

# 1 THE SCIENTIFIC STUDY OF POLITICS

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## 1.1 OVERVIEW

In this chapter we introduce you to some of the important building blocks of a scientific approach to studying politics. As you can already tell from reading the first chapter of the third edition of *The Fundamentals of Political Science Research* – which we will refer to as “*FPSR*” from here on – data are an important part of what we do both to explore the political world and to test hypotheses based on causal theories. An important part of working with data is learning how to use a statistical software package. In the sections that follow, we introduce you to the SPSS program and some basics that you will need to get up and running. In doing this, we also introduce some general principles of good computing practices for effectively working with data.

## 1.2 “A WORKBOOK? WHY IS THERE A WORKBOOK?”

You might be asking yourself this question, and it’s perfectly fair to do so. Allow us to try to explain how this workbook fits in with the main *FPSR* text.

As you will see in the weeks and months to follow in your class, the main textbook will teach you about the use of statistics in political science, mostly by using equations and examples. So yes, in some ways, it will feel rather math-y. (And we think that’s cool, though we realize that it’s not everyone’s cup of tea.) One of the ways that people learn about the practice of statistics is to use computer software to calculate statistics directly. To that end, many instructors want students to learn to use a particular computer software package so they can begin to conduct statistical analyses themselves.<sup>1</sup> We have discovered through years of teaching that this transition between equations in a book and software output on a computer screen is a very difficult one. The goal of this software companion book is to make this connection stronger, even seamless.

If we are successful, this book will do two things. First, it will teach the nuts and bolts about how to use SPSS. Though many (perhaps most) students today are quite computer-literate, we believe that having a reference guide for students to learn the techniques, or for them to teach themselves out of class time, will be helpful. Second, and more importantly, this software guide will provide explicit hand-holding to you as

<sup>1</sup> This particular software companion book teaches students to use SPSS, but we have also produced parallel books for instructors who wish to have their students learn Stata or R.

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you learn to connect the key principles from the main text to the practical issues of producing and interpreting statistical results.

Each chapter of this software guide works in parallel with that of the main *FPSR* text. So when you learn the equations of two-variable regression analysis in Chapter 9 of the main text, you will learn the details about using SPSS to estimate two-variable regression models in Chapter 9 of this companion book. And so on. In the end, we hope that the very important (but perhaps rather abstract) equations in the text become more meaningful to you as you learn to estimate the statistics yourself, and then learn to interpret them meaningfully and clearly. Those three things – formulae, software, and interpretation – together provide a very solid foundation and basic understanding of social science.

Let's start.

### 1.3 GETTING STARTED WITH SPSS

To get started with SPSS, we recommend that you set yourself up in front of a computer that has the program installed with a copy of *FPSR* close by. You should also have the set of computer files that accompany this text (which you can download from the text's website, [www.cambridge.org/fpsr](http://www.cambridge.org/fpsr)) in a directory on the computer on which you are working. You will get the most out of this workbook by working in SPSS as you read this workbook.

The instructions in this book can help you learn SPSS whether you use a Windows-based PC or a Mac. Once the program is launched, SPSS works identically, no matter which platform you use. Mac users should be aware, though, that our screenshots will come from a Windows-based PC. Some of those screenshots that involve finding and opening files on your computer, therefore, will look somewhat unfamiliar to Mac users, but we assume that Mac users are at least somewhat used to this. Overall, the differences between running SPSS on Windows compared to a Mac are minimal.

Finally, we wrote this book while using version 25 of SPSS. Particularly for the statistical fundamentals you will learn in this book, the differences between versions – at least as old as SPSS 20 – are not severe. In fact, if you use any version of SPSS between 20 and 25, you might not notice the difference between what appears on your screen and what appears in the screenshots contained in this book.

#### 1.3.1 Launching SPSS

When you are sitting in front of a computer on which SPSS has been properly installed, you can launch the program by double-clicking on the SPSS desktop icon (if one exists on your computer) or by finding the SPSS program on your Start menu, likely under "IBM SPSS Statistics." At this point, you should see one large window like that in Figure 1.1.

The large box in the middle of the screen enables you to open recent files that have been used on that computer. Since we assume that you're working on a lab or cluster computer, the simplest way to proceed is to simply close that window, either with the "Close" button in the lower-right corner or the "X" in the upper-right corner.

