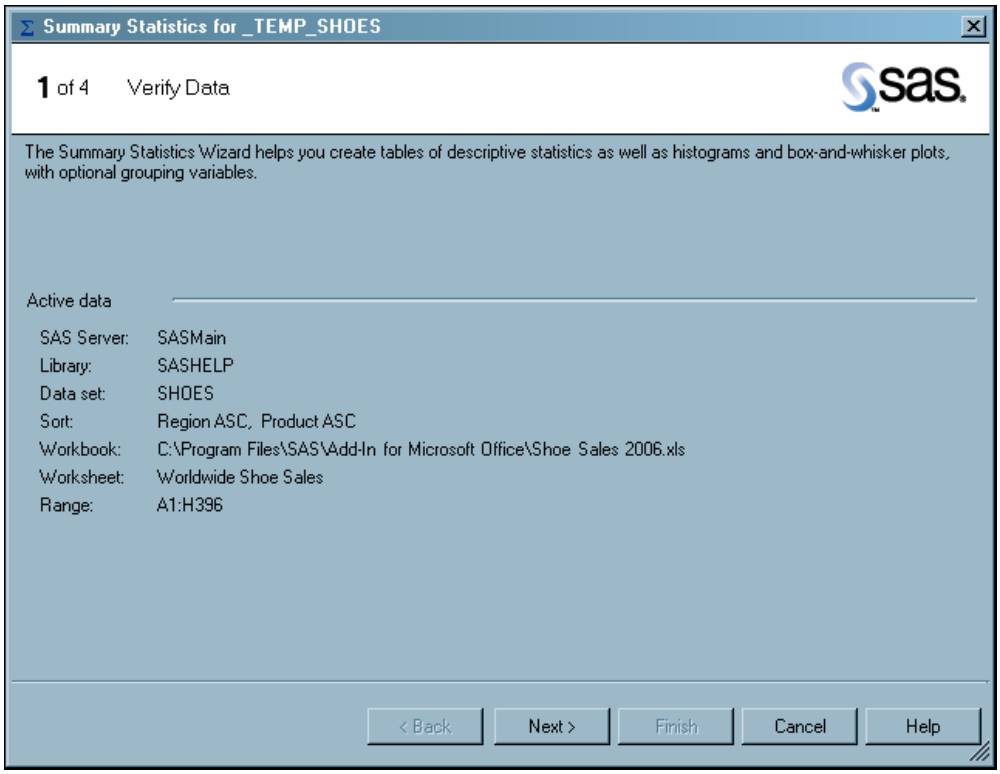
3 In the left pane, select **Describe**. The list of tasks in this category appears in the right pane.



4 Select **Summary Statistics Wizard** and click **Open**. The Summary Statistics Wizard opens.

5 In step 1 of the wizard, you can verify that you have selected the data source that you want to use, but you cannot change the data source after you have opened a SAS task.

For this example, you should have the SHOES data source as the active data.

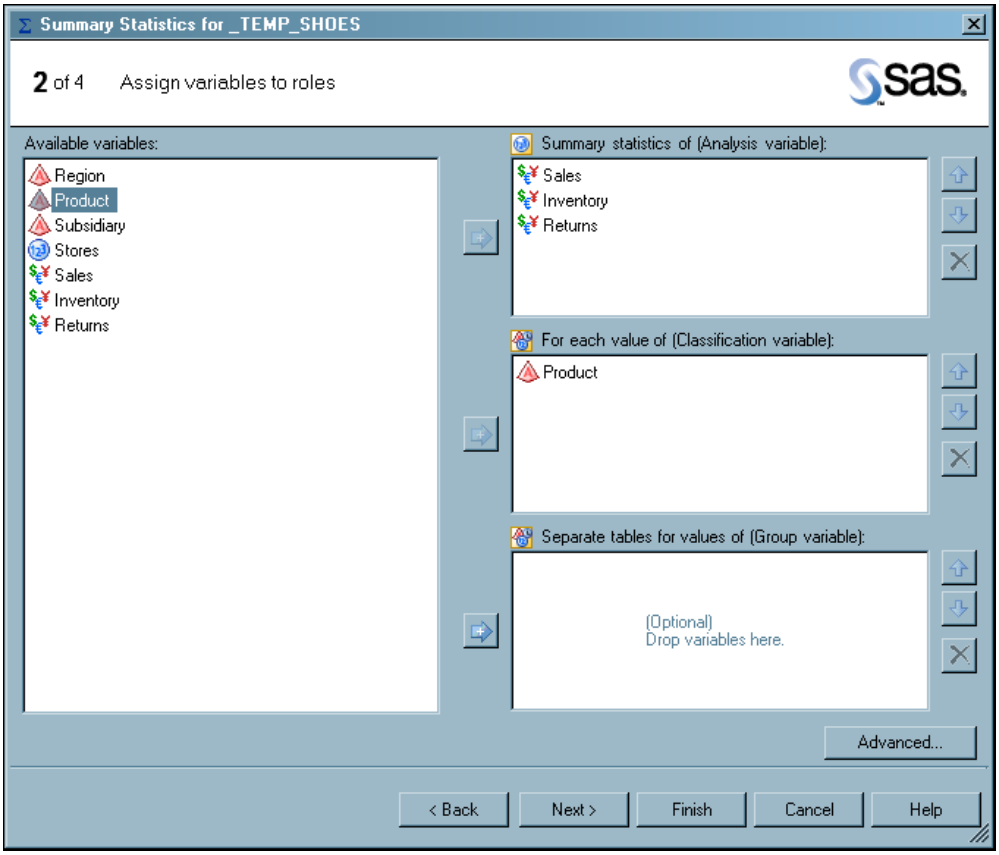


Click **Next** to continue.

6 In step 2 of the wizard, you can assign variables from the data to roles.

Select the following variables in the **Available variables** pane and drag and drop them to the following roles:

Variables	Role
Sales, Inventory, Returns	Summary statistics of (Analysis variable)
Product	For each value of (Classification variable)



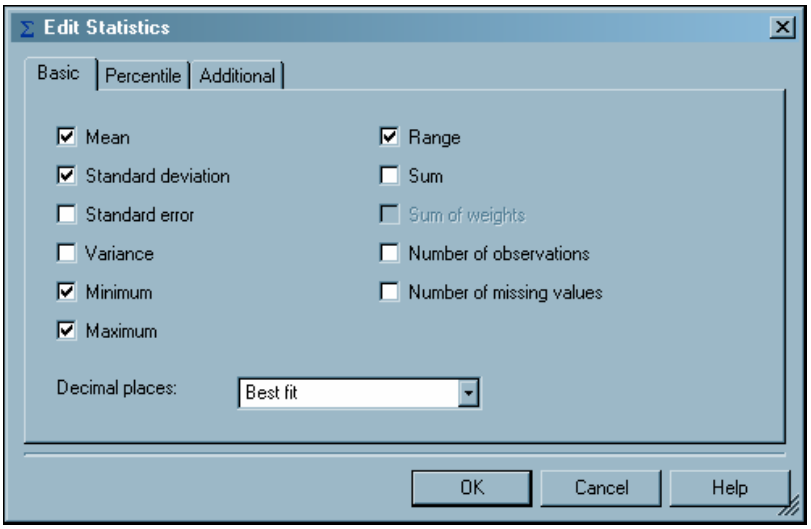
Click **Next** to continue.

7 In step 3 of the wizard, you can specify the statistics and the results to include in the output. By default, the Summary Statistics task calculates the mean, standard deviation, minimum, maximum, and number of observations for each classification variable. However, you want to include the range of values and remove the number of observations from the output.

To specify the statistics to include in the output, complete the following steps:

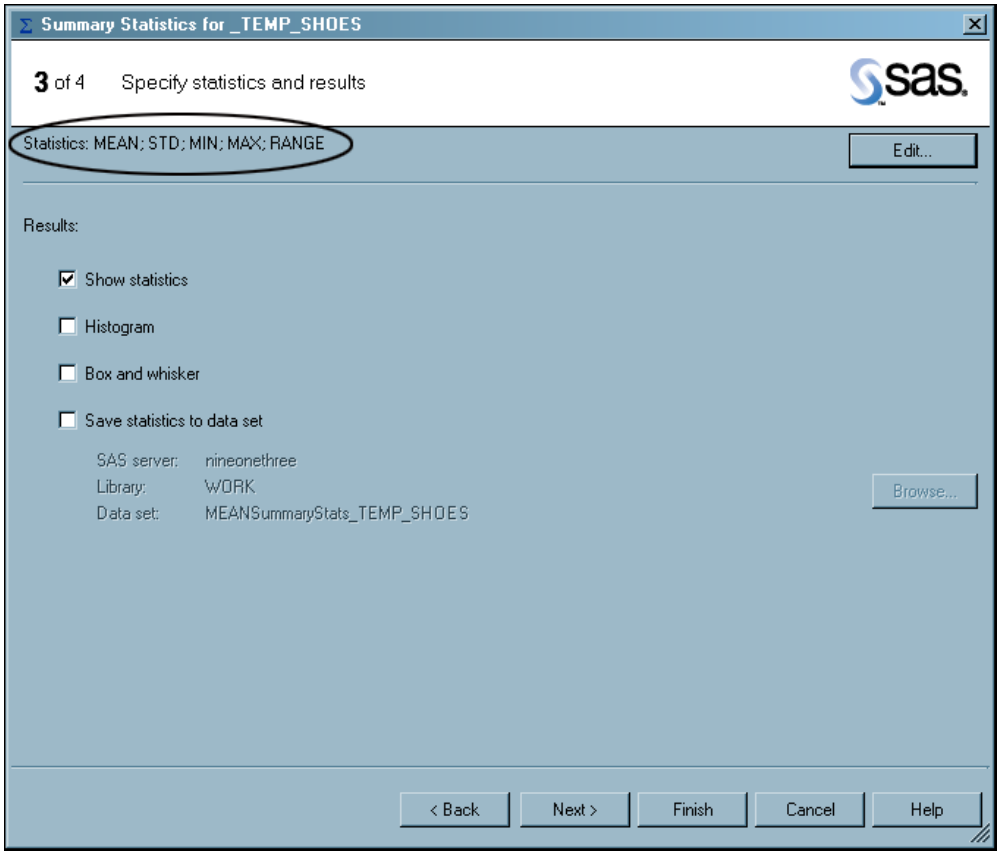
a Click **Edit**. The Edit Statistics dialog box opens.

b On the **Basic** tab, select the **Range** check box, and clear the **Number of observations** check box.



c Click **OK** to return to step 3 of the Summary Statistics Wizard.

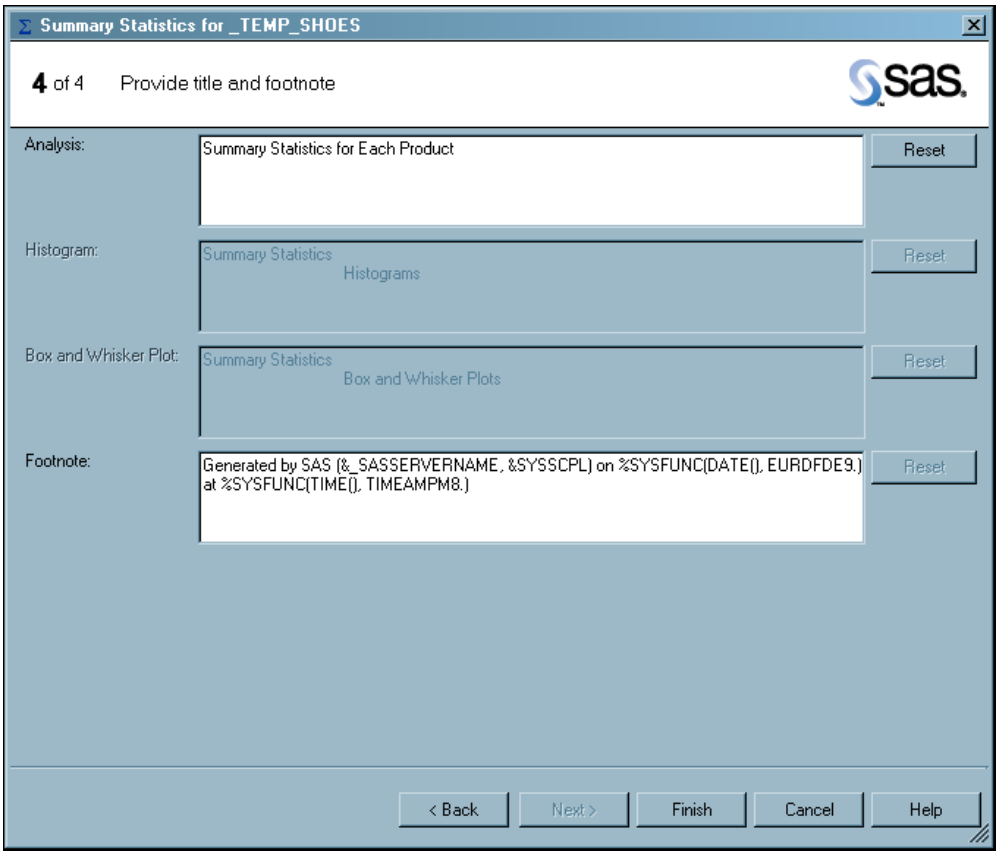
The statistics that are listed in the Summary Statistics Wizard should now be the following:



Click **Next** to continue.

