TranSight v4.2

User's Guide

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I. Introduction

This user's guide is intended to serve as a broad overview of the software interface of TranSight version 4.2. Contained within this document are descriptions and screenshots that map out the overall layout of the application and also highlight some of the specific functionality available in different areas of the product. Given the large number of changes to many parts of TranSight in recent version upgrades, including a major restructuring of the forecast file system and a complete redesign of the results, we at REMI hope that this guide will be useful during the process of learning the updated software.

What Is REMI TranSight?

TranSight is the leading tool for evaluating the total economic effects of changes to transportation systems. Grounded in over 20 years of transportation modeling experience, TranSight provides an integrated system for comprehensive evaluation of transportation systems. This approach allows analysts to thoroughly describe the far-reaching economic and operational effects of transportation projects. As with PI$^+$, TranSight is used by government agencies, consulting firms, and universities.

Integrating economics with travel demand modeling, TranSight dynamically demonstrates how transportation makes economies competitive. Users can test alternative transportation changes and observe the short and long-term impact on jobs, income, population, and other economic variables. TranSight is a sophisticated modeling tool that integrates travel demand models with the REMI model and is constructed with extensive data on emissions, safety valuation factors, and other data.

In addition to continuously improving the software and pushing the frontier of regional economic modeling, REMI is dedicated to providing quality customer service and support.

II. Overview of the TranSight Home Window

The main TranSight application window is the initial jumping off point for all analyses performed with the REMI model. This home window is the central location for creating and managing forecasts, changing general settings, making customizations, examining detailed information specific to your model regions, and finding in-software support material. There are five major sections to the home window, each accessible via tiles located on the left-hand side of the screen.

Figure 1: TranSight Home Window

Home Screen

The first section of the home window, which will be the first thing seen once TranSight has finished launching, is the home screen. The home screen's purpose is to provide quick and simple access points for starting your use of the REMI model to simulate policy change. By clicking on the appropriate tile, you are able to start creating any one of the four types of forecasts available in TranSight: regional simulations, national simulations, regional controls, and national controls. In some cases, you may be prompted to choose a baseline for your new forecast from the Forecast List. Your new forecast will open in a separate window, called the Forecast Window.

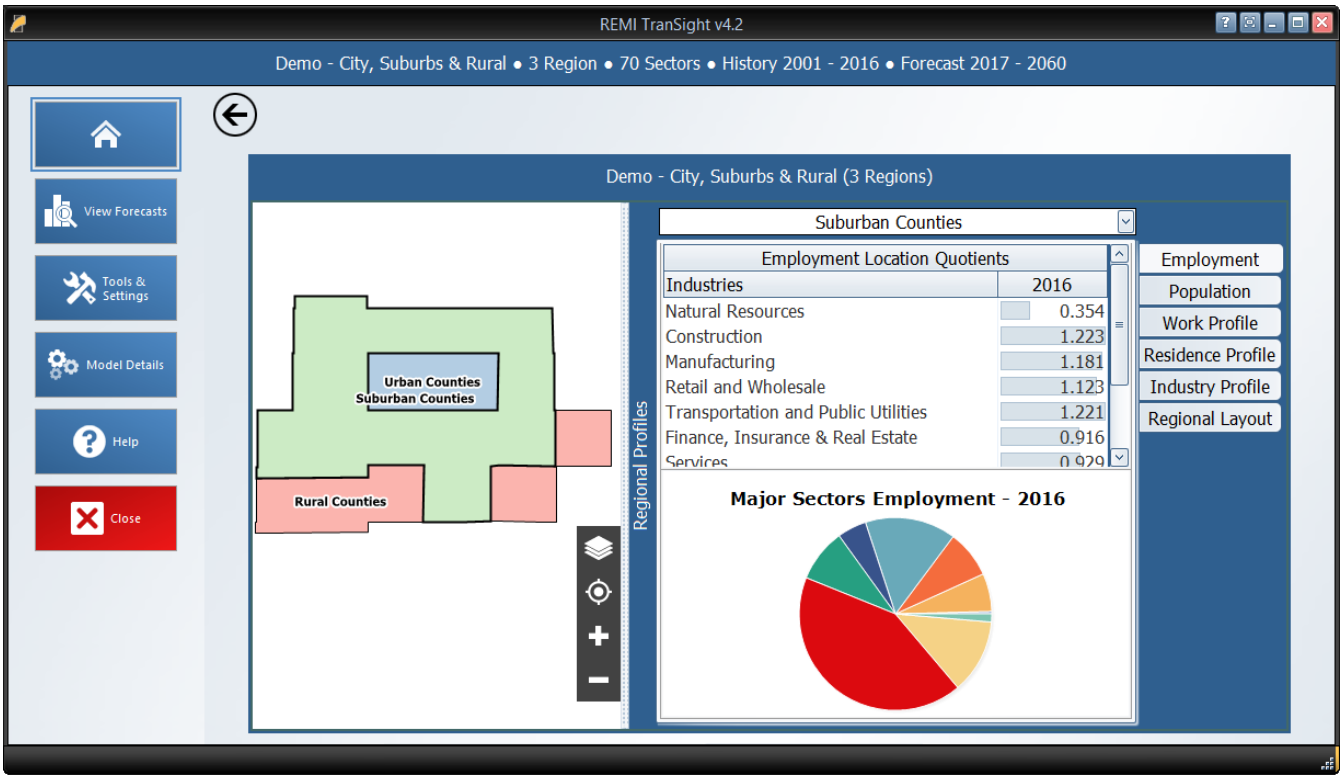
If you are interested in exploring REMI's default control forecasts that form the basis of your model, you can dig directly into the data by clicking on the "Regional Forecast" or "National Forecast" tiles. The selected forecast will be opened in a special Forecast Window that shows only the Results section. Some

specific tables, maps, and data visualizations have been specially chosen to display REMI's baseline forecasts and provide informative profiles of the national and regional economies.
Another way of examining baseline data and visualizing differences between your model regions is to visit the Regional Profile tool, also accessed from the home screen by clicking on the "Regional Profile" tile.

Regional Profile

The Regional Profile tool features a combination of a regional map with several tabs of tables and charts describing last-history-year data for major economic and demographic concepts for each region. This tool is useful for learning about the specific economic and demographic characteristics of your model regions. Many of the tables contain location quotients, which make it easy to identify unique regional attributes in comparison to national averages. Additionally, our newly updated map is capable of displaying an internet-based OpenStreetMaps layer using the Map Layers button, which could prove useful for investigating regional geography.