## 1.3 GETTING STARTED WITH SPSS

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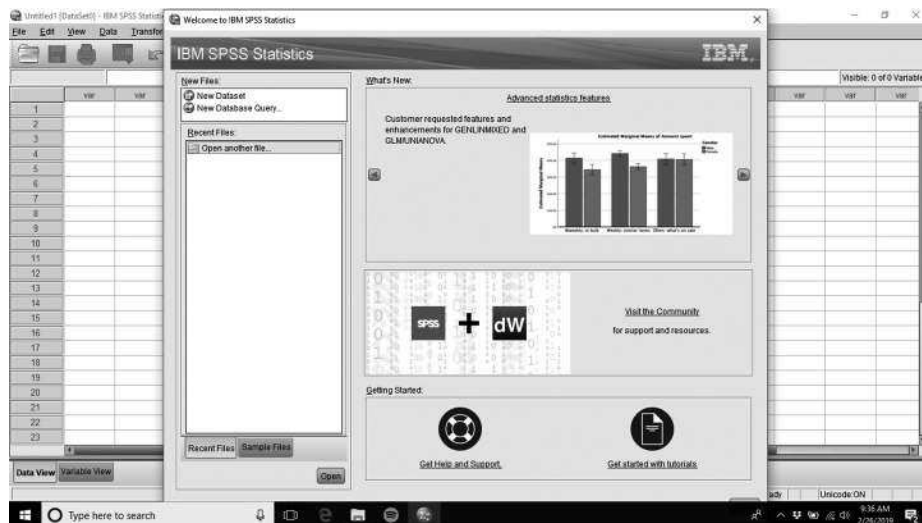


Figure 1.1 SPSS initial launch with recent files window

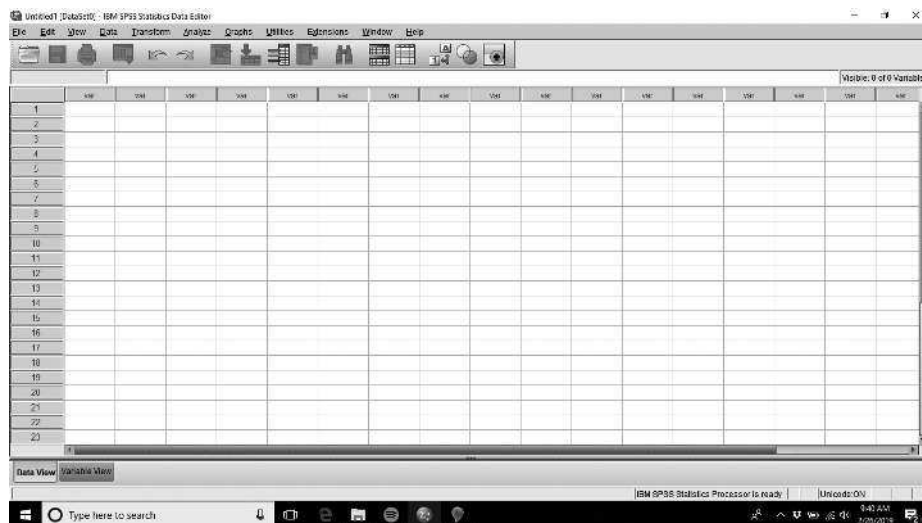


Figure 1.2 SPSS initial launch after closing recent files window

When you do that, you should see something very similar to what appears in Figure 1.2. It looks more or less like an empty spreadsheet, right? Some of the menu items (like “File” and “Edit”) will look quite familiar, but others (“Transform,” “Analyze,” for example) will presumably be new to you. In addition, beneath the menu items, the row of icons will mostly appear unfamiliar – except, perhaps, the far-left icon that looks like an opening manila folder. If you are seeing all of this, you are ready to go.

The part of the screen that looks like an empty spreadsheet is meaningful, especially the “empty” part. As you might guess, that’s where the data that we will be analyzing will appear. As you also might guess, we haven’t loaded any data into SPSS yet, hence the “empty.” We’ll get there soon enough.