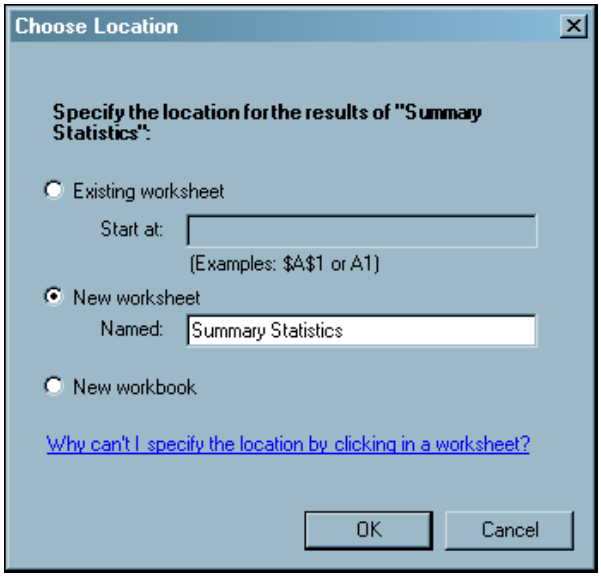
8 In step 4 of the wizard, you can customize the title and footnote for the output.

In the **Analysis** box, delete **Summary Statistics Results** and type **Summary Statistics for Each Product**.



Click **Finish**. The Choose Location dialog box opens.

9 In the Choose Location dialog box, select **New worksheet**, and click **OK**.



The results open in a new worksheet called Summary Statistics.

	A	B	C	D	E	F	G	H
1	Summary Statistics for Each Product							
2								
3	Product	Variable	Label	Mean	Std Dev	Minimum	Maximum	Range
4	Boot	Sales	Total Sales	45202.75	45705.28307	1179	286497	285318
5		Inventory	Total Inventory	187012.9038	172214.3691	374	882080	881706
6		Returns	Total Returns	1896.576923	1652.972277	80	9160	9080
7	Men's Casual	Sales	Total Sales	176304.6	224859.9038	9244	1298717	1289473
8		Inventory	Total Inventory	379672.2889	504818.0812	2176	2881005	2878829
9		Returns	Total Returns	6911.888889	9505.673749	478	57362	56884
10	Men's Dress	Sales	Total Sales	110144.86	126085.4346	3033	757798	754765
11		Inventory	Total Inventory	290146.8	318693.6955	538	1847559	1847021
12		Returns	Total Returns	3281.98	3160.150704	52	16833	16781
13	Sandal	Sales	Total Sales	17723.18367	31555.64156	325	200156	199831
14		Inventory	Total Inventory	65964.79592	101080.6854	960	624163	623203
15		Returns	Total Returns	778.9795918	1341.493547	10	8365	8355
16	Slipper	Sales	Total Sales	118766.0385	127423.8541	3019	700513	697494
17		Inventory	Total Inventory	427526.5385	451452.7593	10234	2520085	2509851
18		Returns	Total Returns	4037.307692	4029.218309	127	21247	21120
19	Sport Shoe	Sales	Total Sales	12773.86275	17910.53844	449	101922	101473
20		Inventory	Total Inventory	65151.01961	79344.1466	455	370388	369933
21		Returns	Total Returns	493.7058824	694.7706469	10	4204	4194
22	Women's Casual	Sales	Total Sales	91952.46667	105862.9157	5389	502636	497247
23		Inventory	Total Inventory	215481.1333	251422.7633	6972	1110412	1103440
24		Returns	Total Returns	2919.866667	3561.211659	185	17448	17263
25	Women's Dress	Sales	Total Sales	122087.7451	138840.1593	4659	756347	751688
26		Inventory	Total Inventory	378525.0784	447663.5925	19899	2503387	2483488
27		Returns	Total Returns	3797.117647	4177.352121	210	19378	19168
28								
29	Generated by SAS (SASMain, NET_SRV) on 07DEC2006 at 10:57 AM							
30								

Sheet1 | Worldwide Shoe Sales | Summary Statistics | Total Sales for Each Product

The output shows the mean, standard deviation, minimum value, maximum value and range of the total sales, total inventory, and total returns for each product. After analyzing the data, you note the following:

- For each product, the average total cost of the inventory exceeds the average total sales. For example, for Boots, the average total inventory is $187,012.90, but the average total sales is only $45,202.75.
- The ranges for all products is rather large. For example, for Boots, the average total sales ranges from $1,179 to $286,497. This large range implies that sales for boots vary across stores worldwide.

Determine Correlation between Sales, Inventory, and Returns

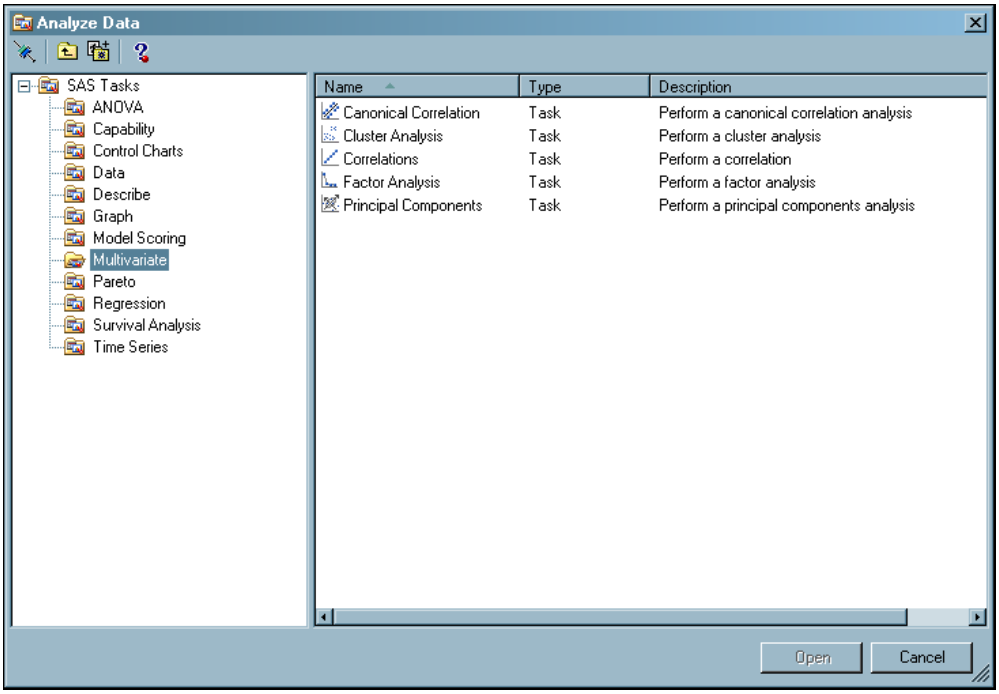
In the previous analysis, you saw that total inventory exceed sales for all products. Therefore, you want to analyze whether there is any correlation between total inventory and sales. You also decide to analyze the correlation between total returns and sales.

To determine if there is a correlation between these items, complete the following steps:

1. From the **`Active Data`** drop-down list on the SAS Data Analysis toolbar, verify that SASHELP.SHOES is the active data source.

2. Select **SAS ▸ Analyze Data** from the main menu. The Analyze Data window opens.

3 In the left pane, select **Multivariate**. The list of tasks in this category appears in the right pane.

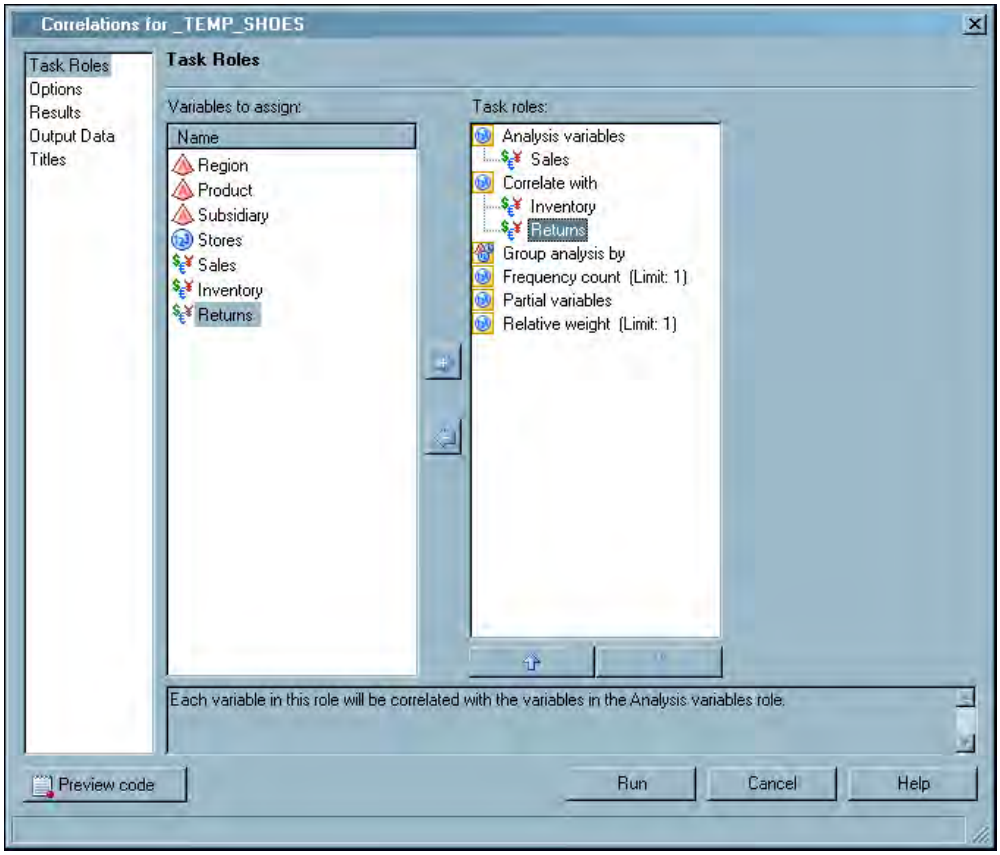


4 Select **Correlations** and click **Open**. The Correlations task opens.

5 In the Task Roles panel, you can assign variables from the data to roles.

Select the following variables in the **Variables to assign** pane and drag and drop them to the following roles:

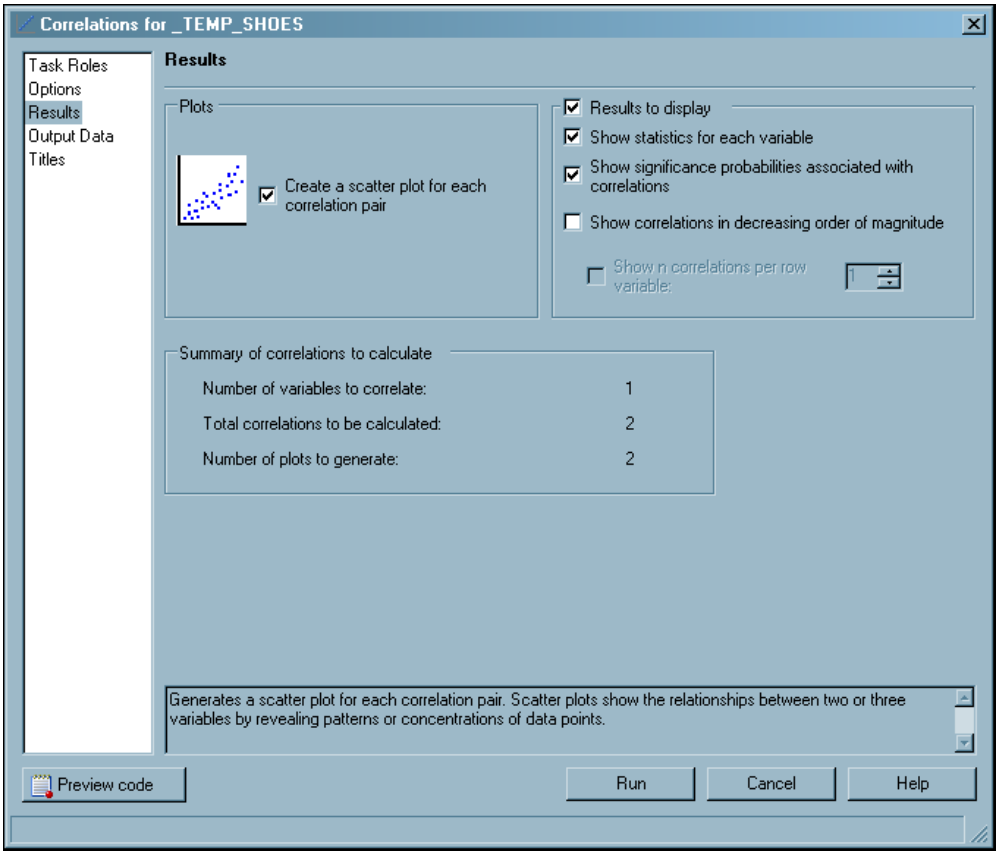
Variables	Role
Sales	Analysis variable
Inventory, Returns	Correlate with



In the selection pane, select **`Results`** to continue.

