Federal Budget Exercise

Use Excel file called "FederalBudget"

The questions you need to answer are in bold and are numbered

Historical federal budget data is readily available in summarized form from the U.S. Office of Management and Budget's web site, http://www.whitehouse.gov/omb/budget/Historicals/

You can also download a detailed version of the current budget (one file for outlays and one for receipts) here: http://www.whitehouse.gov/omb/budget/Supplemental/

The are a variety of summarized versions with historical data, including one we'll work with here called "Outlays by Function and Subfunction." This particular one (downloaded in Feb. 2010) has data from 1962 to 2009 and projections for 2010 through 2015.

Worksheets in the Excel file:

Original — shows how the data looked when first downloaded from this site.

Summary_allyrs — has just the function categories (national defense, international affairs, etc) and includes all years.

Summary_current — has the function categories for 2000 through 2010

Pop estimates — National population figures from the U.S. Census Bureau to use for adjusting the data into per capita figures. Data for 2000 through 2009 are from the Census Bureau's estimates program. The 2010 figure is from their projections program.

Simple Exercise — Has the function categories for just three years. This is a good beginner exercise.

CPI — Consumer Price Index figures for 2000 through 2010

NOTE: The data are displayed in millions of dollars. So if it says "17,425" that means just over $17 BILLION.

BEGINNER EXERCISE:

Use the worksheet called "simple exercise." This worksheet contains budget outlays (or expenditures) by various categories that the federal government refers to as "functions." These functions can cross departments, but they are probably the breakdowns that the general public would most care about. Note that this spreadsheet doesn't include the category "undistributed offsetting receipts" that shows up in the original data. Our analysis here is going to focus solely on what's being spent. The offsetting receipts would be used to balance the budget.

1. Calculate the total outlays for each of the three years, and show the answers here. Hint: don't forget the data is in millions, so be sure to express it correctly here. (include your formula with your answer)

2. Which function had the greatest increase in spending across the three years, in terms of total dollars? (include your formula with your answer)

3. Which function had the greatest percentage change across the three years? (include your formula with your answer)

4. Which function makes up the greatest proportion of the overall federal spending in 2009? (include your formula with your answer)

5. What was the average spent _each_ year? Hint: you will need three numbers for your answer. (include your formula with your answer)

INTERMEDIATE EXERCISE:
   This section will take our analysis a step further and adjust the spending for population growth, so we can look at per person spending. This evens the playing field and reflects that, although spending may have increased, the number of people has also increased. By calculating per person spending, we'll get a clearer picture of how spending is predicted to change and see more clearly how government spending affects the average American.

   Use the worksheet called **"summary_current."** We're also going to refer to the data in the worksheet called "Pop estimates." These population estimates are also in millions of dollars and have been rounded. So for example, the estimate for 2009 is 307 million people.

   To get our feet wet, let's start with something simple.
   First we need to calculate the total spent for each year. So in Row 22 (leave a blank row between the data and this new spot where we're going to put the totals) and calculate the total spending for each year.

   The formula would look like this for the first column. Then copy that across to all the other years.
   =sum(b3:b20)

   Let's adjust the TOTAL line into per-person spending.

   So in row 23 add a new row label called "Per Person Totals" and go to cell B23 and we'll adjust each of the totals (for years 2000 to 2010) for population. To do this, we'd take the total and divide it by the population for the corresponding year.

   Even though our population data is in a separate worksheet, we can still use it in a formula in our "summary_current" worksheet. Notice that the pop estimates worksheet is set up to follow the same pattern as the data in our budget worksheet — each year is going across the columns. Setting it up this way allows us to take advantage of Excel's copy across/down feature so that it will automatically adjust our formula as it moves across the years.

   So go back to "summary_current" and click on cell B23 and let's put in this formula:
   =b22/'Pop estimates'!B4

   Notice that it has the name of the worksheet in quotes, then an exclamation mark and then the cell reference from Pop Estimates that we want to use (this is where the 2000 estimate is stored)

   Now click on B23 and get the copy tool and copy the formula across all the years. Check the work to make sure it's doing the math properly. You should find that it is getting the correct population estimate from the other worksheet. Yeah!

   So this shows us that in 2000, federal spending was about $6,495 per person. In 2010 the projection is for $12,199.

PER PERSON BY FUNCTION:

   Now you can move on and calculate each of the function figures into per-person amounts. I'd recommend setting this up either in a separate section of the "summary_current" worksheet (such as below the existing data) or in an entirely new worksheet. Either way, start by copying the function names into the new area and then copy the years so you have header rows. Leave all the cells for the "data" empty and you can populate the same way we did the totals.

   I'm going to put my new chunk of data below my existing data. The headers are in row 25 and the function names are in the A column.

   So in cell B26 (under the 2000 header) I'm going to start my formula to calculate the per-person amounts. Remember last time we just compared one row of totals to one row of population figures. Now we need to compare multiple rows of function figures to ONE row of population. That means we need to use an anchor to hold our formula on the correct population figure. In Excel, the anchor symbol is the dollar sign.

   Here's how anchors work:

If you put the dollar sign in front of the letter for the cell address, then it will stay on the same column, but it will allow it to move down the rows (as you copy your formula). Example: $B2. If you copy this down to the next row the formula will change to $B3. But if you copy across to another column, it will stay on $B2.