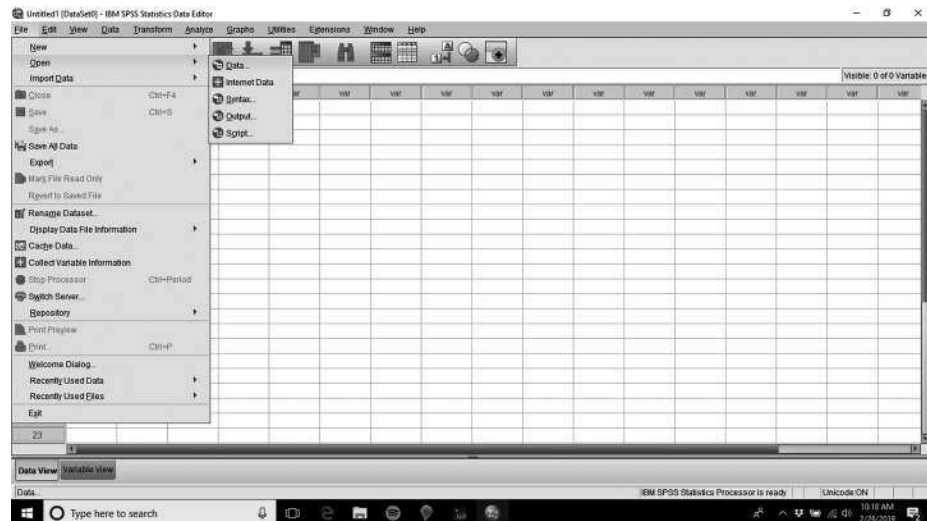


Figure 1.3 Opening a file with pull-down menu for “File,” “Open,” and “Data” selected

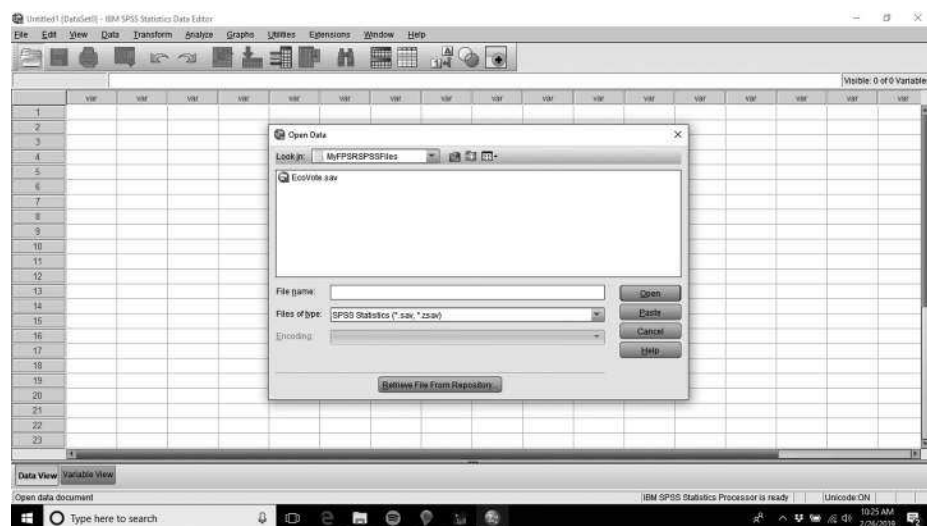
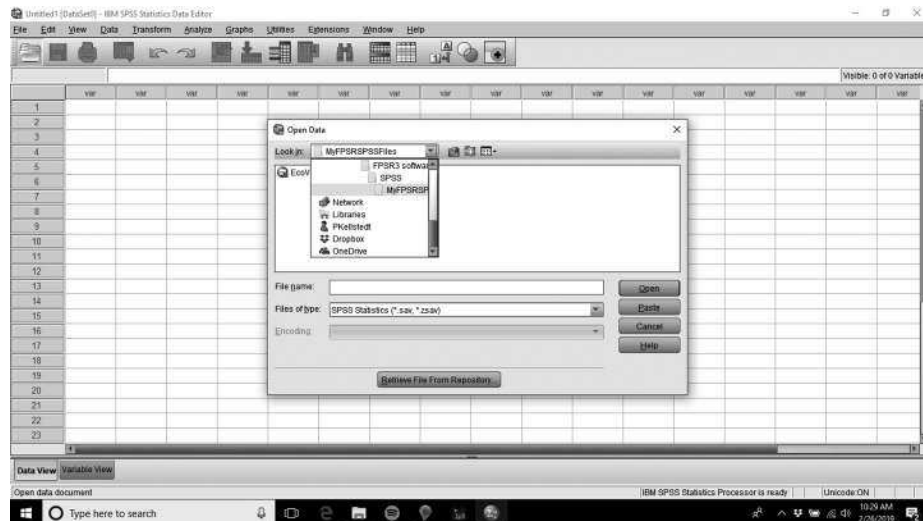