Figure 2: Regional Profile

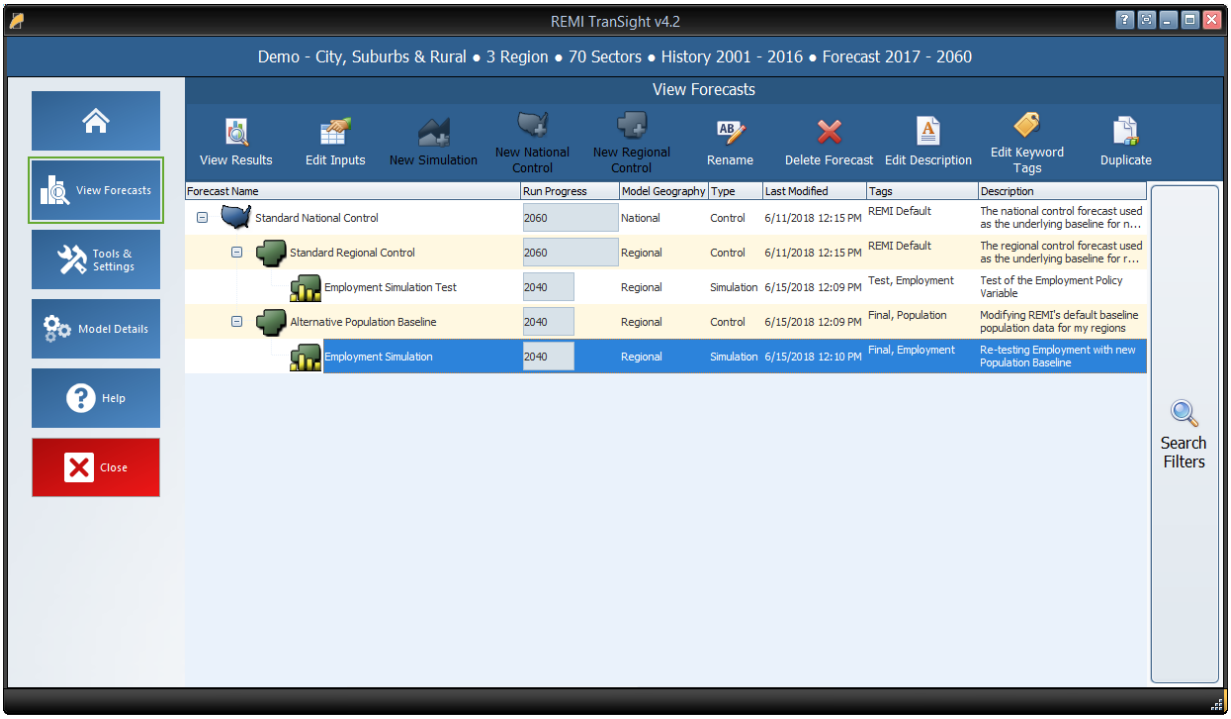


Forecast List

The Forecast List, accessed by clicking on the "View Forecasts" tile, is the central location for everything to do with forecast management. Unlike in previous versions of TranSight, version 4.2 no longer operates in a workbook-based manner. Instead of opening singular workbooks that each may have contained multiple forecasts, we have moved to an approach of always providing visible access to every forecast at the same time on the Forecast List. Forecasts are not opened automatically, so large lists of forecasts will not

inherently cause any increased operating overhead for TranSight. We hope that this new file management system will result in less file management work for users and fewer instances of forecasts being lost if errors occur.

Figure 3: Forecast List



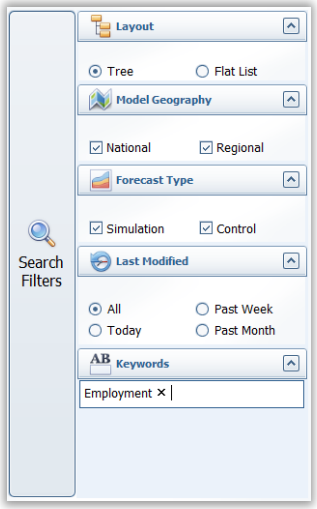
The Forecast List organizes forecasts in a tree structure. Each forecast appears underneath its parent baseline control, with the Standard National and Standard Regional Controls at the top. Selecting a forecast in the list will activate buttons above the list depending on the forecast selected and what options are available to it. For control forecasts, buttons for creating new control or simulation forecasts will become active depending on the type of control forecast selected. All forecasts in the list can be opened for viewing in their respective Forecast Window. Depending on whether a forecast being opened already has been run, the Forecast Window will open to either the Inputs List or the Results section.

Other actions can be taken for forecasts on the Forecast List are renaming, deleting, adding or editing a description, adding or editing keyword tags, and duplicating. Tags and descriptions are new features that should be useful for organizing your forecasts now that they are all contained in the same place. For further ease of use when the forecast list becomes long, we have added search filters that can quickly hide all forecasts that you are not currently interested in seeing.

Search Filters

Clicking on the righthand “Search Filters” panel on the Forecast List pops open a set of useful options for filtering down the list of known forecasts. There are filters for viewing only national or regional forecasts, for hiding all simulations or all controls, for seeing only forecasts modified within a recent time period, and lastly, an auto-complete search filter for retrieving forecasts with information matching the search terms.