If you put the dollar sign in front of the number for the cell address (and not in front of the letter), it will stay on the same row, but would allow it to move across columns. Example: B$2. If you copy this down to the next row, the formula will stay on B$2. If you copy across to another column, it will switch to C$2.

If you put the dollar sign in both places — in front of both the number and the letter — it will hold the formula on that one cell and won't allow it to adjust at all.

In our data, I want the 2000 population figure (which is in B4 in the Pop Estimates worksheet) to apply to all the functions in column B. But then I want my formula to adjust to C4 when I copy across to the 2001 data. To get it to do this — and only have to type the formula once — you can put the anchor in front of the row number only. This will still allow it to adjust to the different years.

So in cell B26, here's our formula:
B3/ 'Pop estimates'!B$4

Note: the single quote marks around "Pop estimates" are necessary because the name of our worksheet has a space in it.

Copy this down through all the functions. And copy across for all the years. Check that it did the math properly.

If it's displaying a lot of decimal points, highlight all the data cells and go to Format Cells to reduce the number of decimal points. This will make it easier to understand. If you haven't already done so, you can also go to Format Cells to convert this to currency (so that it displays a dollar sign and the commas)

Now with the new per person figures, we can calculate a new percentage change and see which functions had the greatest increases or decreases.

BEWARE: If you plan to sort this new chunk of data, you should first do a Copy-Paste Special to get rid of the formulas. Highlight all of the data and do a Ctrl-C to copy and then right-mouse click and choose "Paste Special." In the box that pops up, choose the radio button called "Values." And say ok. This will paste the data back in the same location, but the formulas will be gone. If you don't do this, your formulas will automatically readjust and will grab the wrong information from the original table.

6. What do the new percentage change figures show? Answer as if you are characterizing it for a story. Try to look beyond the outliers and look for overall patterns in all the categories.

ADVANCED EXERCISE:
This section will adjust the per-person spending for inflation. This also helps to make the comparison fairer. Ultimately you will compare two columns of numbers that have been adjusted BOTH for population growth and for inflation, using the Consumer Price Index.

The Consumer Price Index (CPI) is a statistical measure of change, over time, of the prices of goods and services in major expenditure groups—such as food, housing, apparel, transportation, and medical care— typically purchased by urban consumers. Essentially, it compares the cost of a sample "market basket" of goods and services in a specific month relative to the cost of the same "market basket" in an earlier reference period. This reference period is designated as the base period.

The consumer price index figures for 2000 to 2010 are in a separate worksheet called "CPI". These data came from the Bureau of Labor Statistics and these represent the "All Urban Consumers-Current Series" data, which is the primary index that researchers use. The data comes with a figure for each month of the year, and an annual average. We're going to use the annual average.

You'll see that our data is currently in one column, with each row representing a year. Remember how slick it was with the population data that it went across the columns — just like our budget data?

So let's change this so it works better for us. We can flip it around using **Paste Special and the Transpose option.**

Start by highlighting the years in column A. Do a Ctrl-C to copy. Then click in C3 and right-mouse click and choose Paste Special. When the little box comes up, click the Transpose checkbox in the lower right corner.

Now do the same with your data, except this time paste it starting in cell C4 (next to where the data starts). Now you can delete columns A and B cause you don't need them anymore.

How to adjust for inflation:
We want to adjust all of the budget figures into CURRENT DOLLARS. Doing this will take away the effect of inflation and any percentage change we see can be attributed to something other than inflation.

If we adjust the per person figures we created in the intermediate exercise, we can get an even better result since we can also say that any increases are not the result of an increasing population, either.

To do the work, I'm going to create another section for new data — just like we did above. I'm going to put a new set of a header row (with the years) in Row 46 and a new set of the function names in column A below that.

The formula for adjusting to current dollars is to DIVIDE the current CPI (in this case 2010) by the CPI for the earlier year --- this gets us a ratio of prices — and then we multiply that by the dollar figure you want to adjust.

(CPI NOW/CPI THEN)*old budget figure

I'm going to leave my CPI figures in a separate worksheet, however you could paste them into your current worksheet (perhaps just above your new table) to make things easier.

To get started, put your cursor in cell B47 (the first blank data cell in your new table area) and put in this formula:
=(CPI!K4/CPI!A$4)*B26

Notice: We're using anchors a bit differently. The first cell reference is for the 2010 CPI number. We want to ALWAYS use that number, even when we're adjusting the 2001, 2002, 2003, etc. figures, so we are using 2 anchors to hold it on that exact cell. But the second cell reference refers to the 2000 CPI. We want this to change as we move across our data, so we are using just one anchor to hold the row steady.

The B26 refers to the first piece of data in our per-person people table above. We don't need an anchor on this one since we want the formula to adjust to the different budget figures as we copy down and across.

Copy the formula down the functions and across all the columns. Make sure it worked by spot checking that it referred back to the correct columns. You may also want to reduce the number of decimals being displayed by going to Format Cells. And make sure to do a Paste Special-Values before you do any sorting.

When you get to the 2010 column, you'll notice that it simply gives you the same figures you had above. That's OK.

7. Now you can calculate the percentage change for this new set of data. What does it show? Answer as if you are characterizing it for a story. Try to look beyond the outliers and look for overall patterns in all the categories. Remember that any change you see is over the rate of inflation.

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