Figure 1.4 Pop-up menu for opening a file in SPSS

### 1.3.2 Getting SPSS to Do Things by Using Pull-Down Menus

We will accomplish the vast majority of the tasks in SPSS by using the pull-down menus you see across the top of Figure 1.2. In our first foray into the program, we are simply going to open a data set. This means that we need to start either by clicking on the textual heading “File,” then “Open,” and then “Data.” In Figure 1.3, we show what this will look like. Alternatively, you can just click on the icon that looks like a folder being opened, right below “File.” Either way, you’ll see a pop-up box open up that looks like what we see in Figure 1.4.



**Figure 1.5** Navigating directory paths in SPSS to open a file

Once you have done this, you will need to direct SPSS to the location on your computer where you have placed the *FPSR* SPSS companion files. (As we noted above, these can be downloaded from [www.cambridge.org/fpsr](http://www.cambridge.org/fpsr).) Throughout this workbook, on the computer on which this workbook was created, these files are located in the directory “C:\MyFPSRSPSSFiles.” To navigate to that folder, we use the pull-down menu as in Figure 1.5, and then change the drive and directory as necessary until we find the correct location where the data set is stored.

The initial data set that we wish to open is named “EcoVote.sav,” so once we see that file, as you can in Figure 1.4, we click on “EcoVote.sav” and then click the “Open” button. The “.sav” portion of the file name denotes that the file is in the format of an SPSS data set.<sup>2</sup>

You may have noticed that, when you opened the data set, SPSS launched an additional window. This is an important part of how SPSS works. When you execute a command in SPSS, it appears in what we will call the “output window.” You can toggle back and forth between the main window and the output window by hovering over the SPSS icon in your task tray in Windows. Figure 1.6 shows the main window of SPSS with the output window layered on top of it. Every command you run in SPSS will generate some type of output, and all of that output will be shown in that output window. You will be able to edit the output – we’ll show you how to do that eventually. This happens frequently, actually, even with experienced data analysts, because we often

<sup>2</sup> Like most software programs, SPSS can import data sets that are created with other types of software. To do that, you would click “File,” “Import data,” and then choose the format that you’re trying to import and follow along as pop-up boxes open. If you want to continue to use imported files in SPSS, you might wish, once a file is imported, to “Save As” an SPSS .sav file. (“Save As” is also under the “File” menu.)

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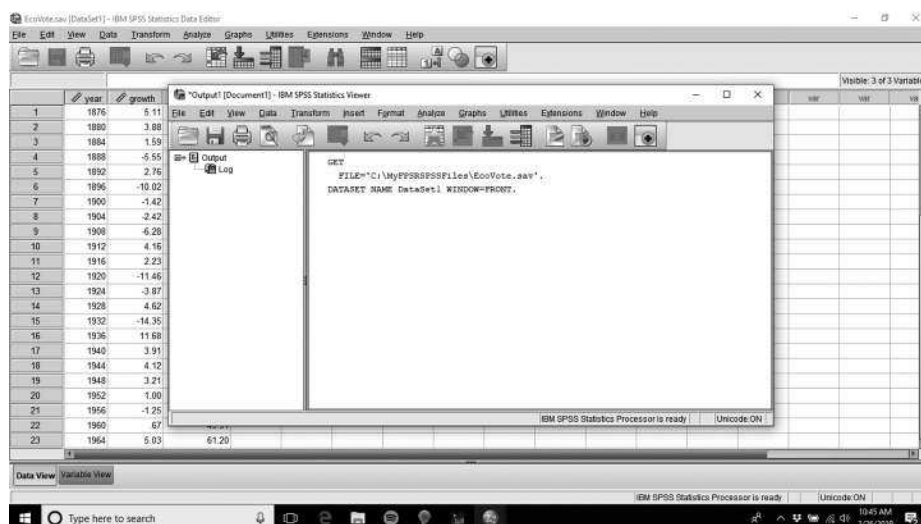