6 In the Results panel, you can specify whether to include any plots in the output and what statistics to include in the output. You can also view a summary of the correlations for the task.

For this analysis, select the **Create a scatter plot for each correlation pair** check box.



In the selection pane, select **Titles** to continue.

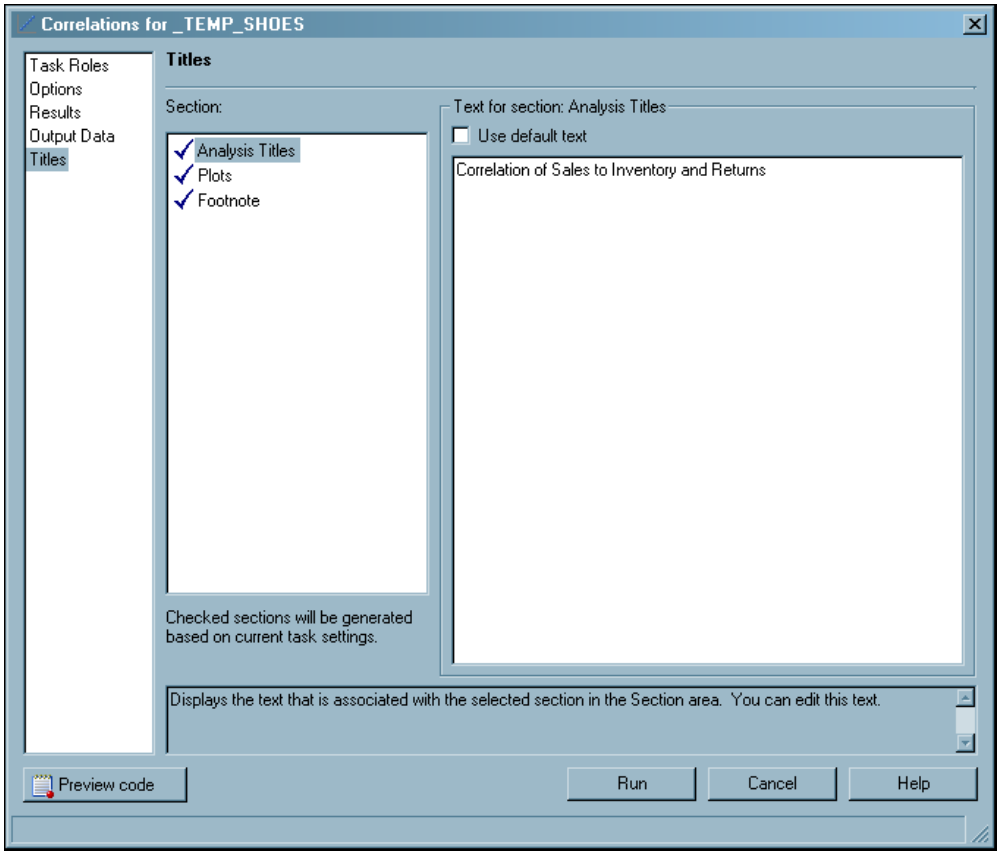
7 In the Titles panel, you can customize the title and footnote for the output.

To create a customize title for the analysis, complete the following steps:

a In the Section area, select **Analysis Titles**.

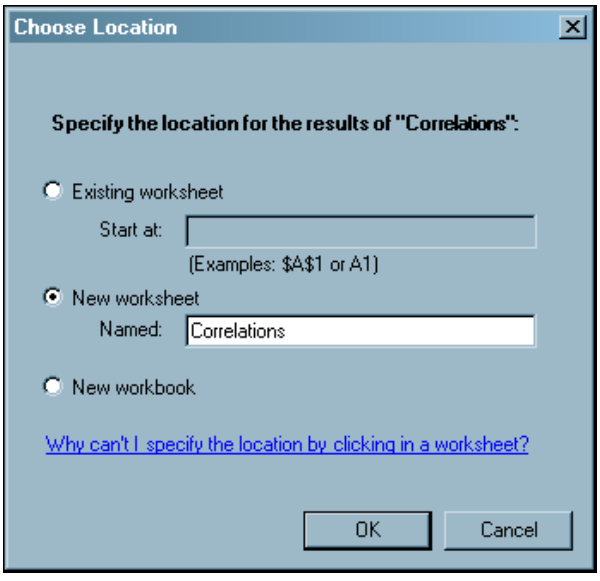
b In the **Text for section: Analysis Titles** area, clear the **Use default text** check box.

c Delete the default text and type **Correlation of Sales to Inventory and Returns**.

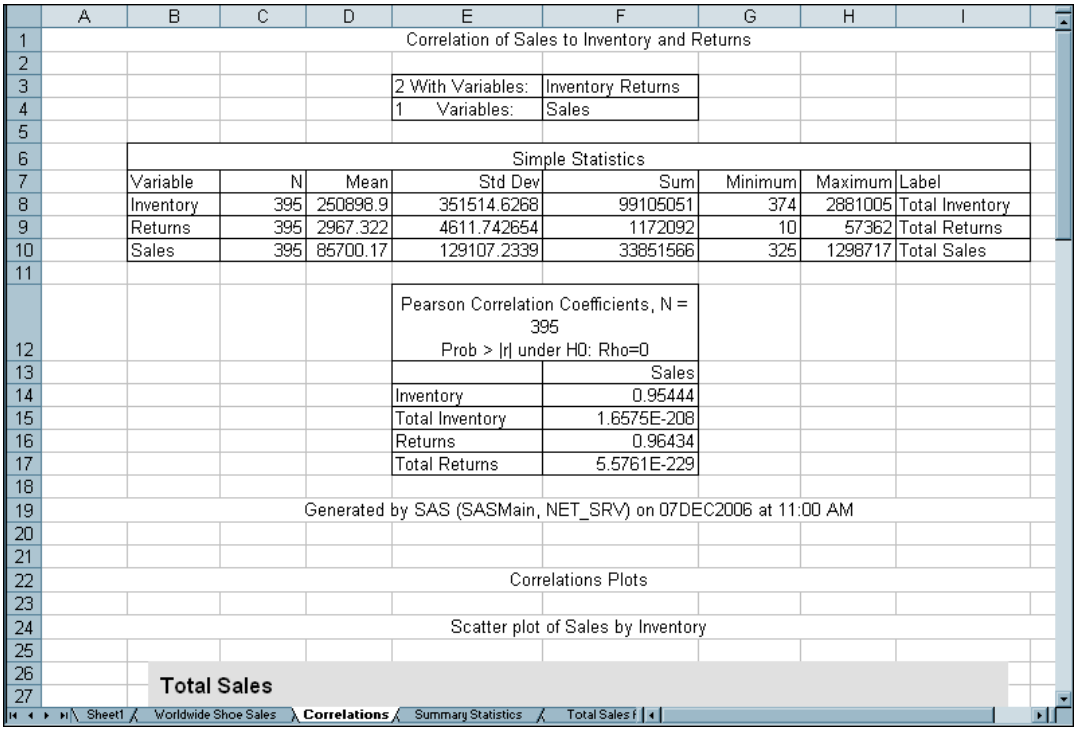


Click **Run**. The Choose Location dialog box opens.

8 In the Choose Location dialog box, select **New worksheet**, and click **OK**.



The results open in a new worksheet called Correlations.



1	Correlation of Sales to Inventory and Returns								
2									
3					2 With Variables:	Inventory Returns			
4					1 Variables:	Sales			
5									
6		Simple Statistics							
7		Variable	N	Mean	Std Dev	Sum	Minimum	Maximum	Label
8		Inventory	395	250898.9	351514.6268	99105051	374	2881005	Total Inventory
9		Returns	395	2967.322	4611.742654	1172092	10	57362	Total Returns
10		Sales	395	85700.17	129107.2339	33851566	325	1298717	Total Sales
11									
12					Pearson Correlation Coefficients, N = 395 Prob > |r| under H0: Rho=0				
13						Sales			
14					Inventory	0.95444			
15					Total Inventory	1.6575E-208			
16					Returns	0.96434			
17					Total Returns	5.5761E-229			
18									
19	Generated by SAS (SASMain, NET_SRV) on 07DEC2006 at 11:00 AM								
20									
21									
22	Correlations Plots								
23									
24	Scatter plot of Sales by Inventory								
25									
26									
27									

Total Sales

Sheet1 | Worldwide Shoe Sales | Correlations | Summary Statistics | Total Sales f

The output shows the correlation statistics for the correlation between sales and inventory and sales and returns. The analysis shows the following:

- The correlation between sales and inventory is 0.95444. This implies a strong positive correlation between sales and inventory.
- The correlation between sales and returns is 0.96434. This implies a strong positive correlation between sales and returns.
- The scatter plots also reflect this strong positive correlation. The scatter plots also show a few outliers as sales reach $1,400,000.

Perform a Linear Regression Analysis

In the previous analysis, you saw that total inventory and returns were strongly correlated to sales. You now want to perform a linear regression analysis on the data. You want to determine what model you can use to determine total sales for each product.

To run a linear regression analysis, complete the following steps:

1 From the **`Active Data`** drop-down list on the SAS Data Analysis toolbar, verify that SASHELP.SHOES is the active data source.

2 Select **SAS ▸ Analyze Data** from the main menu. The Analyze Data window opens.

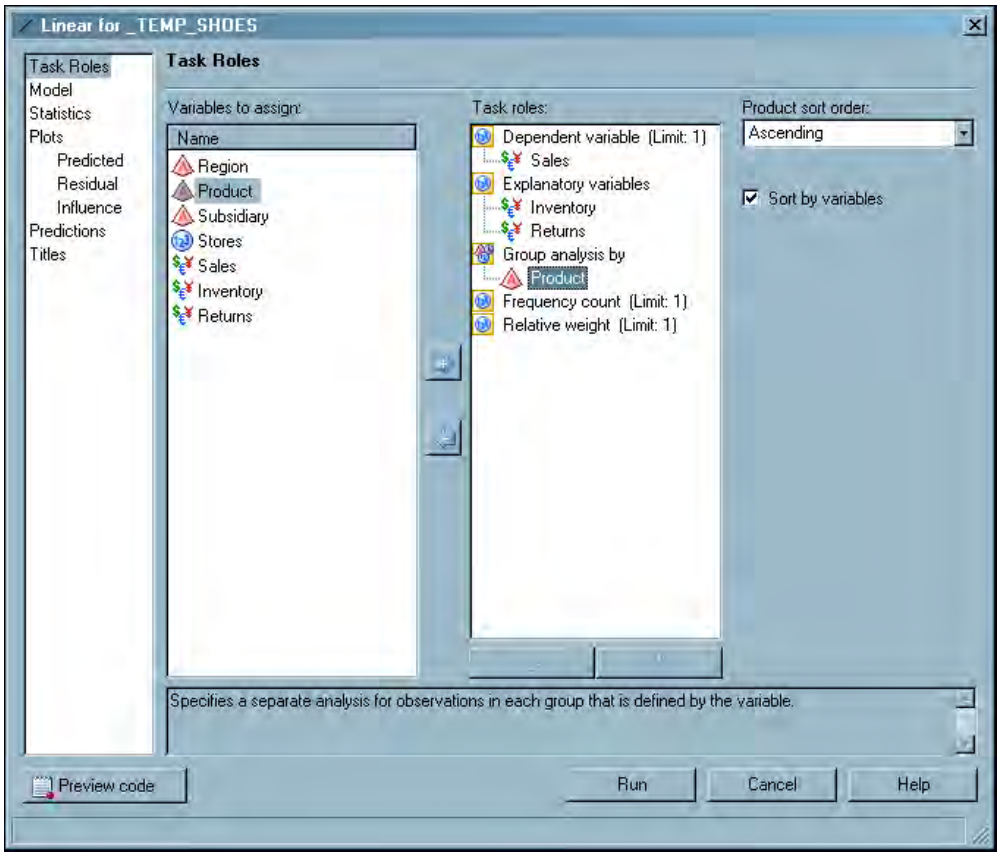
3 In the left pane, select **`Regression`**. The list of tasks in this category appears in the right pane.

4 Select **`Linear`** and click **`Open`**. The Linear task opens.

5 In the Task Roles panel, you can assign variables from the data to roles.

Select the following variables in the **`Variables to assign`** pane and drag and drop them to the following roles:

Variables	Role
Sales	Dependent variable
Inventory, Returns	Explanatory variables
Product	Group analysis by



In the selection pane, select **Titles** to continue.