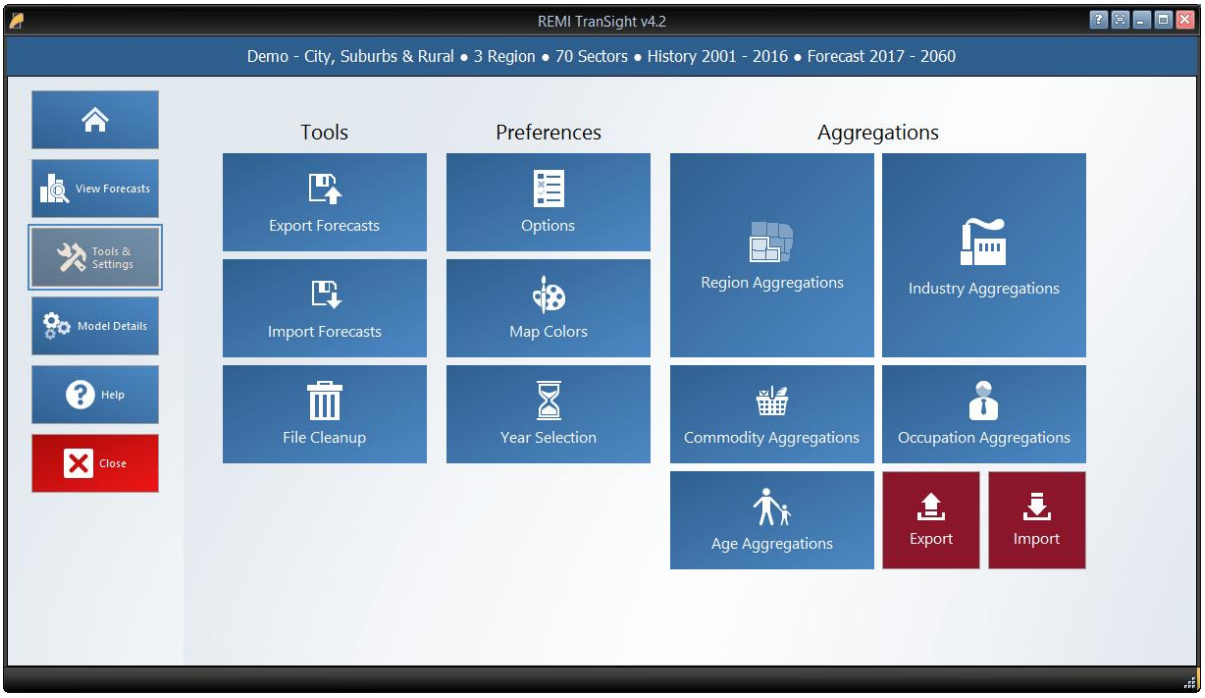
Figure 4: Search Filters



Tools & Settings

The Tools & Settings section of the main window contains, as the name suggests, several tools and settings that will likely be useful at some point in your use of TranSight.

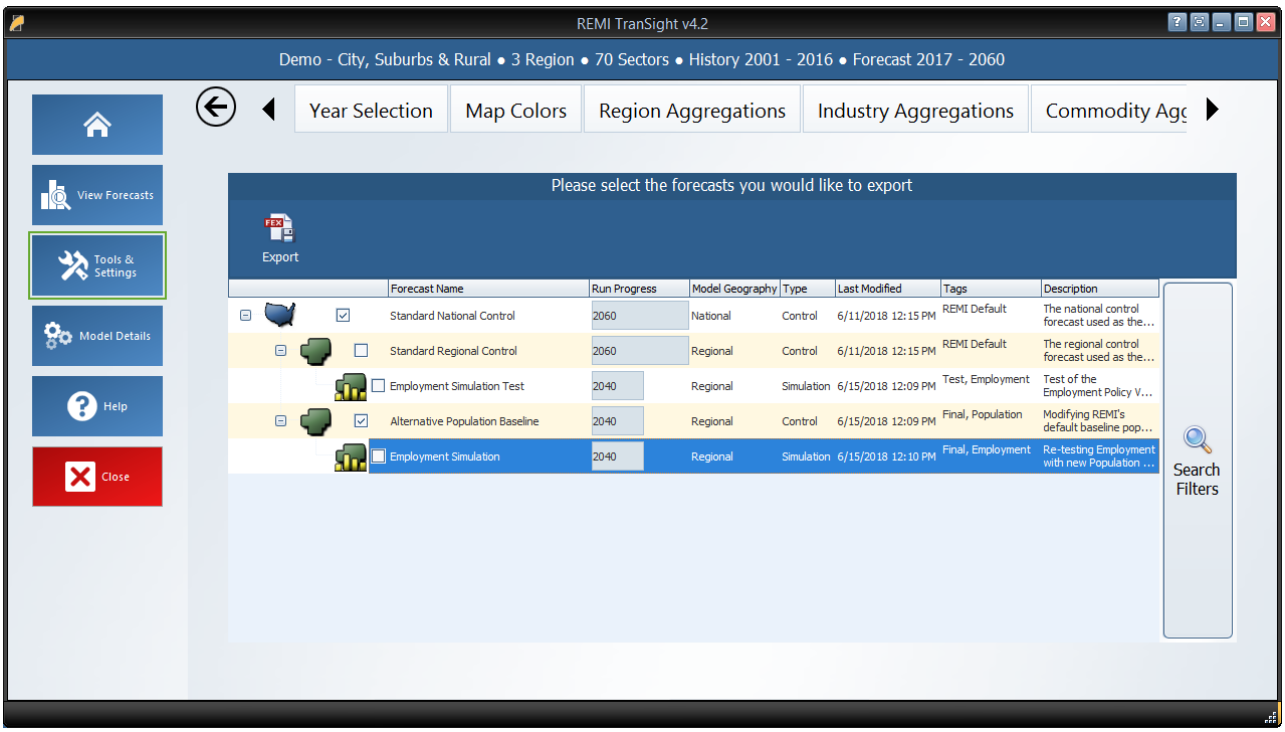
Figure 5: Tools & Settings



Exporting and Importing Forecasts

Perhaps most important among the various tools and settings available on the Tools & Settings screen are the forecast export and import features. Due to our new system of automatically managing forecast files, it is no longer possible to simply pass along a ".RWB" workbook file to other users or to REMI for support because a given installation of TranSight will not know about forecasts in files that it did not create itself. The solution to this is our new export and import features. The corresponding tiles are located under the "Tools" heading. The export feature will allow you to select any forecasts you want to share and package them up in a single file that can be imported by another user with the same TranSight model. Exported forecasts will be contained within a new ".FEX" file format. When selecting forecasts for export, be aware that any parent control forecasts are required to be exported as well and will be automatically checked off.

Figure 6: Forecast Export



File Cleanup

Another file management feature that has been added with version 4.2 is the forecast backup file. Each time a forecast is saved, a backup file is created as well so that there is something to fall back in case the file is corrupted or lost when it is next used. If you end up with too many backup files in the Workbooks subdirectory of your model folder or if you find that you would like to attempt to access a backup, you can use the File Cleanup feature. The File Cleanup dialog will determine how many forecast files exist that are unknown to TranSight as either backups, exports that have yet to be imported, or any other forecast files and allow you to deal with them by either deleting or importing them.