Figure 1.6 Opening a data set and launching the output window

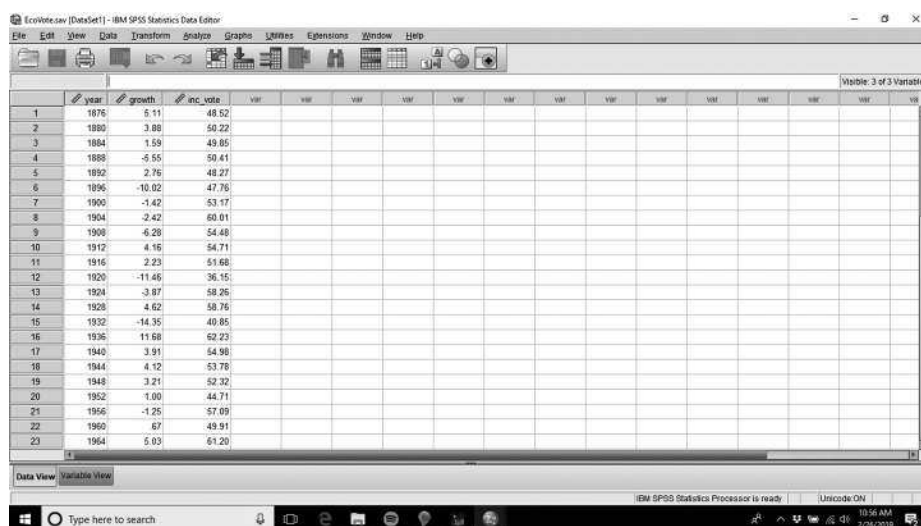


Figure 1.7 Main window view of the “EcoVote.sav” data set

run some type of data analysis and then realize we wished we had done something else. Saving or printing the results of the output window is also easy, and we’ll show you how to do that, too.

For the moment, let’s simply minimize the output window by just clicking on the “\_” (minimize) portion of the output window near the top-right. That will leave us with the main SPSS window where we will eventually do our analysis. That view is displayed in Figure 1.7.

Case #	year	growth	inc_vote
20	1876	1.00	44.71
21	1880	-1.25	57.09
22	1884	.87	49.91
23	1888	5.03	61.20
24	1892	5.05	49.42
25	1896	5.83	61.79
26	1900	3.82	48.95
27	1904	-3.58	48.84
28	1908	5.55	59.12
29	1912	2.40	53.83
30	1916	3.04	46.38
31	1920	3.32	54.74
32	1924	2.83	50.26
33	1928	2.09	51.23
34	1932	-1.79	46.31
35	1936	1.42	52.01
36	2016	.97	51.11

Figure 1.8 Scrolling down to the bottom of the “EcoVote.sav” data set

### 1.3.3 Initially Examining Data in SPSS

Now that we have shown you how to get data into SPSS, we want you to take a look at the data that you have loaded into the program.<sup>3</sup> These data are from a famous study of economic voting conducted by Ray Fair (Fair 1978). They contain values of economic growth and incumbent party vote from US presidential elections between 1876 and 2016.

In Figure 1.7, you will see data in three columns, labeled from left to right as “year,” “growth,” and “inc\_vote.” Those labels correspond to the names of the three variables in our data set. Down the rows, you will see the cases of the three variables. For example, in row 10 of the data window, which is the tenth case in the data set, we see the following values for the three variables. “Year” takes on the value of “1912,” “growth” has the value of “4.16,” and “inc\_vote” has the value 54.71. From the discussion in Chapter 1 of *FPSR*, can you guess what these three variables represent, and what the corresponding values mean?

You can use the bars at the right and at the bottom of the data set to scroll through it. As you already know, this data set has only three variables, so there is no need to scroll to the right to see any other variables. However, you can use the bar at the right of the screen to scroll down, as we do in Figure 1.8. There, you’ll notice that the last of our cases is for the year 2016, with a value for “growth” of 0.97 and a value for “inc\_vote” of 51.11. You can see that the bottom row of our data set is row 36, which means that our data set of US presidential elections consists of 36 cases.