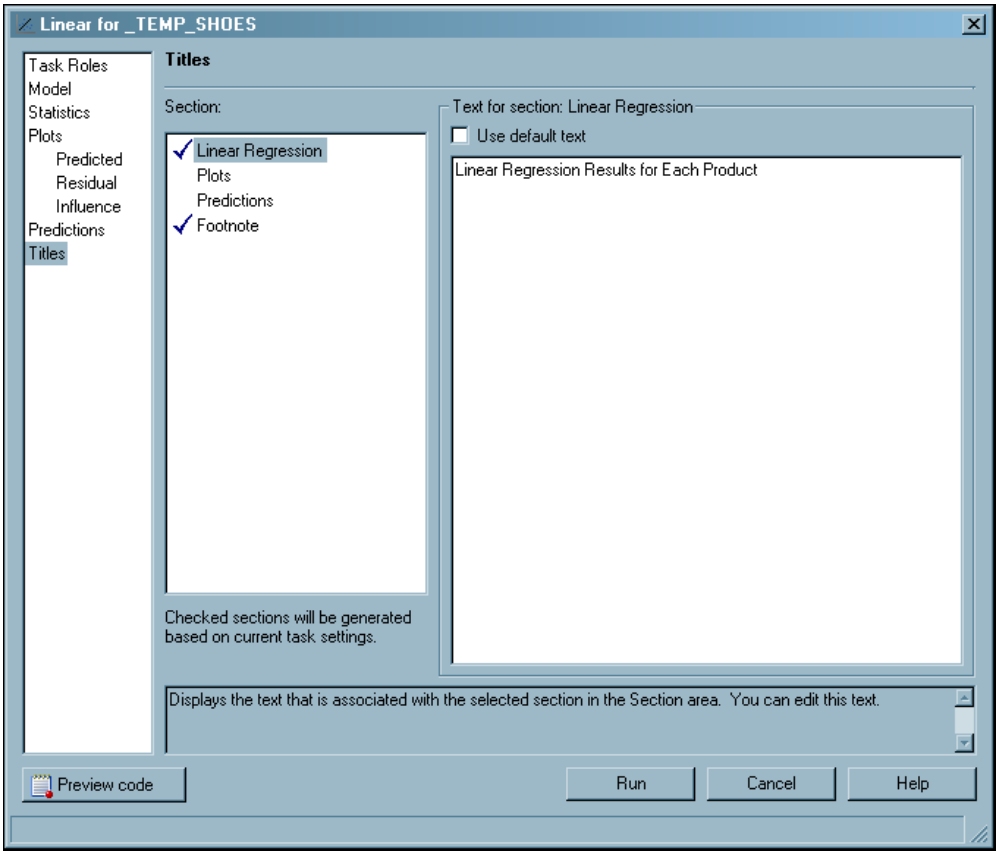
6 In the Titles panel, you can customize the title and footnote for the output.

To create a customize title for the analysis, complete the following steps:

a In the Section area, select **Linear Regression**.

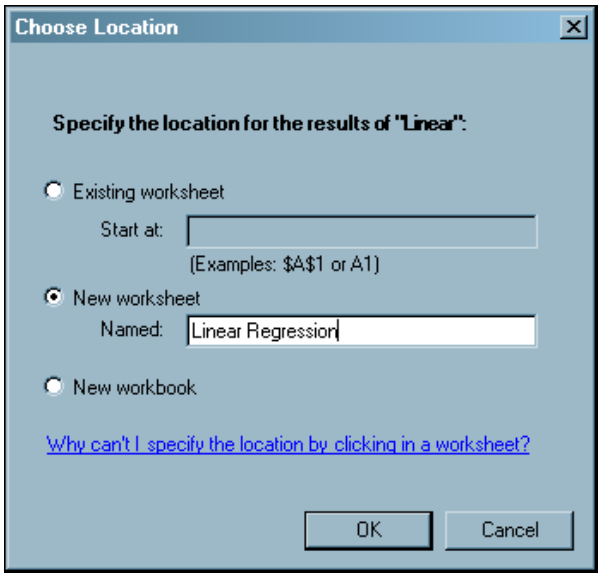
b In the **Text for section: Linear Regression** area, clear the **Use default text** check box.

c Delete the default text and type **Linear Regression Results for Each Product**.

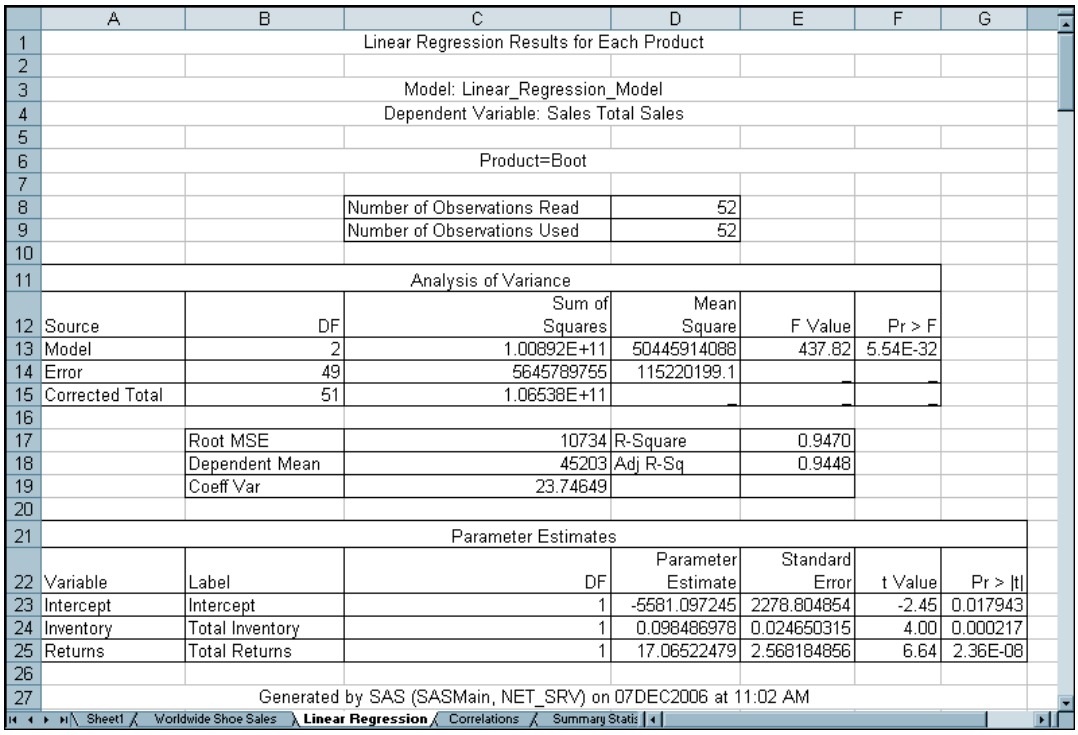


Click **Run**. The Choose Location dialog box opens.

7 In the Choose Location dialog box, select **New worksheet** and in the **Named** box, type **Linear Regression**.



Click **OK**. The results open in a new worksheet called Linear Regression.



	A	B	C	D	E	F	G
1	Linear Regression Results for Each Product						
2							
3	Model: Linear_Regression_Model						
4	Dependent Variable: Sales Total Sales						
5							
6	Product=Boot						
7							
8			Number of Observations Read	52			
9			Number of Observations Used	52			
10							
11	Analysis of Variance						
12	Source	DF	Sum of Squares	Mean Square	F Value	Pr > F	
13	Model	2	1.00892E+11	50445914088	437.82	5.54E-32	
14	Error	49	5645789755	115220199.1			
15	Corrected Total	51	1.06538E+11				
16							
17		Root MSE	10734	R-Square	0.9470		
18		Dependent Mean	45203	Adj R-Sq	0.9448		
19		Coeff Var	23.74649				
20							
21	Parameter Estimates						
22	Variable	Label	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
23	Intercept	Intercept	1	-5581.097245	2278.804854	-2.45	0.017943
24	Inventory	Total Inventory	1	0.098486978	0.024650315	4.00	0.000217
25	Returns	Total Returns	1	17.06522479	2.568184856	6.64	2.36E-08
26							
27	Generated by SAS (SASMain, NET_SRV) on 07DEC2006 at 11:02 AM						

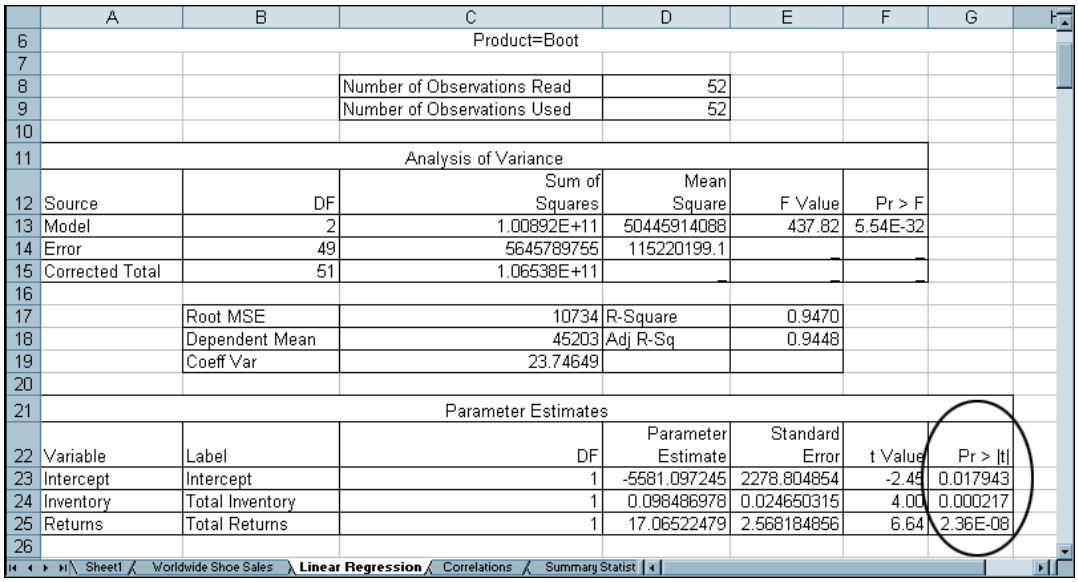
Sheet1 | Worldwide Shoe Sales | **Linear Regression** | Correlations | Summary Statis

Before running this analysis, you assumed a significance level of 0.05. Therefore, any parameter estimates that have a *p*-value less then 0.05 should be included in the model, and any parameter estimates that have a *p*-value greater than 0.05 should not be included in the model.

The following analysis of the Boot product shows you how to analyze the results for each product.

- You can use the Pr>|t| column in the Parameter Estimates table to determine if an input is statistically significant and should be included in the model.

  The total inventory and total returns have a *p*-value less than 0.05, so these inputs can be included in the model.



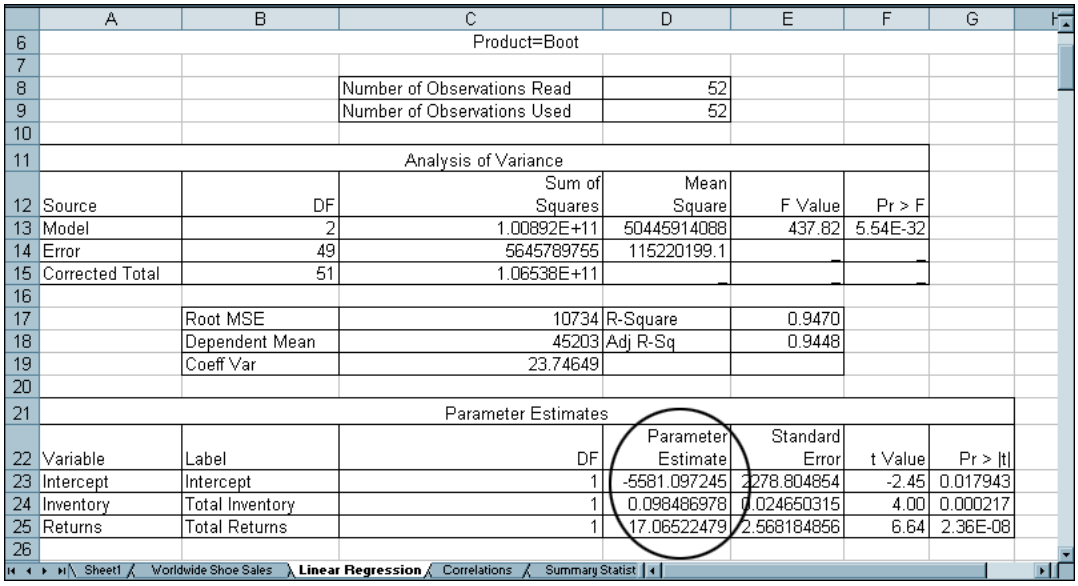
	A	B	C	D	E	F	G
6	Product=Boot						
7							
8			Number of Observations Read	52			
9			Number of Observations Used	52			
10							
11	Analysis of Variance						
12	Source	DF	Sum of Squares	Mean Square	F Value	Pr > F	
13	Model	2	1.00892E+11	50445914088	437.82	5.54E-32	
14	Error	49	5645789755	115220199.1			
15	Corrected Total	51	1.06538E+11				
16							
17		Root MSE	10734	R-Square	0.9470		
18		Dependent Mean	45203	Adj R-Sq	0.9448		
19		Coeff Var	23.74649				
20							
21	Parameter Estimates						
22	Variable	Label	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
23	Intercept	Intercept	1	-5581.097245	2278.804854	-2.45	0.017943
24	Inventory	Total Inventory	1	0.098486978	0.024650315	4.00	0.000217
25	Returns	Total Returns	1	17.06522479	2.568184856	6.64	2.36E-08
26							

Sheet1 | Worldwide Shoe Sales | **Linear Regression** | Correlations | Summary Statist

- After you have determined that an input is statistically significant, you can use the value in the Parameter Estimate column to determine the impact that these inputs have.