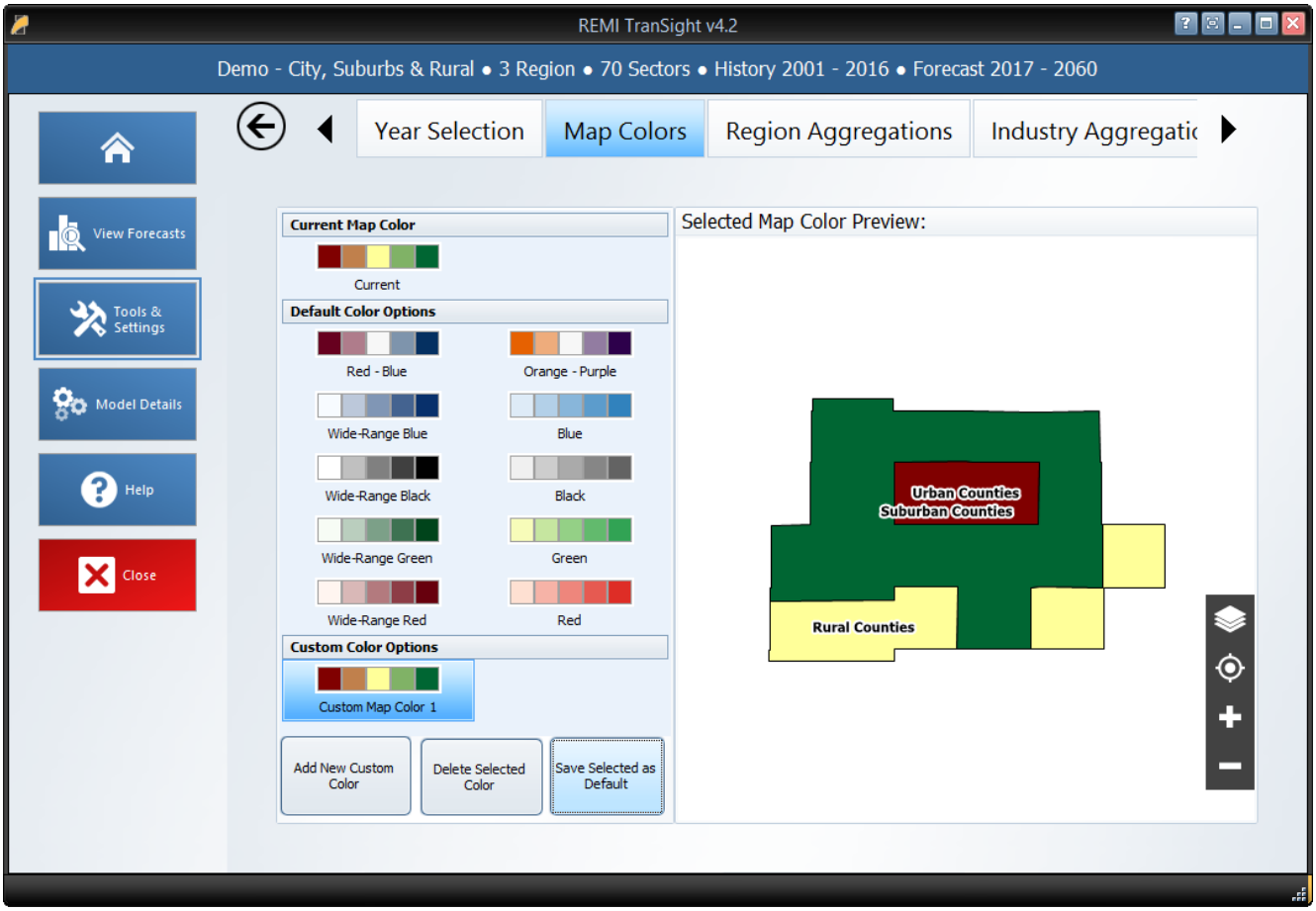
Options

The options menu consists of several non-crucial settings. You can change the TranSight color scheme, select an alternative tile navigation design, decide whether exported files should automatically open, allow for TranSight to use the Internet to retrieve OpenStreetMaps data, supply a sound file for use as an indicator alert that TranSight has finished running a forecast, and select from several alternative industry labelling forms that include NAICS codes.

Map Colors

The map colors interface allows for selecting what colors the map should use when it displays results. To select your preferred color option, choose it from the gallery and click the "Save Selected as Default" button. Custom colors can be created by using the "Add New Custom Color" button. Three-color ranges are offered for ease of viewing both positive and negative results on the same map while two-color ranges work better for black-and-white printing.

Figure 7: Map Colors



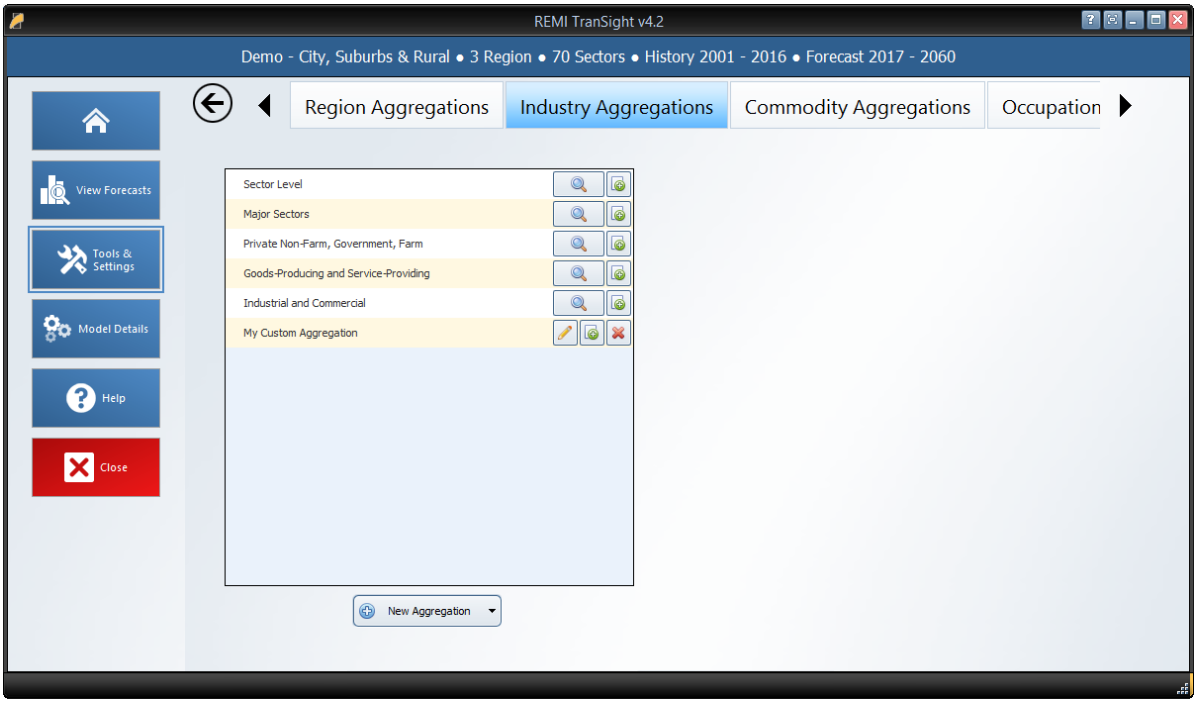
Year Selection

The Year Selection screen is used to build lists of years for use on the results. Saved year lists that you create can later be applied to result visualizations such that only the years included in the list are shown. This feature is useful if you are only interested in viewing certain years of results and would prefer to have a saved list rather than filtering the years shown by visualizations manually.

Aggregation Manager

Aggregations are groupings of details including regions, industries, commodities, occupations, and ages. They are a new feature for version 4.2 and have been thoroughly integrated into the model with respect to both policy variable creation and the results. Aggregations save time when you are interested in only certain details or when you would like to define your own customized structuring of all the details. The Aggregation Manager allows you to create aggregations for each of the five supported detail types, export all of your aggregations to a file, and import aggregations from an exported file. Exporting and importing aggregations may be useful for collaborating with other users, sharing with REMI in a support scenario, or for transferring your aggregations when a new version of TranSight is released.