<sup>3</sup> We discuss how to manually enter your own data into an SPSS file in a webpage, available at [www.cambridge.org/fpsr](http://www.cambridge.org/fpsr).

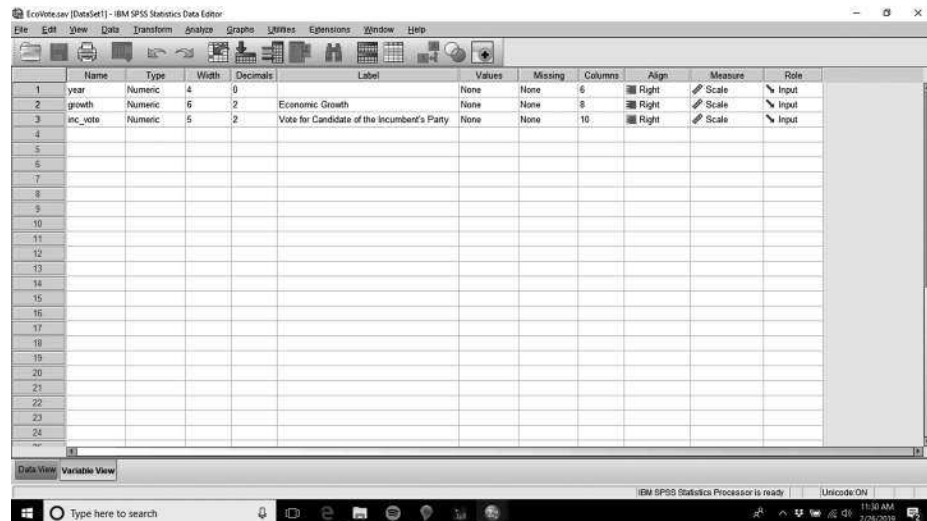
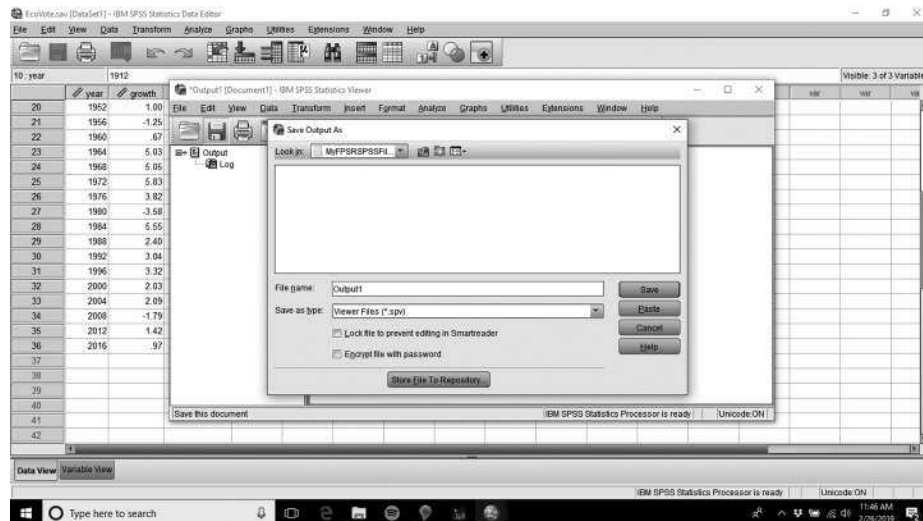


Figure 1.9 The “Variable View” feature in SPSS

In the lower-left portion of Figure 1.8, you will notice that there are two tabs – on the left, in a peach-like color, is “Data View” (the view that is currently active, as you might guess, because you’re viewing the data), and on the right, in light blue, is “Variable View.” Click on the “Variable View” tab. You will notice a few things, including that the colors have reversed themselves, with the “Data View” now in light blue, and the “Variable View” in peach. More importantly, we are no longer looking at the columns of data, but instead at the description of the variables in the data set. It should look like Figure 1.9.