The impact that each of these inputs have on total sales is the following:

- For each $1.00 spent on inventory, total sales increase by $0.10.
- For each $1.00 of returns, total sales increase by $17.07. While at first this result was confusing, you remembered that some of your stores charge a 20% re-stocking fee on all returns. This means that your company still makes some money off of returned items.



	A	B	C	D	E	F	G
6			Product=Boot				
7							
8			Number of Observations Read	52			
9			Number of Observations Used	52			
10							
11			Analysis of Variance				
12	Source	DF	Sum of Squares	Mean Square	F Value	Pr > F	
13	Model	2	1.00892E+11	50445914088	437.82	5.54E-32	
14	Error	49	5645789755	115220199.1			
15	Corrected Total	51	1.06538E+11				
16							
17		Root MSE	10734	R-Square	0.9470		
18		Dependent Mean	45203	Adj R-Sq	0.9448		
19		Coeff Var	23.74649				
20							
21			Parameter Estimates				
22	Variable	Label	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
23	Intercept	Intercept	1	-5581.097245	2278.804854	-2.45	0.017943
24	Inventory	Total Inventory	1	0.098486978	0.024650315	4.00	0.000217
25	Returns	Total Returns	1	17.06522479	2.568184856	6.64	2.36E-08
26							

Sheet1 | Worldwide Shoe Sales | **Linear Regression** | Correlations | Summary Statist

You can perform the same analysis on the other products.

Save the Workbook

To save the workbook, select **File ▶ Save**.

You have now finished your initial analysis of your company's 2006 sales data. You can now use a PivotTable report to analyze a specific product line. For more information, see Chapter 5, "Analyzing a SAS Data Source in a PivotTable Report," on page 37.

CHAPTER

5

Analyzing a SAS Data Source in a PivotTable Report

About the Tasks That You Will Perform **37**
Open the Sales Data into a PivotTable Report **38**
Create a PivotTable Report for the Sport Shoe Product Line **41**
Drilling Down on the Data for Asia in the PivotTable Report **42**
Save the Workbook **44**

About the Tasks That You Will Perform

During the first part of the scenario, you saw that sports shoes had the lowest sales. After your initial report, your managers asked you to identify the regions that had sport shoe sales less than $10,000, and to perform a more in-depth analysis into the region with the lowest sales. Because you are in Microsoft Excel, you can perform this analysis using a PivotTable report.

To analyze the Sport Shoe product line, you will perform the following main tasks:

1 You will select the data source to open.

Note: In this scenario, you are accessing a SAS data source from the SAS server. However, you can use the SAS add-in to access data from a database, such as Oracle, Teradata, and DB2. In Excel, you can also use Excel worksheets as the data source. △

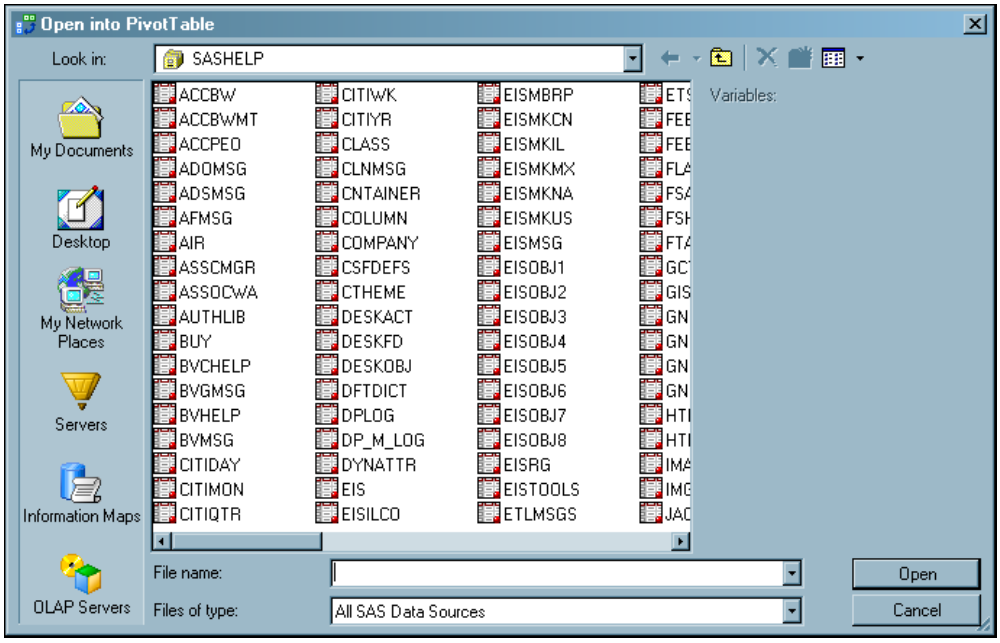
2 For the data source, you will select the following:

- the variables to include in the output
- a filter that will subset the data
- the output location for the PivotTable report

Open the Sales Data into a PivotTable Report

To open the SHOES data source (which is available from the SASHELP library) into a PivotTable report, complete the following steps:

1 Select **SAS ▸ Open Data Source ▸ Into PivotTable**. The Open into PivotTable window opens.

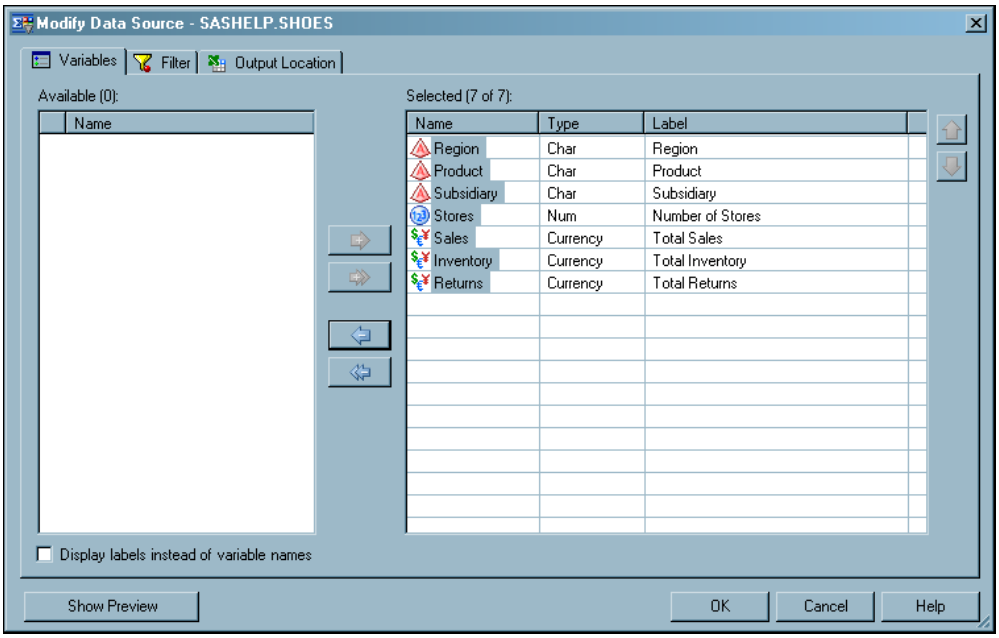


2 From the SASHELP library, select the **SHOES** data source. The variables in the SHOES data source appear in the Variables pane.

3 Click **Open**. The Modify Data Source window opens.

4 On the **Variables** tab, you select the variables that you want to include in the final output. You can also specify the order of the variables.

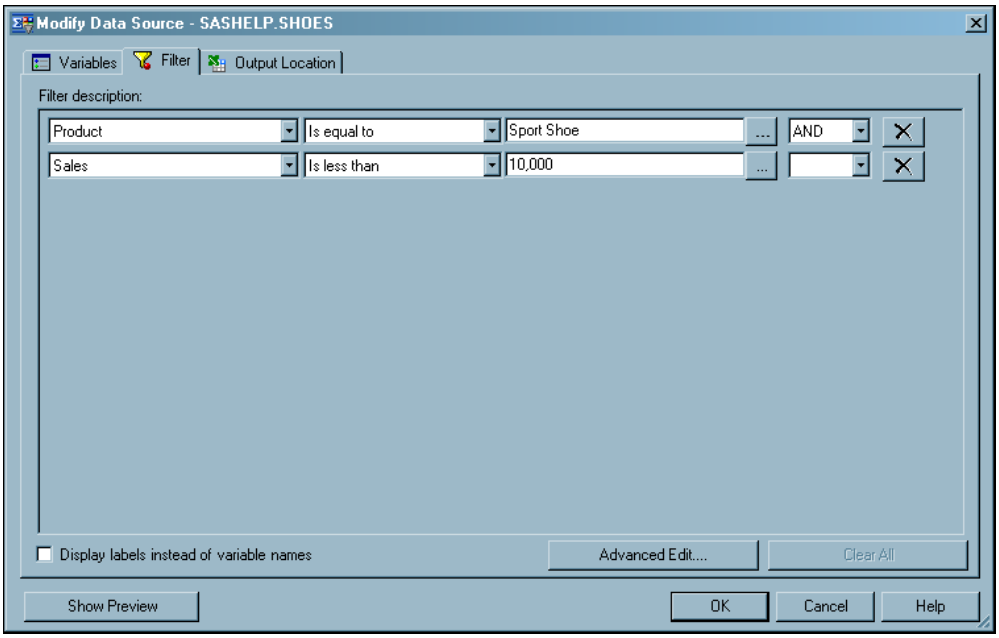
Click to move all the variables from the **Available** list box to the **Selected** list box. Select the variables so they appear in the following order:



Click the **Filter** tab to continue.

5 On the **Filter** tab, you can specify the condition that you want to use to subset the data. On this tab, you will specify two conditions and join them by an AND operator to create a filter.

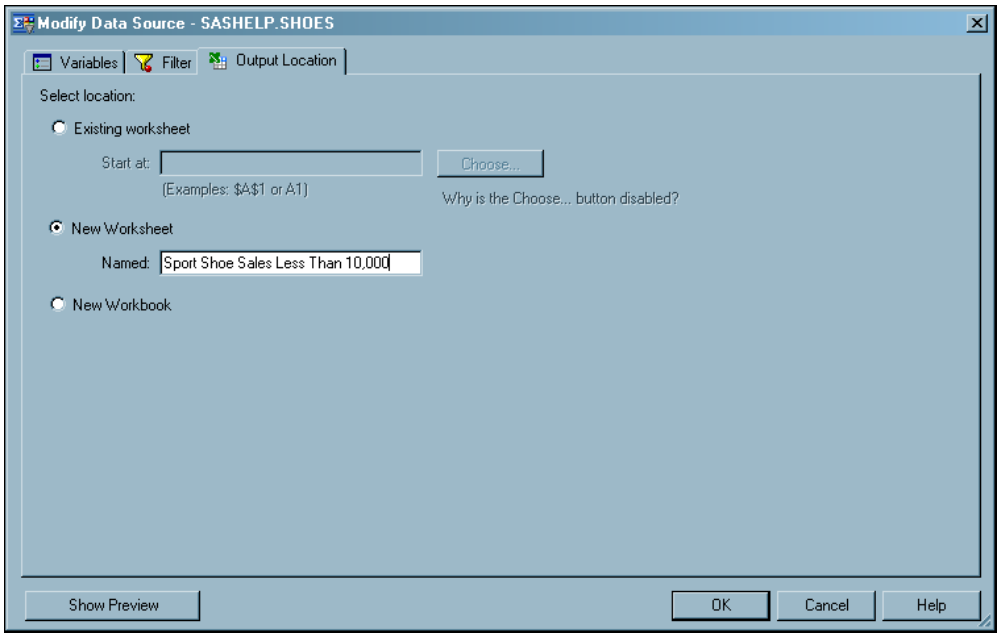
Use the drop-down lists and the text box to create the following filter:



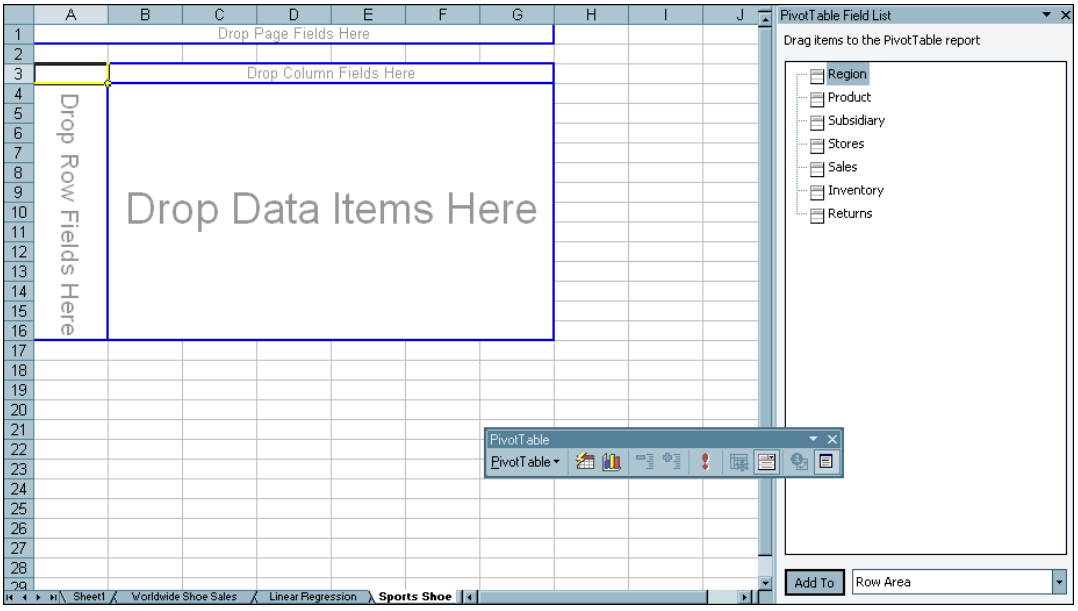
Click the **Output Location** tab to continue.