Figure 8: Industry Aggregation Manager

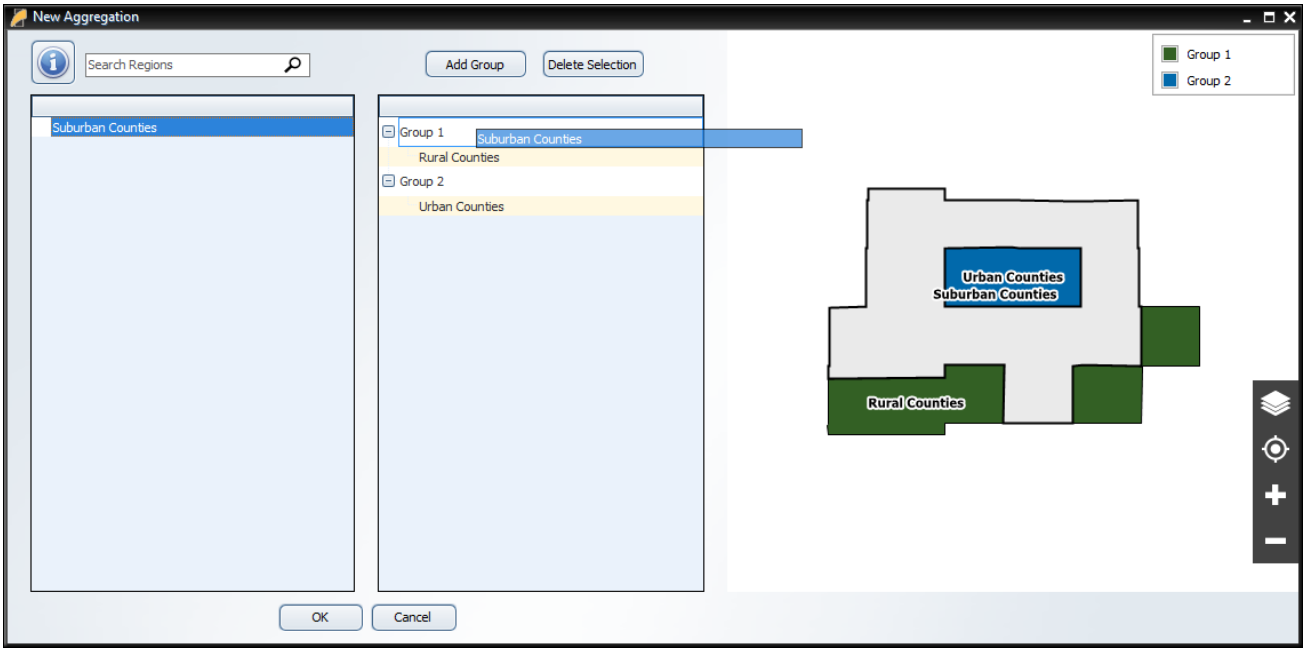


For most of the detail types, you will find some default aggregations built by REMI. You can view these default aggregations to see how they categorize details and also duplicate them if you would like to make a small change. For making a completely new aggregation, click the "New Aggregation" button at the bottom of the aggregation list. Depending on your model and the detail type, you may be prompted to choose what level of detail you would like to use in building the aggregation. For example, a 70-sector model would be able to create industry aggregations using the default 70 sectors or, optionally, using 23 sectors instead.

Creating a custom aggregation will open the Aggregation Editor. To build an aggregation using the Aggregation Editor, simply create some groups using the "Add Group" button, give them meaningful names, and then drag details from the left-hand list box onto the groups. In long lists of details, it may be useful to use the search box to filter the list. Groups and details can be deleted by selecting them and clicking the "Delete Selection" button, and details can be moved between groups or back to the left-hand

list box by dragging. There are additional detail-moving features located in the right-click menu. Using the Aggregation Editor to create a region aggregation includes a map as an additional tool. Regions listed in either list box can be selected using the map (hold shift while dragging to multi-select on the map) and the map also serves to visually indicate how your regions are being aggregated.

Figure 9: Region Aggregation Editor

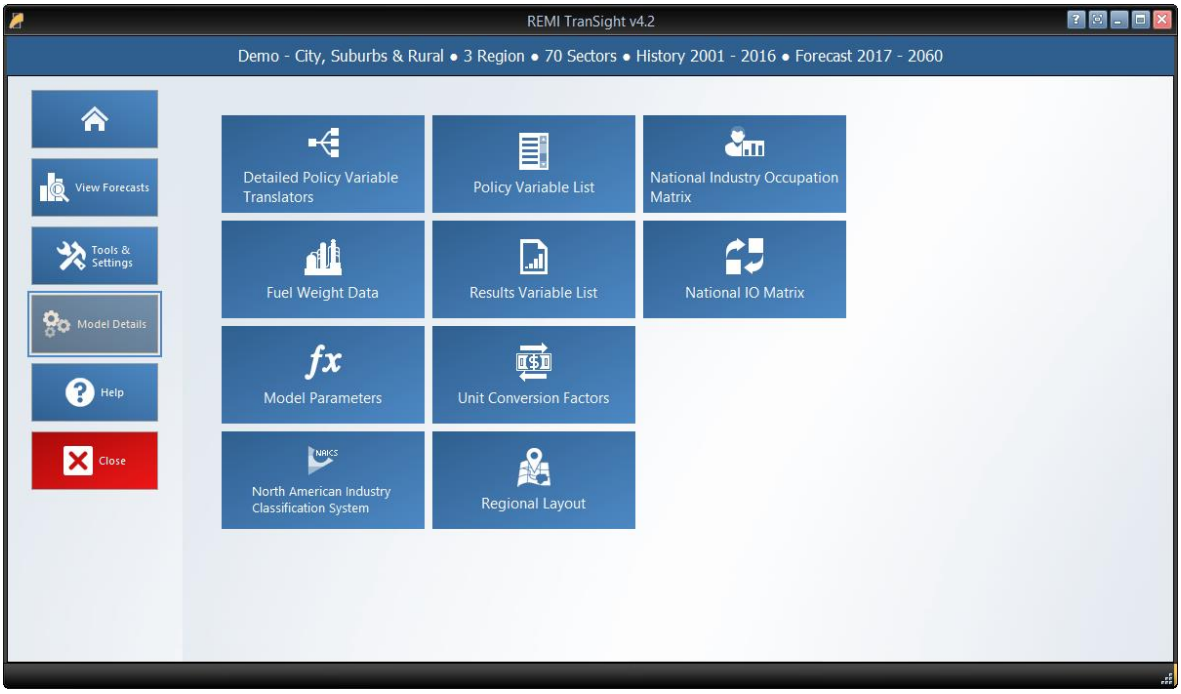


Once finished, the aggregation will appear on the Aggregation Manager's list and can be given a name. This saved aggregation will now be available when creating policy variables with the same detail type. Instead of selecting from the regular detail list, you will be able to select from groups you created when building the aggregation. In some cases, where policy variables only allow a subset of the full detail list (such as industry policy variables that exclude farm and government industries), your aggregation will be automatically filtered to remove excluded details and groups containing only excluded details. Similarly, results can also be displayed at the level of your aggregation groups rather than the regular detail list.

