**Introduction:**

PivotMaker2 is a tool for visual exploration of table outputs from OpenM++ or Modgen models. PivotMaker2 creates an Excel workbook containing a pivot table and a pivot chart for each output table, within a hyperlink navigation scheme. It uses functionality in Excel to visualize multi-dimensional data. For a simple example from the RiskPaths model, see the Excel workbook Default(tbl).pmk2.xlsx located in the same folder as this document.  
  
PivotMaker2 requires that Excel be installed, and sufficient permission to save an user-specific add-in (the steps are below).

Working from an Excel workbook previously exported from an OpenM++/Modgen model, PivotMaker2 creates a new workbook which contains, for each exported table, a formatted Excel pivot table (with comma thousands separators, an appropriate number of decimals, etc.) and a linked Excel pivot chart. The new workbook contains a Table of Contents sheet with basic information on the scenario and links to the tables and charts in the workbook. Each table and chart sheet contains navigation buttons to switch between table and chart, to navigate forward or backward among the model output tables, and a link to return to the Table of Contents sheet. Each pivot table can be manipulated in Excel to permute and select the dimensions to display, and to select or hide individual values of categorical variables. The linked pivot chart changes correspondingly. Once the pivot tables in the workbook have been customized for a model, the workbook can be saved and re-used for other scenarios exported by the model.

The installation section below describes the steps to make PivotMaker2 available from within Excel. This is followed by a section describing how to export tables from the model for PivotMaker2, how to create a new workbook using PivotMaker2, and how to make an existing workbook use a different scenario.

**Installation:**

The following instructions describe how to install the PivotMaker2 add-in in Excel 2016, and how to create a button to invoke PivotMaker2 on the Excel ribbon. Steps for earlier versions of Excel are similar.

1. Open PivotMaker2.xlsm from a local hard drive on your system. If a yellow security warning bar appears, click the button Enable Content.
2. Do File > Save As, then double-click “This PC”. The Save As dialog should appear. In the drop-down “Save as type” select “Excel Add-In (\*.xlam)” from the drop-down. Excel will save the file as a new add-in named PivotMaker2.xlam in the user-specific add-in folder on your workstation, which is a location like C:\Users\Steve\AppData\Roaming\Microsoft\AddIns (but you probably don’t need to know that).
3. Close PivotMaker2.xlsm.
4. In Excel, click File > Options > Add-ins. At the bottom of the screen in the “Manage:” drop-down, select “Excel Add-ins” and click “Go…”
5. Check the check-box for PivotMaker2, and click OK.
6. In Excel, click File > Options > Customize Ribbon, and add an icon for the macro PivotMaker2 where you want in the ribbon. To create it in the Developer ribbon, follow these steps:  
   In the right pane “Customize the Ribbon”  
   - Check the box next to “Developer” in the right pane, if it is not already checked.  
   - Click the “Developer” ribbon in the right pane  
   - Click the “New Group” button  
   - Click “Rename” to change the name of the new group to “PivotMaker2”, and associate an icon with the group.  
   - In the left pane drop-down “Choose commands from:”, select “Macros”  
   - Click “AAA\_PivotMaker2” at the top of the list.   
   - Click the button “Add>>”  
   - Click “Rename” to change the command name from “AAA\_PivotMaker2” to “PivotMaker2”.  
   - Click “OK”

**Use:**

* + - 1. To use, you must first export tables from a model run into Excel in a specific way.  
           
         OpenM++: At the time of writing, export to Excel from an OpenM++ model is most easily done using the User Macros property sheet from within Visual Studio. Set RUN\_SCENARIO to 1, set the EXPORT\_EXCEL macro to 1, and (optionally) set EXPORT\_EXCEL\_LANG to either EN or FR to control the language used in the exported Excel workbook. With these settings, building the project in Visual Studio will run the model and export all output tables. Optionally, setting the EXPORT\_EXCEL\_LAUNCH will open the exported workbook in Excel. For more information on building and running OpenM++ models in Visual Studio, please see the OpenM++ wiki.  
           
         Modgen: From a Modgen model with the desired scenario open, pick Scenario > Export. Select "MS Excel" and click OK. Optionally, select the tables you wish exported. Ensure that "Pivot table format" is selected. Leaving "sparse" unchecked will result in pivot tables whose categories are ordered correctly, but it may result in larger and slower workbooks.
      2. Open the Excel workbook exported from Excel. With that workbook selected, click the PivotMaker2 button you added to Excel during installation. PivotMaker2 will create a new workbook and prompt you for a location to save it. PivotMaker2 will suggest a new name by appending “pmk2” to the name of the original workbook, e.g. Default(tbl)**pmk2**.xls.
      3. For Modgen models only, If additional statistics or replicates were selected when exporting, (e.g. CV, replicate 0, etc.), PivotMaker2 will create a separate workbook for each additional statistic, appending the name of the statistic to the file name, e.g. Base(tbl)pmk2\_CV.xlsx. The name of the statistic will also be noted in the titles of all charts and tables, e.g. ‘Basic Demography (Base, Rep1)’.
      4. You can re-run the model scenario and view the new results without losing the customization you applied to the pivot tables and charts. To do so, repeat step 1 above to export tables with new values, being sure to include the same tables and statistics as originally requested (Modgen will remember your previous selections when you export). Next, re-open the previously created PivotMaker2 workbook, e.g. Default(tbl)pmk2.xls. Then, from the Data ribbon, click “Refresh All”. The date of the new model run will be noted at the top of the Contents sheet.
      5. If you attempt to use a PivotMaker workbook created on a different workstation, you must tell Excel the correct location of the PivotTable add-in. To do that, open the workbook, click “Edit Links” from the Data ribbon, select the Source PivotMaker2.xlam, click “Change Source…”, and navigate to the location where you installed the PivotMaker2 add-in on the current machine, typically something like C:\Users\Steve\AppData\Roaming\Microsoft\Addins\PivotMaker2.xlam.
      6. You can also ‘redirect’ a previously customized workbook created by PivotMaker2 to use tables exported from a different scenario. To do so, open the previously created and customized PivotMaker2 workbook, and click the PivotMaker2 button. PivotMaker2 will open a dialog to navigate and select the Excel workbook exported from a different scenario. The name of the new scenario will appear in the title of all tables and charts. To avoid confusion, it’s probably a good idea to rename the Excel workbook to reflect the name of the marching scenario.
      7. Excel Pivot tables allow you to select the order of dimensions (page, row, column) by dragging the buttons labelled with the dimension names to where you want them.
      8. Excel Pivot tables allow you to display or hide selected values of a categorical dimension. This feature can be quite useful, in particular to eliminate the "All" category of a Modgen table if the value dwarfs the other values due to its magnitude.
      9. Excel Pivot charts allow you to drag the dimensions around on the chart just as for the pivot table.

**Revision History:**

**Version 2.1.2: 2016-02-06**

1. Some minor fixes. Revision of the documentation (this file).

**Version 2.1.1: 2014-01-19**

1. Force Excel to save a copy of the data for every pivot table in the workbook, to make it portable.

**Version 2.1.0: 2013-10-01**

1. Can now change data sources. See Item 6 in “Use” section above.

**Version 2.0.0: 2013-06-03**

1. Initial version. PivotMaker2 is a re-implementation (with improvements) of an experimental Excel add-in named PivotMaker which was developed at Statistics Canada in 2003.