6 On the **Output Location** tab, you can select the location for the final output.

By default, the SAS add-in opens the PivotTable report in a new worksheet. In the **Named** box, delete **SASHELP.SHOES** and type **Sport Shoe Sales Less Than 10,000**.



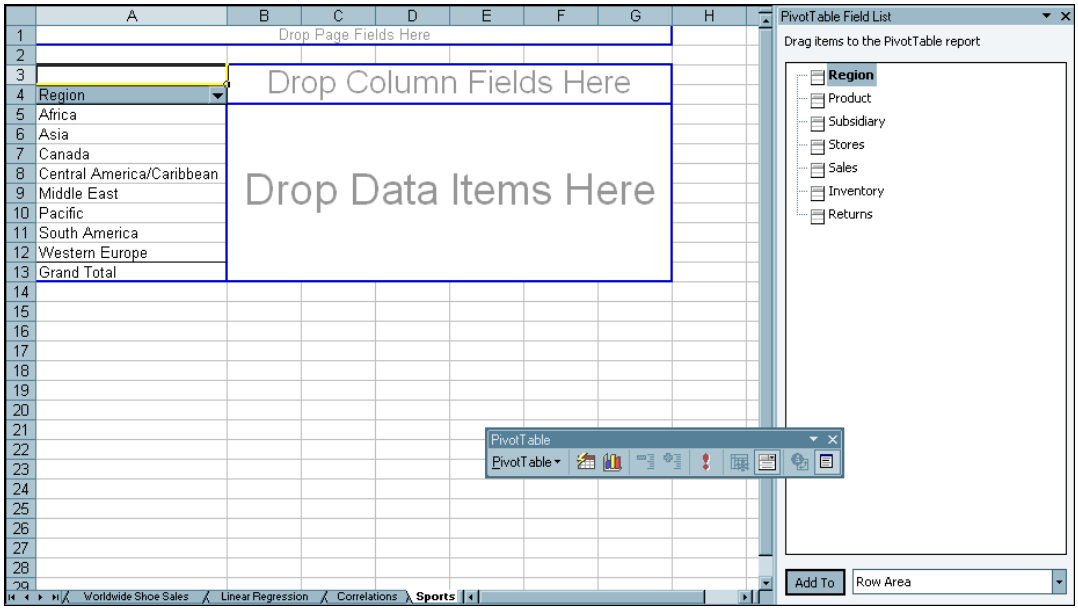
Click **OK**. The PivotTable report opens in a new worksheet.



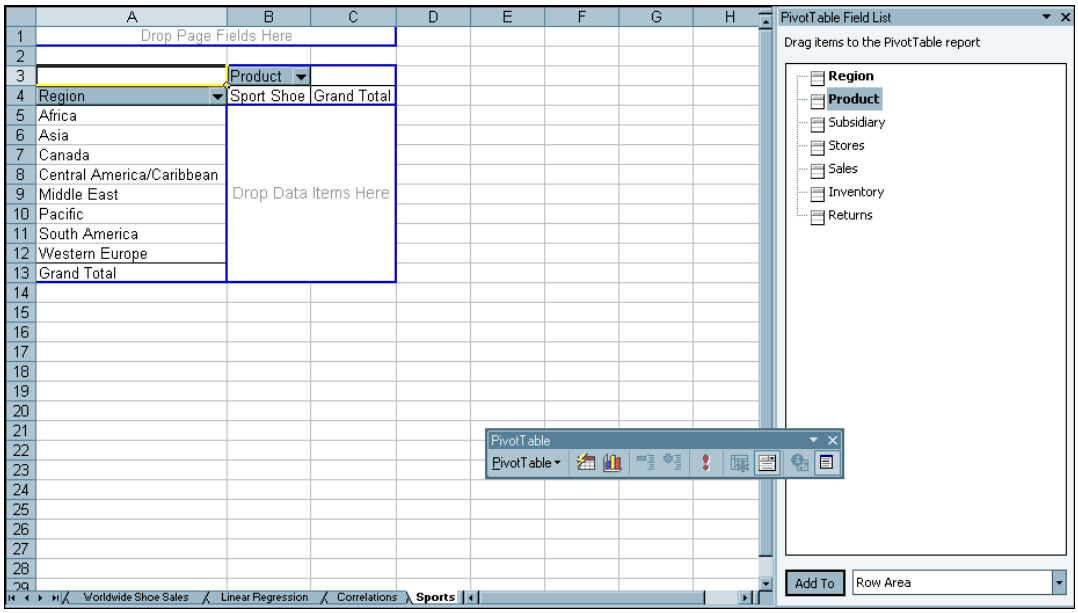
Create a PivotTable Report for the Sport Shoe Product Line

To create a PivotTable report that analyzes the actual and predicted sales for the Sport Shoe product line, complete the following steps:

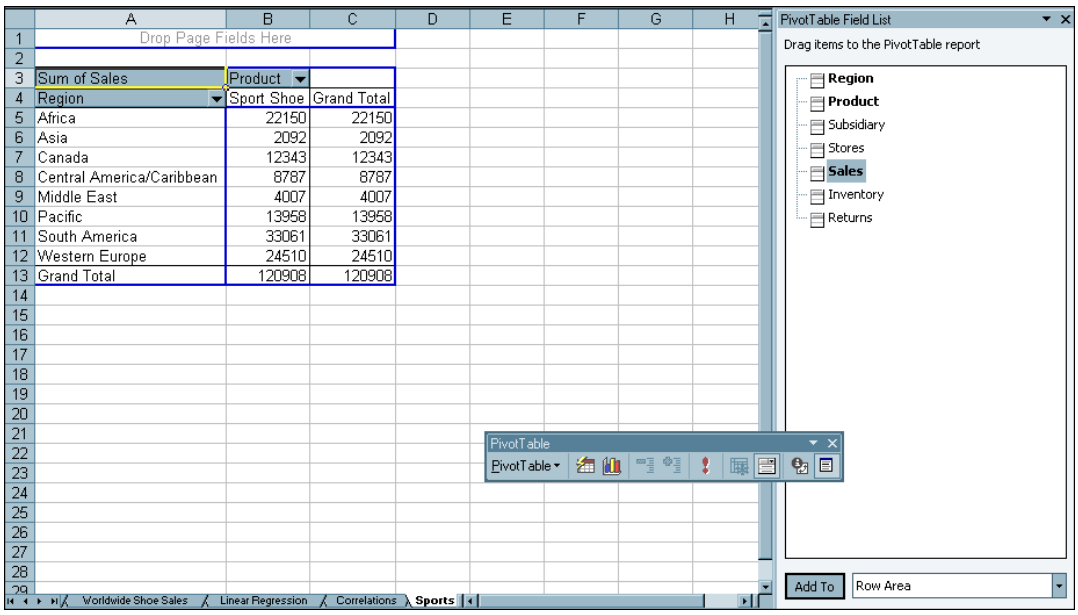
1 From the PivotTable Field List, drag and drop **Region** to the area marked **Drop Row Fields Here**.



2 From the PivotTable Field List, drag and drop **Product** to the area marked **Drop Column Fields Here**.



3 From the PivotTable Field List, drag and drop **Sales** in the area marked **Drop Data Items Here**.



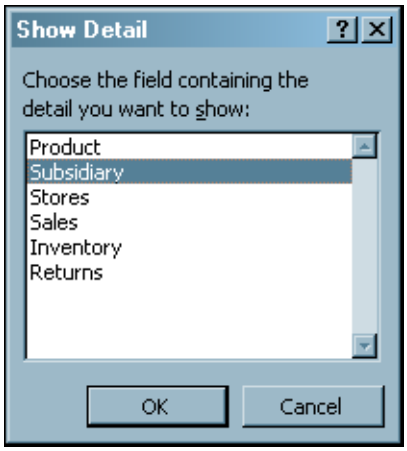
The results show that three regions (Asia, Middle East, and Central America/ Caribbean) have total sport shoe sales under $10,000. Asia has the lowest sales, so you want to drill-down on the data in the Asia region to investigate further.

Drilling Down on the Data for Asia in the PivotTable Report

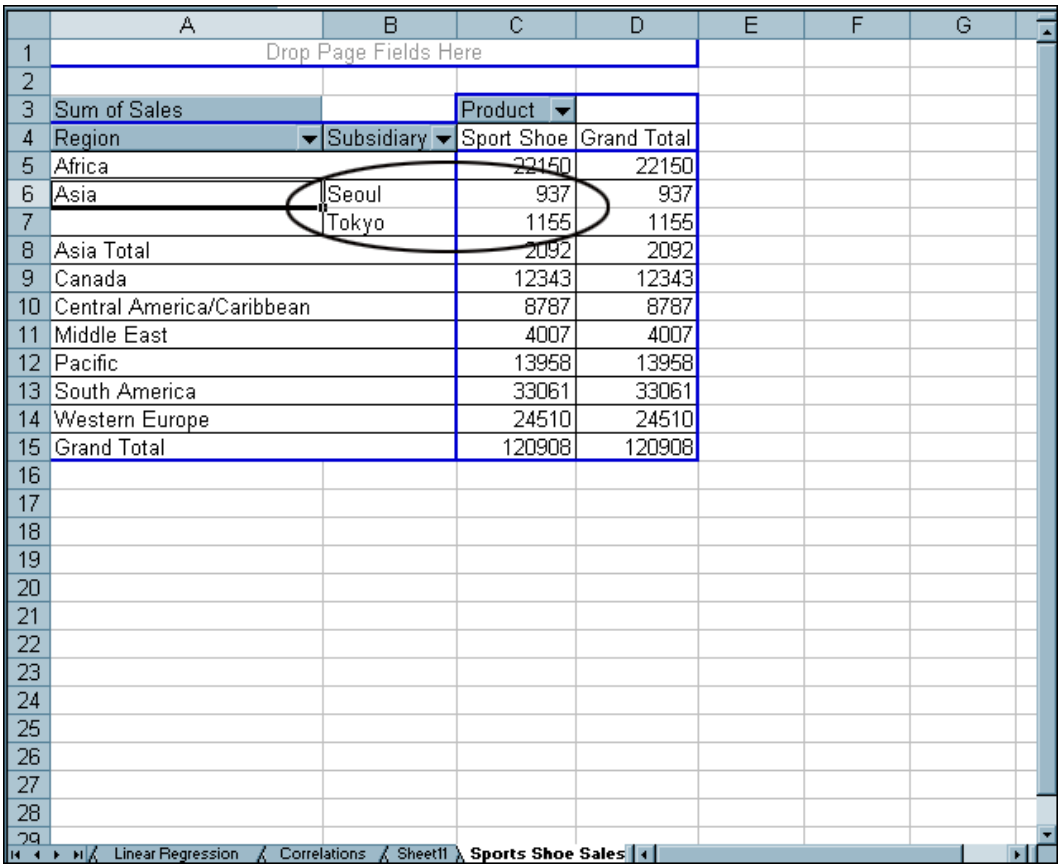
To drill-down on the data for the Asia region, complete the following steps:

1 In the Region column, right-click in the **Asia** cell. From the pop-up menu, select **Group and Show Detail ▶ Show Detail**. The Show Detail dialog box opens.

2 Select **Subsidiary** and click **OK**.



The Asia row now shows the sales for the Seoul and Tokyo subsidiaries.