Model Details

The fourth section of the TranSight Home Window is the Model Details screen. This area contains a variety of detailed data as well as other information like lists of all possible variables, your model region layout, and industry sectors cross-listed with NAICS codes.

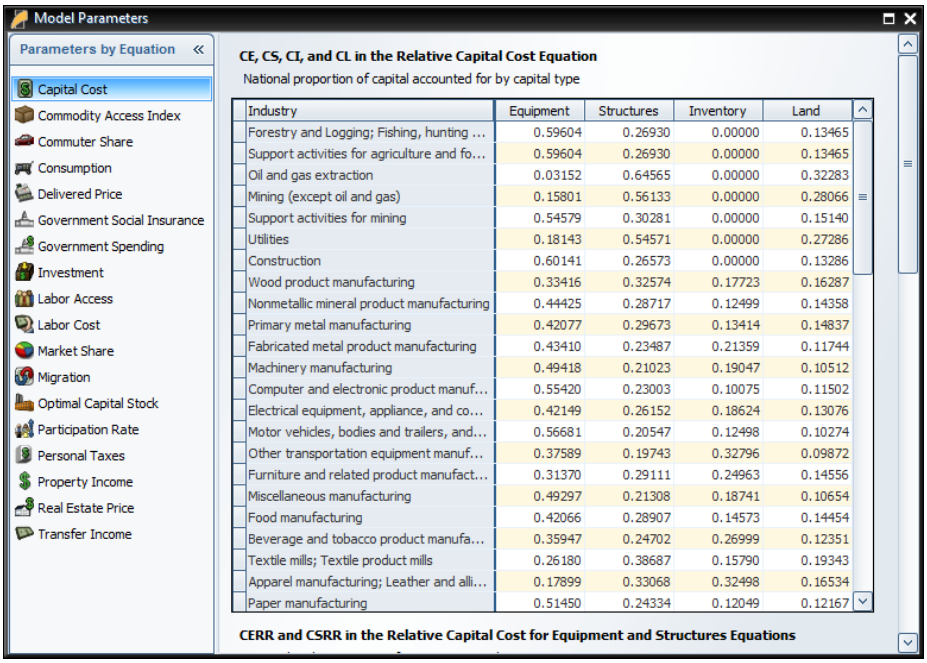
Figure 10: Model Details



Model Parameters

The Model Parameters window displays the values of all parameter constants used in REMI's equations for your specific model. The window is arranged so that each model equation has its own tab containing all relevant parameters. Descriptions are provided to explain the significance of each parameter in its equation.

Figure 11: Model Parameters

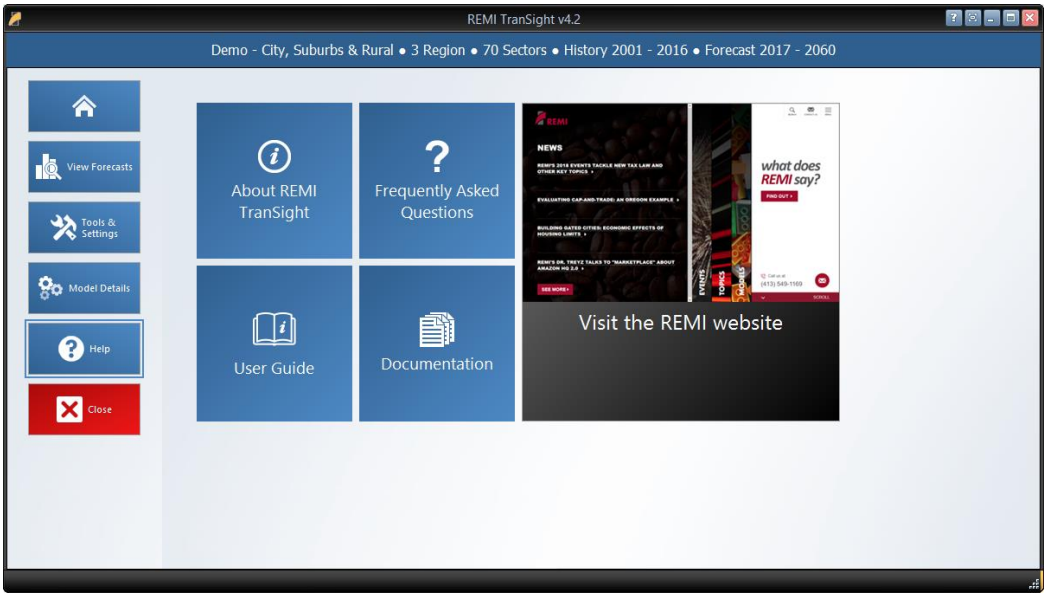


Industry	Equipment	Structures	Inventory	Land
Forestry and Logging; Fishing, hunting ...	0.59604	0.26930	0.00000	0.13465
Support activities for agriculture and fo...	0.59604	0.26930	0.00000	0.13465
Oil and gas extraction	0.03152	0.64565	0.00000	0.32283
Mining (except oil and gas)	0.15801	0.56133	0.00000	0.28066
Support activities for mining	0.54579	0.30281	0.00000	0.15140
Utilities	0.18143	0.54571	0.00000	0.27286
Construction	0.60141	0.26573	0.00000	0.13286
Wood product manufacturing	0.33416	0.32574	0.17723	0.16287
Nonmetallic mineral product manufacturing	0.44425	0.28717	0.12499	0.14358
Primary metal manufacturing	0.42077	0.29673	0.13414	0.14837
Fabricated metal product manufacturing	0.43410	0.23487	0.21359	0.11744
Machinery manufacturing	0.49418	0.21023	0.19047	0.10512
Computer and electronic product manuf...	0.55420	0.23003	0.10075	0.11502
Electrical equipment, appliance, and co...	0.42149	0.26152	0.18624	0.13076
Motor vehicles, bodies and trailers, and...	0.56681	0.20547	0.12498	0.10274
Other transportation equipment manuf...	0.37589	0.19743	0.32796	0.09872
Furniture and related product manufact...	0.31370	0.29111	0.24963	0.14556
Miscellaneous manufacturing	0.49297	0.21308	0.18741	0.10654
Food manufacturing	0.42066	0.28907	0.14573	0.14454
Beverage and tobacco product manufa...	0.35947	0.24702	0.26999	0.12351
Textile mills; Textile product mills	0.26180	0.38687	0.15790	0.19343
Apparel manufacturing; Leather and alli...	0.17899	0.33068	0.32498	0.16534
Paper manufacturing	0.51450	0.24334	0.12049	0.12167

Help

The final section of the home window is the Help center. Here you will find several useful sources of information that can help answer questions about the TranSight software or the underlying REMI model.