Several things are worth mentioning. First, the variable names that were formerly across the top in columns under the “Data View” are now down the left in rows in “Variable View.” And there are details about what each of those variables means. In particular, notice the “Label,” “Values,” and “Missing” columns. The “Label,” as you might guess, is the label of the variable. The variable “year” does not even have a label (it is fairly self-explanatory). The labels for “growth” and “inc\_vote,” respectively, are “Economic Growth” and “Vote for Candidate of the Incumbent’s Party.” So we no longer have to guess what the variables mean. The labels tell us. Also, under “Values” and “Missing,” you will note that all of the cells say “None.” The “Values” option will be useful later on, and we will refer to it frequently in this book. There are no labels for the values here, because for all three variables, the values speak for themselves. If, for any of the cases, we could not obtain data for any reason for the values of a variable, we would need a category for that to let SPSS know that the value is missing. Typically, researchers use a value like “–9999” to denote a missing case. If any of our variables had missing cases, and the “Missing” cell for that variable read “–9999,” then SPSS





**Figure 1.10** How to save your output in SPSS

would know to conduct whatever analysis using that variable without making reference to that particular case. Again, these features will come into play in subsequent chapters with other data sets.

### 1.3.4 Saving Output and Exiting the Program

To save the results of our output window, from Figure 1.6, we can just click on the icon that looks like an old-style floppy disk, or click on “File,” followed by “Save.” One thing to note is that SPSS will not default to saving your output in the same place where the data are stored, so use the pull-down menu as above to find the correct drive and directory where you want your output saved. Your screen should look similar to Figure 1.10.

Another caution: SPSS defaults to saving its output as an “SPSS Viewer File,” which means you can only see it on a computer that has an SPSS license on it. So if you were to save your output from a lab onto a memory stick or a folder in the Cloud, you would only be able to view the output if you were on another computer with an SPSS license. As a result, we recommend using the pull-down menu next to the “Save as type” option, and saving files as .html files (what SPSS will call an “SPSS Web Report”). That detail is displayed in Figure 1.11.

You can exit SPSS by clicking the “X” in the top-right of the program, and it will prompt you to see if you’re sure you want to exit, and if any file changes need to be saved.

You are now ready to proceed to the end-of-chapter exercises.

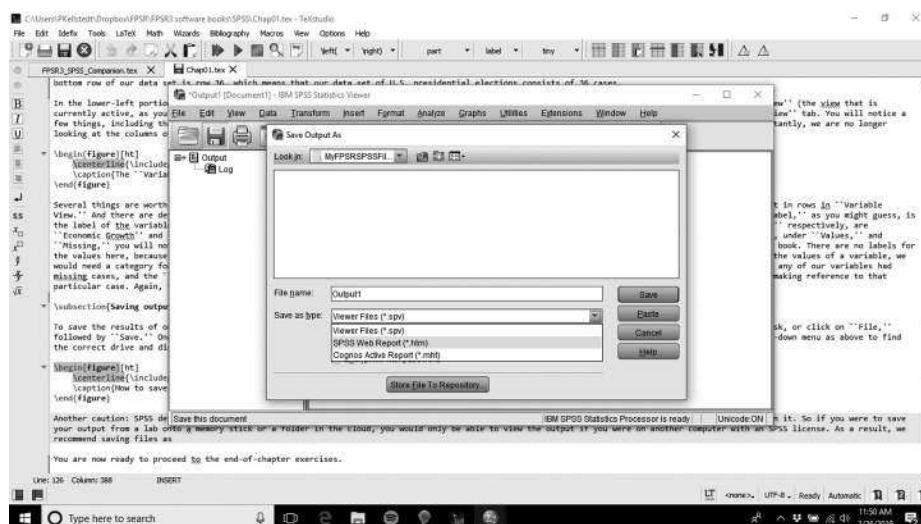


Figure 1.11 How to save your output in SPSS as an .html file

## 1.4 EXERCISES

1. Go through all of the steps described above. Once you have the “Data View” open (so that your computer looks like Figure 1.7), do the following:
  - (a) Look at the values in the column labeled “growth.” This is Fair’s measure of percentage change in real GDP per capita. Do the following:
    - i. Identify the year with the highest value for this variable.
    - ii. Identify the year with the lowest value for this variable.
    - iii. What does it mean if this variable goes up by 1?
  - (b) Look at the values in the column labeled “inc\_vote.” This is Fair’s measure of the percentage of major party votes cast for the party of the president at the time of the election. Now do the following:
    - i. Identify the year with the highest value for this variable.
    - ii. Identify the year with the lowest value for this variable.
    - iii. What does it mean if this variable goes up by 1?