	A	B	C	D	E	F	G
1	Drop Page Fields Here						
2							
3	Sum of Sales		Product				
4	Region	Subsidiary	Sport Shoe	Grand Total			
5	Africa		22150	22150			
6	Asia	Seoul	937	937			
7		Tokyo	1155	1155			
8	Asia Total		2092	2092			
9	Canada		12343	12343			
10	Central America/Caribbean		8787	8787			
11	Middle East		4007	4007			
12	Pacific		13958	13958			
13	South America		33061	33061			
14	Western Europe		24510	24510			
15	Grand Total		120908	120908			
16							
17							
18							
19							
20							
21							
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29							

Linear Regression | Correlations | Sheet11 | **Sports Shoe Sales**

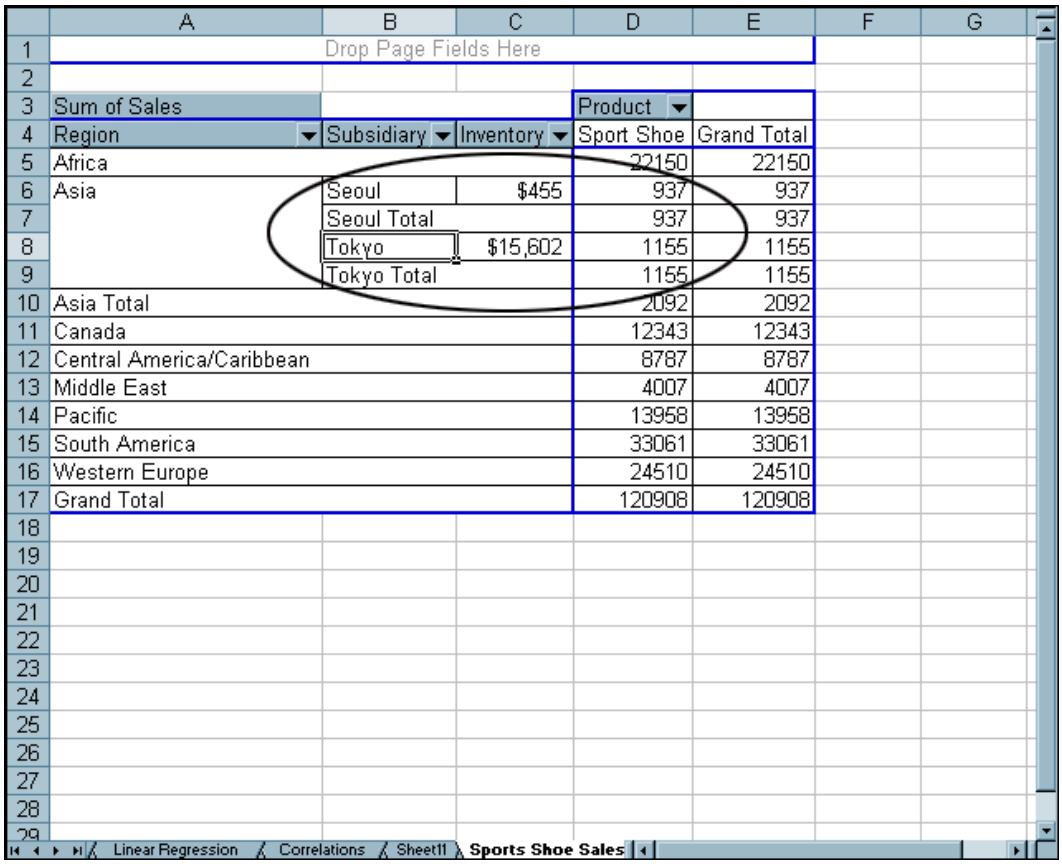
3 In the Subsidiary column, right-click on the **Seoul** cell. From the pop-up menu, select **Group and Show Detail ▶ Show Detail**. The Show Detail dialog box opens.

4 Select **Inventory** and click **OK**.

The Seoul row now shows the inventory cost for the Seoul subsidiary.

5 Right-click on the **Tokyo** cell. From the pop-up menu, select **Group and Show Detail ▸ Show Detail**.

The Tokyo row now shows the inventory cost for the Tokyo subsidiary.



	A	B	C	D	E	F	G
1	Drop Page Fields Here						
2							
3	Sum of Sales			Product			
4	Region	Subsidiary	Inventory	Sport Shoe	Grand Total		
5	Africa			22150	22150		
6	Asia	Seoul	$455	937	937		
7		Seoul Total		937	937		
8		Tokyo	$15,602	1155	1155		
9		Tokyo Total		1155	1155		
10	Asia Total			2092	2092		
11	Canada			12343	12343		
12	Central America/Caribbean			8787	8787		
13	Middle East			4007	4007		
14	Pacific			13958	13958		
15	South America			33061	33061		
16	Western Europe			24510	24510		
17	Grand Total			120908	120908		
18							
19							
20							
21							
22							
23							
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26							
27							
28							
29							

Linear Regression | Correlations | Sheet11 | **Sports Shoe Sales**

The results suggest the following:

- While the sales for the Seoul subsidiary were $937, the cost of inventory was only $455. This suggests that the profit for sport shoes was good. It could also suggest that demand for sport shoes exceeded the inventory that the Seoul subsidiary had in the warehouse.
- While the sport shoe sales for the Tokyo subsidiary were $1,155, the cost of inventory was $15,602. This suggests that the Tokyo subsidiary was not profitable in selling sport shoes. Then you remember that a low-price competitor recently entered the Tokyo market. The demand for sport shoes declined unexpectedly, and consequently, the Tokyo subsidiary has leftover inventory in the warehouse.

Before ordering sport shoes for either of these subsidiaries, your company will probably want to perform an in-depth market analysis into the trends in each of these markets.

Save the Workbook

To save the workbook, select **File ▸ Save**.

You have now finished analyzing the sports shoe sales in a PivotTable report. This completes the second part of the scenario.

CHAPTER

6

Next Steps: A Quick Look at Additional Features

Working with Published Documents **45**
What Is a Published Document? **45**
Publish the Sales Workbook **46**
Open the Published Workbook **47**
Working with Favorites **47**
What Is a Favorite? **47**
Add a Favorite for the Sales Workbook **47**
Run the Favorite for the Sales Workbook **48**
Sending Results to Microsoft Word or Microsoft PowerPoint **48**
About Sending Results from Excel **48**
Send Results from the Sales Workbook to Microsoft PowerPoint **48**
Refresh Your Results in PowerPoint **50**

Working with Published Documents

What Is a Published Document?

After you have completed an analysis, you might want to share the results with others at your site. Published documents are Excel, Word, or PowerPoint documents that are saved to a common repository.

Publishing your documents to a common repository has the following benefits:

- The workbooks, documents, and presentations in this repository can be opened by others at your site.
- When you publish the workbook, document, or presentation to the metadata repository, information about all the data sources is saved to the repository. Storing this metadata in the repository enables you to perform an impact analysis on a document. Impact analysis enables you to see where a data source came from and the items that depend on this source. This analysis enables you to know how changing a data source might affect other documents.

Note: To publish a document, your site administrator must have installed SAS Web Report Studio on the same metadata server. If you cannot publish documents, contact your site administrator. △

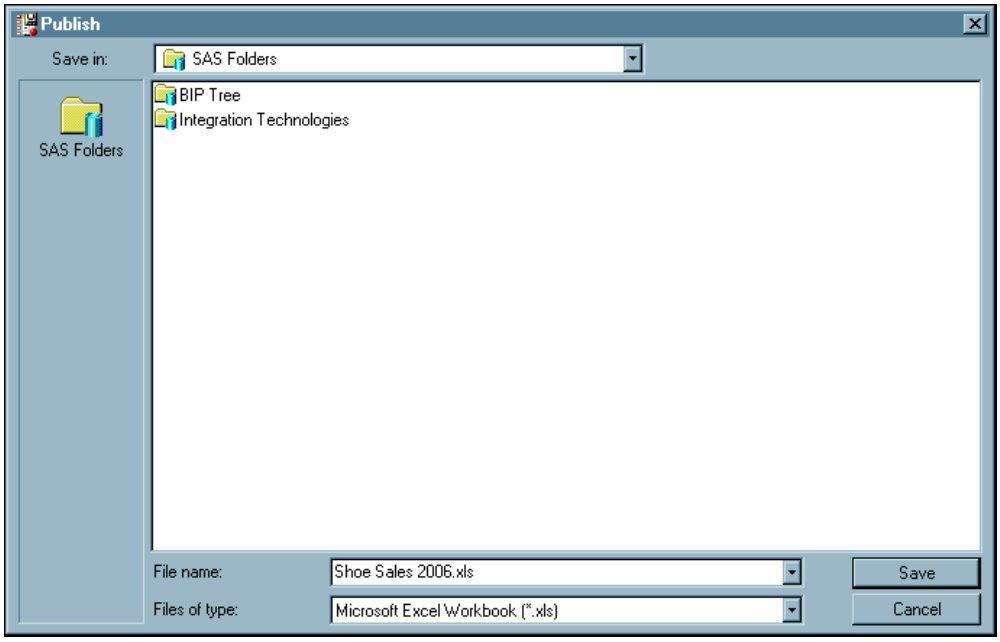
Publish the Sales Workbook

To publish the Shoe Sales 2006 workbook, complete the following steps:

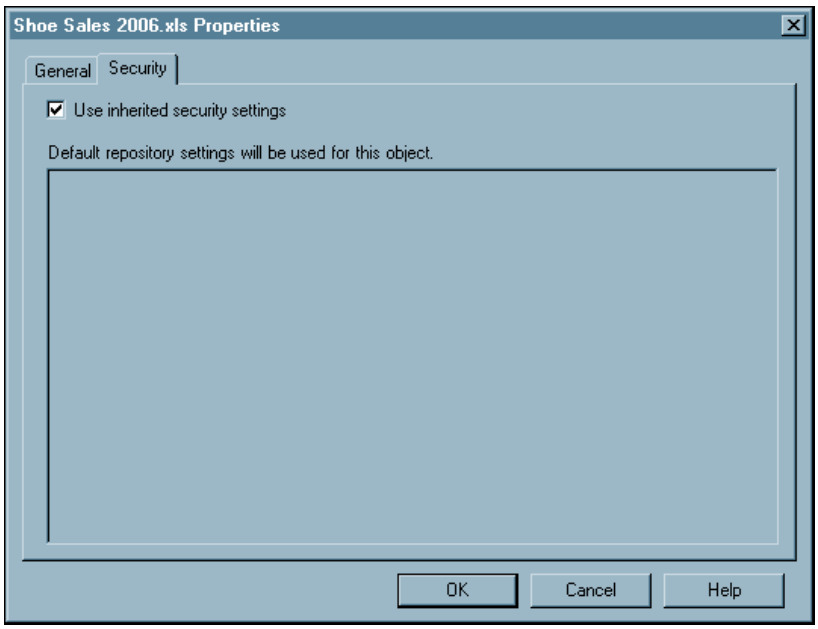
1 Select **SAS ▸ Tools ▸ Publish** from the main menu.

Note: If you have any data sources that cannot be tracked in your document, then the Verify Document for Impact Analysis dialog box opens. Click **OK** to continue. △

The Publish window opens.



2 Select the location where you want to publish your document and click **Save**. The Properties dialog box for the published document opens.



3 On the **Security** tab, specify the security settings for the published document. By default, the **Use inherited security settings** check box is selected and the published document has the same settings as the parent directory.

   For more information about how to set the security settings for a document or folder, click **Help** in this window.

4 Click **OK** to publish the document.

Open the Published Workbook

After a document has been published to a metadata repository, others at your site can view this document.

For example, to open the Shoe Sales 2006 workbook, complete the following steps:

1 Select **SAS** ▸ **Reports**. The Reports window opens.

   Tip: You can also open the Reports window by clicking

in the SAS Data Analysis toolbar.

2 Select **Shoe Sales 2006.xls**.

3 Click **Open**.

Working with Favorites

What Is a Favorite?

If you are going to be accessing a published document frequently, then you might want to add it to your list of favorites. In the SAS Add-In for Microsoft Office, a favorite is a task, stored process, or published document that is saved to the SAS Favorites folder so that you can quickly access it later.

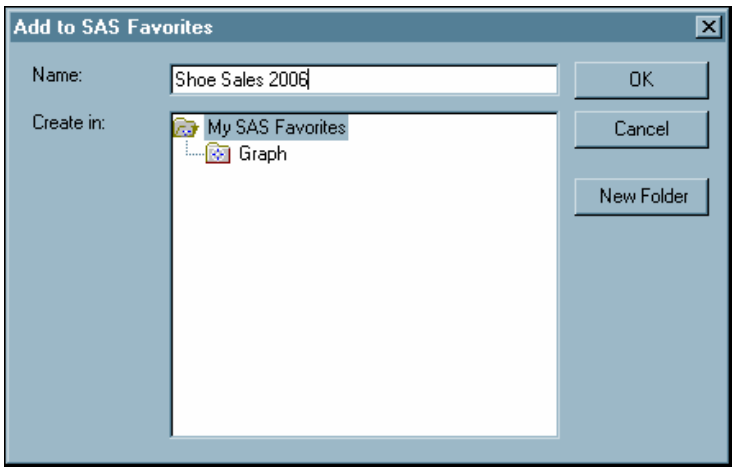
Add a Favorite for the Sales Workbook

To add the Shoe Sales 2006 workbook to your list of favorites, complete these steps:

1 Select **SAS** ▸ **Reports**. The Reports window opens.

2 Select **Shoe Sales 2006.xls**.

3 In the toolbar, click . The Add to SAS Favorites window opens.



4 Select the folder where you want to save this workbook and click **OK**.

Run the Favorite for the Sales Workbook

To open the Shoe Sales 2006 workbook that you added to your list of favorites, select **SAS ▶ SAS Favorites ▶ Shoe Sales 2006**.