Figure 12: Help Center



Software Information

The "About" window displays information about your installation of TranSight. It contains version, model, and build ID numbers as well as information that could be useful for a REMI support situation such as information about applied patches and some statistics pertaining to your computer's memory usage.

Frequently Asked Questions

The FAQ window contains answers to common questions about using TranSight. Questions and answers are grouped by topic and provide insight into important REMI model concepts, detail some best-practices for policy variable usage, explain the options available when running a forecast, and give tips for troubleshooting errors.

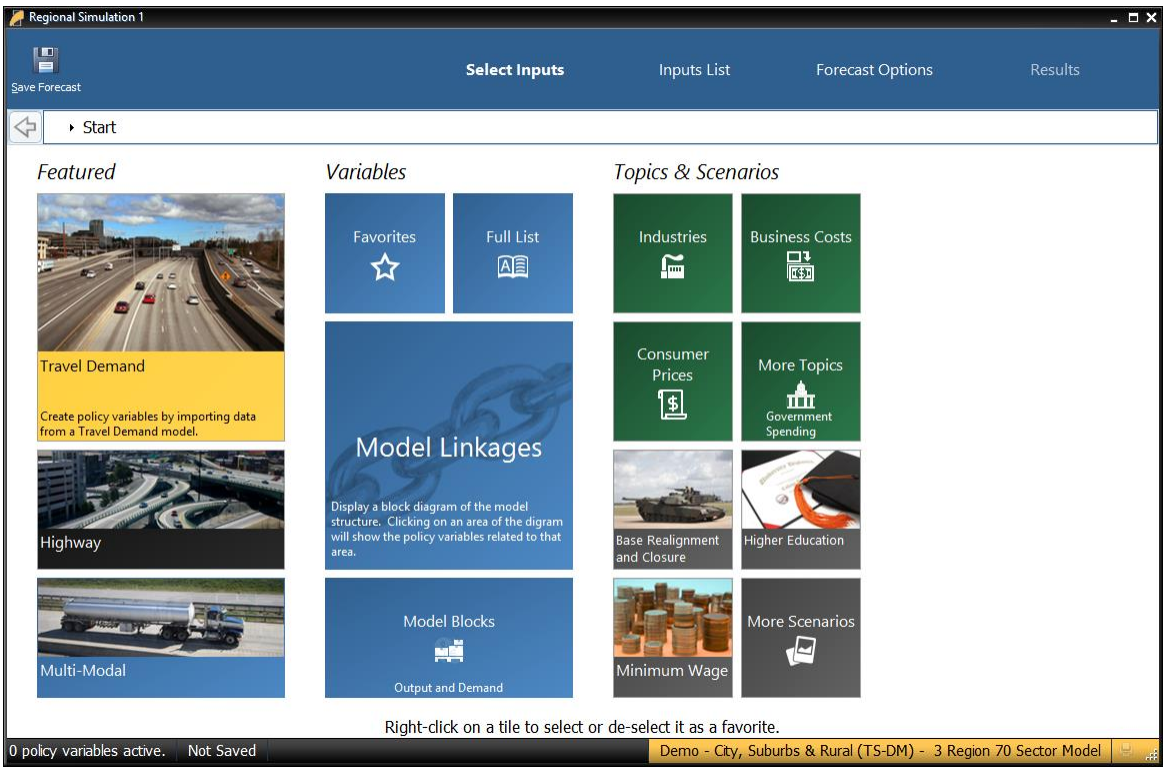
Documentation

The documentation viewer is a built-in PDF viewer that provides easy access to all documentation files that are shipped with your model. From the documentation viewer, you can print as well as easily open our Documentation folder if you'd like to copy or share our documentation files. Specific documentation pieces that are worth noting are the TranSight Changes file, which briefly outlines a history of major changes between TranSight versions, and the TranSight Overview file which provides an in-depth description of data, software, and methodology changes made for the current version. The rest of our documentation focuses on REMI's model equations, data sources, estimation procedures, and industry and occupation layouts.

III. Overview of Forecast Windows

The process of creating a forecast takes place within a Forecast Window. The three main aspects of working with a forecast: specifying policy variables, running the forecast, and viewing the results, each take place on separate screens of the Forecast Window and are accessed using the navigation links along the window's header panel. At any time, your forecast and its contents such as policy variables and customized result visualizations can be saved using the "Save Forecast" button which is always located at the upper left of the screen on the header panel. Forecast windows are now separate entities from the main application window and thus multiple forecasts can now be open simultaneously, with each accessible via a button on the Windows taskbar.