Tip: You can also access your favorites by clicking the down arrow next to **SAS Favorites** in the SAS Data Analysis toolbar.

The Shoe Sales 2006 workbook opens in Excel.

Sending Results to Microsoft Word or Microsoft PowerPoint

About Sending Results from Excel

After you performed your initial analysis of the company's 2006 sales data in Excel, your managers asked you to create a short presentation for the yearly sales meeting. This presentation should include the following:

- the total sales for each product
- the average sales, inventory, and returns for each product

From Excel, you can select the results from the Shoe Sales 2006 workbook to send to Word or to PowerPoint. When you select the SAS content to send, the current results for that analysis are automatically displayed in Word or PowerPoint. To make sure that the most up-to-date results are displayed in Word or PowerPoint, you should refresh the analysis after the results are sent to these applications.

Note: You can send only SAS content from Excel to Word or PowerPoint. Any formatting or text changes that you made to the SAS content are not sent. Only the results are re-opened in Word or PowerPoint.

You cannot send a SAS data source or data in an Excel worksheet. Word and PowerPoint are unable to open and read an Excel data source. Additionally, you cannot send a PivotTable report to Word or PowerPoint. △

Send Results from the Sales Workbook to Microsoft PowerPoint

To send SAS content from the Shoe Sales 2006 workbook to Microsoft PowerPoint, complete the following steps:

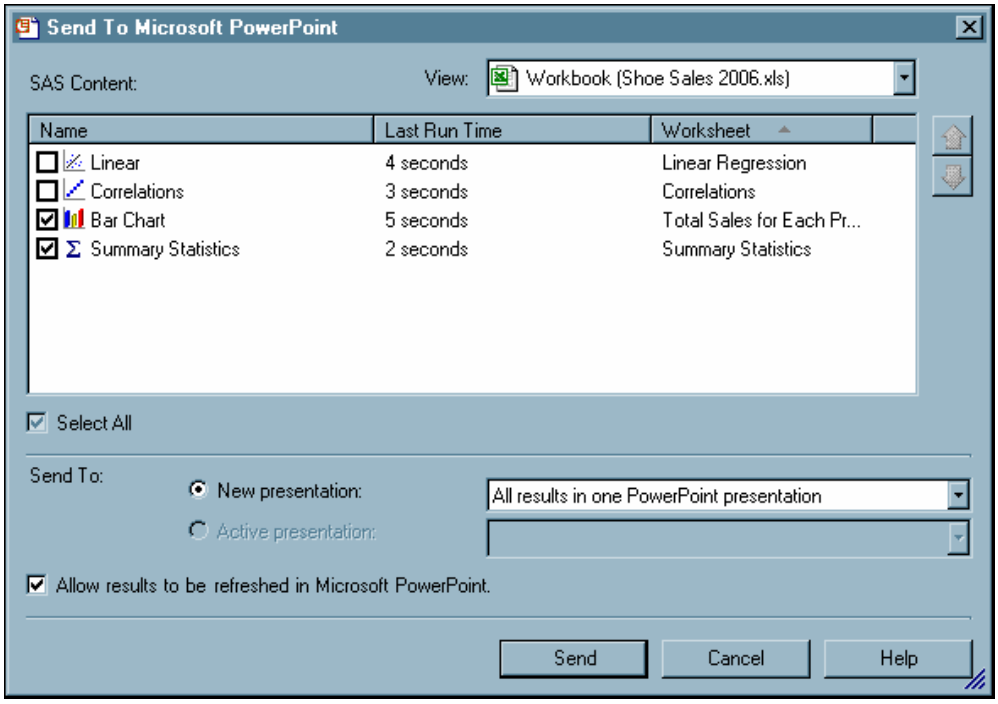
1 Select **SAS ▶ Tools ▶ Send To ▶ Microsoft PowerPoint**. The Send to Microsoft PowerPoint window opens and displays all the analyses in the Shoe Sales 2006 workbook.

   Tip: You can use the **View** drop-down list to the view the analyses for a particular workbook or worksheet. The list of analyses in the **SAS Content** box changes based on the workbook or worksheet that you selected. For each analysis, the estimated time to send this analysis and the worksheet where this analysis is stored is listed. By default, all of the analyses are selected.

2 In the **SAS Content** box, clear the **Linear** and **Correlations** check boxes.

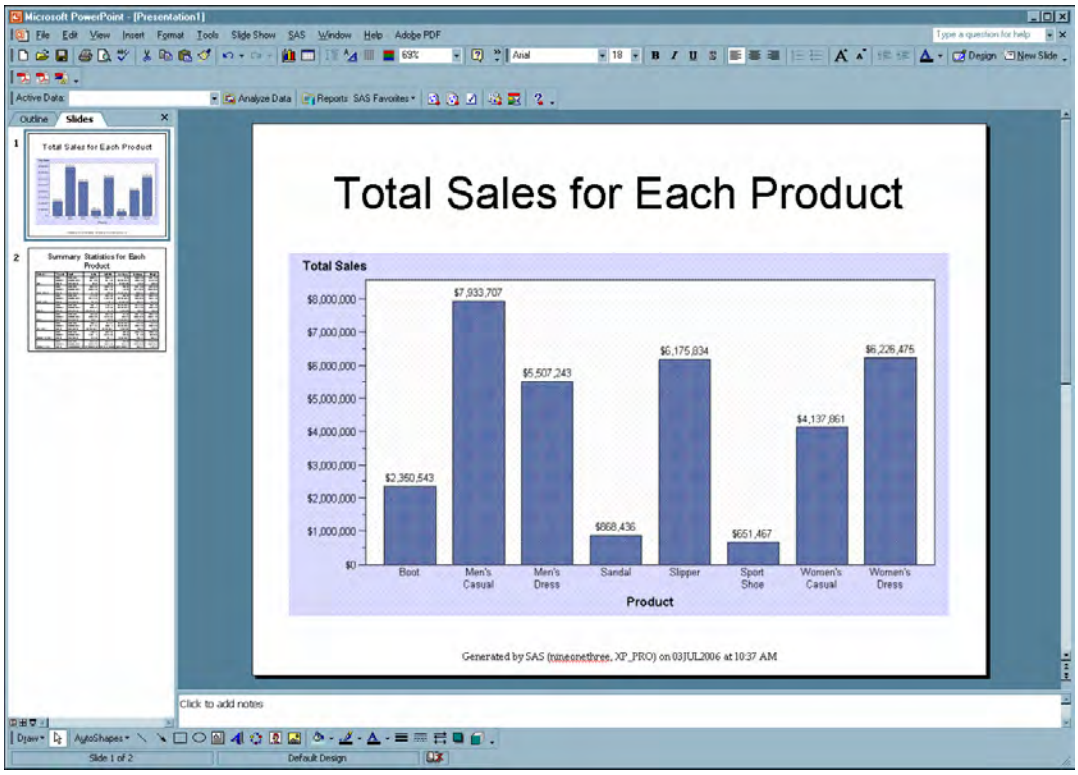
3 Select **Bar Chart** and click . This moves the results from the Bar Chart task up one position.

The Send to Microsoft PowerPoint window should appear similar to the following:



4 Click **Send**.

The current results automatically open in PowerPoint. You can now use the functionality in PowerPoint to customize these slides and create your presentation.

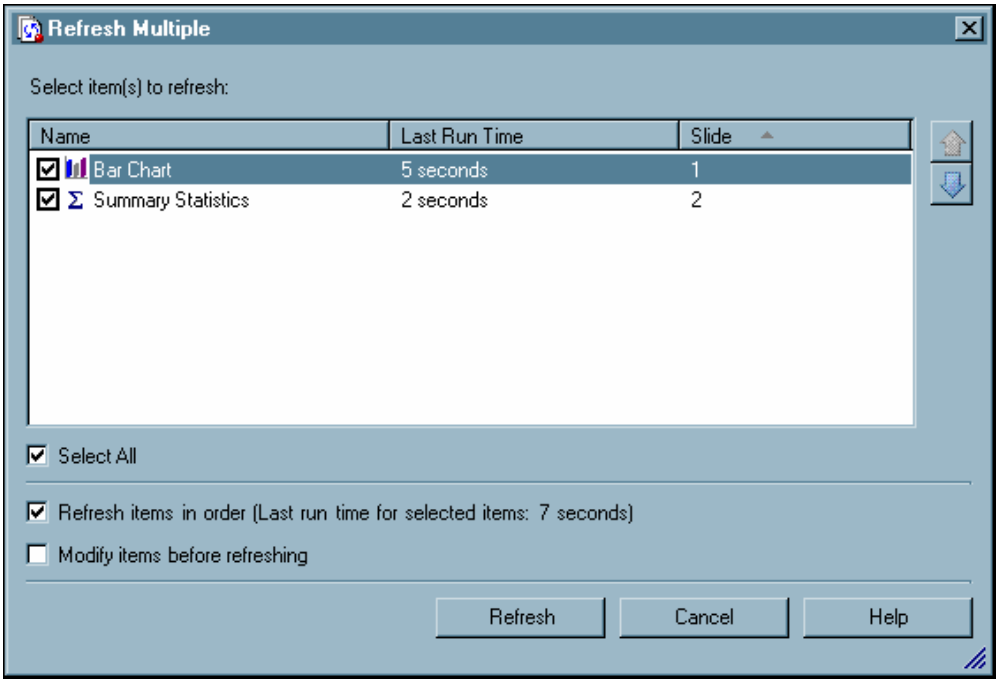


Refresh Your Results in PowerPoint

To make sure that the most up-to-date results are displayed in Word or PowerPoint, you should refresh the analysis after the results are opened in Word or PowerPoint. You also might want to refresh your results if the data source for the analysis has been updated or modified since you last ran the analysis.

To refresh your results in PowerPoint, complete the following steps:

1 Select **SAS ▸ Refresh Multiple**. The Refresh Multiple window opens.



2 Click **`Refresh`**.

The SAS add-in refreshes all of the analyses in your presentation.

Tip: You can also use the Refresh Multiple window to select which analysis to refresh. For each analysis, the estimated time to run this analysis and the slide number of this content is listed. By default, all of the analyses are refreshed.

CHAPTER
7

Recommended Reading

Recommended Reading

Here is the recommended reading list for this title:

- the online Help for the SAS Add-In 2.1 for Microsoft Office
- SAS offers instructor-led training and self-paced e-learning courses to help you get started with the SAS add-in, learn how the SAS add-in works with the other products in the SAS Enterprise Intelligence Platform, and learn how to run stored processes in the SAS add-in. For more information about the courses available, see **support.sas.com/training**.

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Glossary

active data source
an Excel data source or a SAS data source that you specify to run all tasks on. Specifying an active data source enables you to perform multiple analyses on the same data source without having to specify that data source each time you run a task. See also SAS data source, task.

analysis
a statistical calculation that is generated by either a task or a stored process. See also task, stored process.

default metadata server
the metadata server that you will be automatically connected to when you start Microsoft Excel, Microsoft Word, or Microsoft PowerPoint. See also metadata, metadata server.

default server
the SAS server that will automatically be used to execute any tasks that use a Microsoft Excel worksheet or local data as the data source, unless an active data source that exists on a different server has been specified. See also active data source.

execution server
the server where the data is refreshed or the analysis is run.

favorite
in the SAS Add-In for Microsoft Office, a task or stored process that is saved to the My SAS Favorites folder so that you can quickly access it later.

filter
a program or section of a program that processes or forwards only the subset of a data source that meets specific criteria.

impact analysis
a search that enables you to track data sources and stored processes to see where they are used. For example, you can use a tool like SAS Data Integration Studio to determine what Microsoft Office documents are using a particular data source. This helps you to understand what items will be impacted if you delete or rename that data source.

label
text that describes the contents of a column in a Microsoft Excel file or of a variable in a SAS data set.

metadata
a description or definition of data or information.

metadata configuration file
a file that enables users to specify which SAS metadata server they want to connect to by default. The connection to the metadata server enables users to access and run stored processes and to access SAS data sources on remote computers.

metadata repository
a collection of related metadata objects, such as the metadata for a set of tables and columns that are maintained by an application.

metadata server
a server that stores information about servers, users, and stored processes and that provides this information to one or more client applications.

observation
a row in a SAS data set. All of the data values in an observation are associated with a single entity such as a customer or a state. Each observation contains either one data value or a missing-value indicator for each variable.

PivotTable
an interactive table that analyzes and summarizes data in Microsoft Excel. You can rotate the rows and columns in the table to see different views of the data.

published document
a Microsoft Office document that is saved to a central repository. This workbook, document, or presentation can be opened with the appropriate Microsoft Office application.

SAS data source
a data file that contains SAS data. See also active data source.

SAS library
a collection of one or more files that are recognized by SAS and that are referenced and stored as a unit. Each file is a member of the library.

stored process
a SAS program that is stored on a server and which can be executed as requested by client applications. Stored processes are often used to create reports.

task
a program that generates and executes SAS programming code that performs a particular type of statistical analysis on the active data source that you have specified. A wizard prompts you for the information that is required in order to execute the task. See also analysis, active data source.

variable
a column in a SAS data set or in a SAS data view. The data values for each variable describe a single characteristic for all observations.

Your Turn

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