Figure 13: Forecast Window



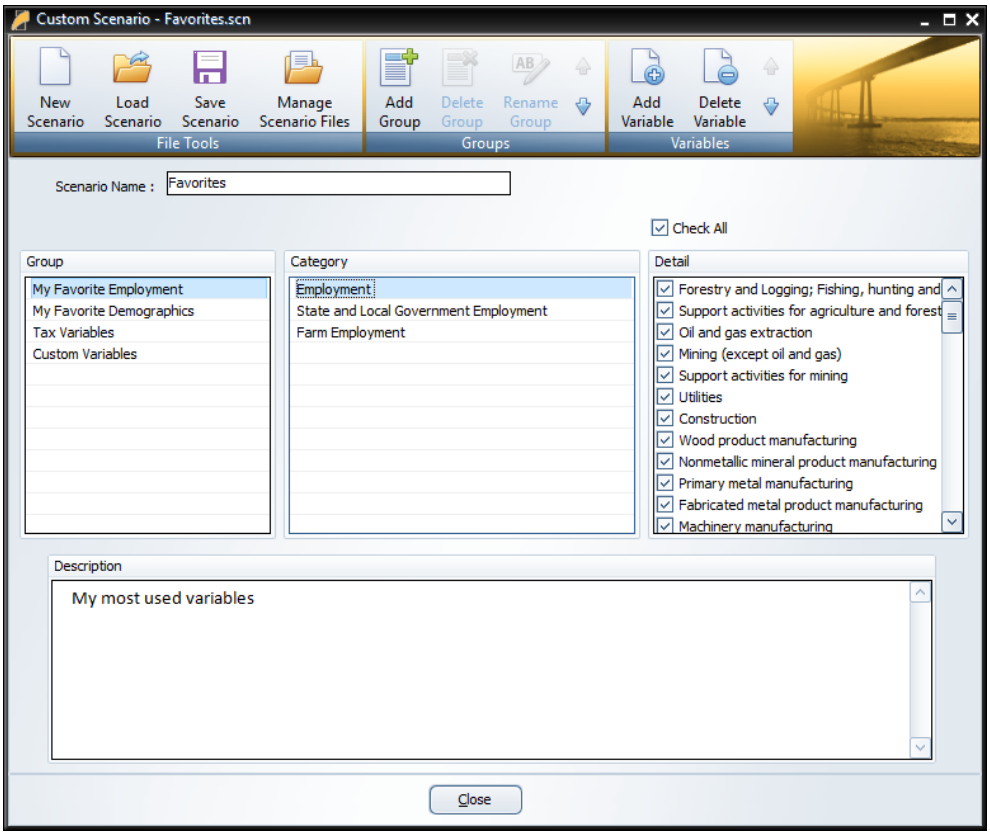
Select Inputs

The first screen that will be visible when creating a new forecast is Select Inputs (shown in Figure 13). This tile-based interface is the jumping off point for choosing what policy variables to add to the forecast. Each tile represents some number of policy variables which will be opened in the Policy Variable Selector, whether it is a single variable like in the case of the Employment tile or a group of related policy variables like with the Business Costs or various Scenario tiles. At the forefront of the input selection screen, the Featured section highlights variables and topics that are likely to be used most often. Alternatively, the

Model Linkages and Model Blocks tiles offer ways of accessing policy variables by area of the REMI model structure where they fit in. If you'd prefer to see all variables that are available for your forecast, the Full List tile will open all variables in the Policy Variable Selector.

If there are certain policy variables that you are likely to frequently use together and they are not already grouped by one of REMI's scenarios, you might consider using the Custom Scenario editor to build your own. This editor, found under the "More Scenarios" tile by clicking "Custom Scenarios", allows for creating multiple groups of policy variables where each variable can also have its list of details filtered down to remove ones that won't be useful. The custom scenario can be given a name, description, and saved using the controls on the editor. Saved custom scenarios are given their own tiles in the "Custom Scenarios" section of the Select Inputs screen.

Figure 14: Custom Scenario Editor



In order to make your most-used policy variables and custom scenarios even more accessible, you can make use of the Favorites section. Right-clicking any tile will save it to your Favorites (indicated with a star), where they can then be dragged into any customized order.

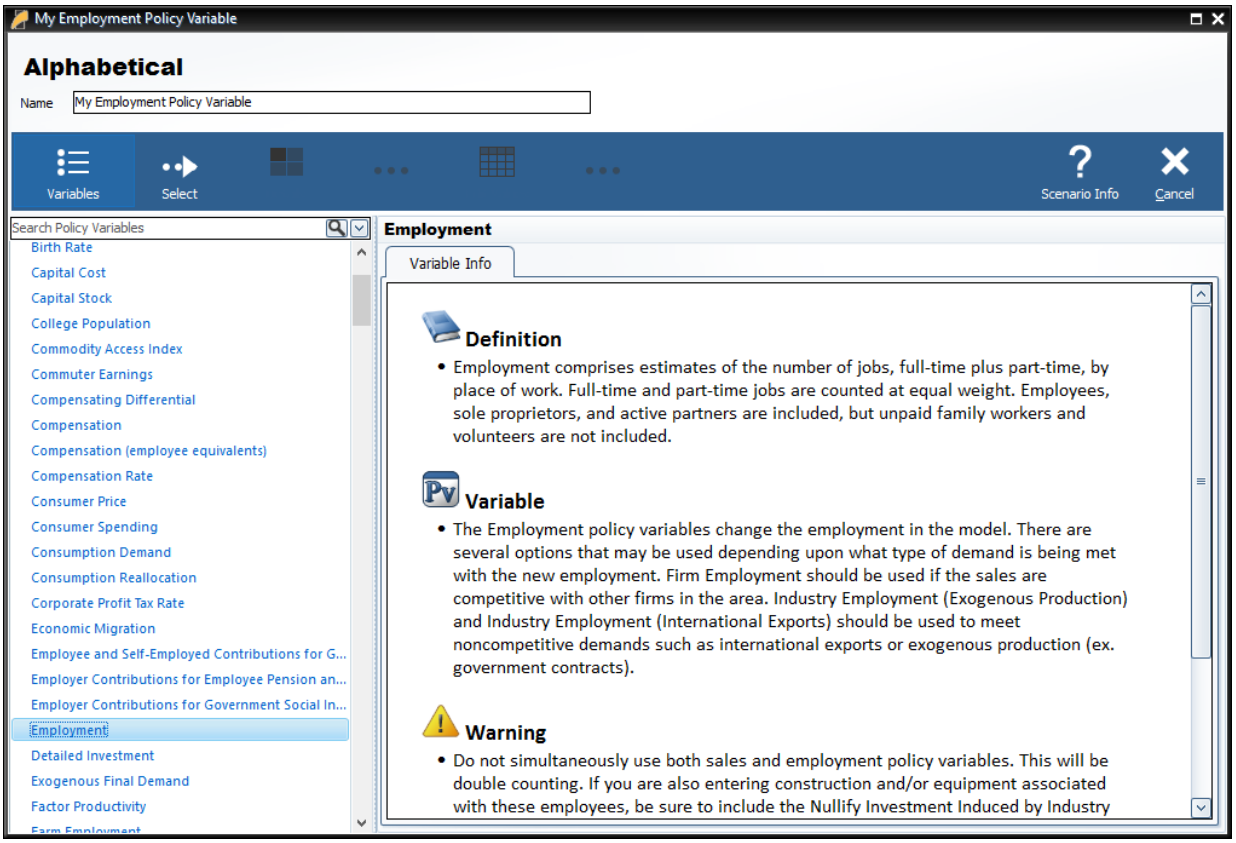
Policy Variable Selector

Clicking on a tile that represents some number of policy variables will open up the Policy Variable Selector window. This window is split into three tabs ("Variables", "Details", and "Edit Values") that each represent a step in the process of defining exactly how your policy variables will enter into the model. At any time, you can name your policy variables using the editor at the top of the window. You can also click the "Scenario Info" button to see a description of the scenario you have open.

The first tab on the Policy Variable Selector contains the variable list. This screen is where an individual policy variable is selected for editing. The contents of the variable list are determined by what group of variables was previously chosen. Only one variable can be selected for editing at a time, but once you finish creating a variable, you can always go back to the variable list tab to start working with another. In cases where you accessed the Policy Variable Selector using a tile that represents just a single variable, this section will be skipped since there is no selection to be made. If the number of available variables is large, it may be helpful to use the search field for filtering the list down by variable name or description.

Clicking a variable in the list will display information about it and its options. In some cases, a diagram may be available that depicts how the selected policy variable interacts with other variables and how it fits into the REMI model. Once you have decided what variable to choose, clicking the "Select" arrow button on the window's header panel will move the variable to the Details tab to begin editing.

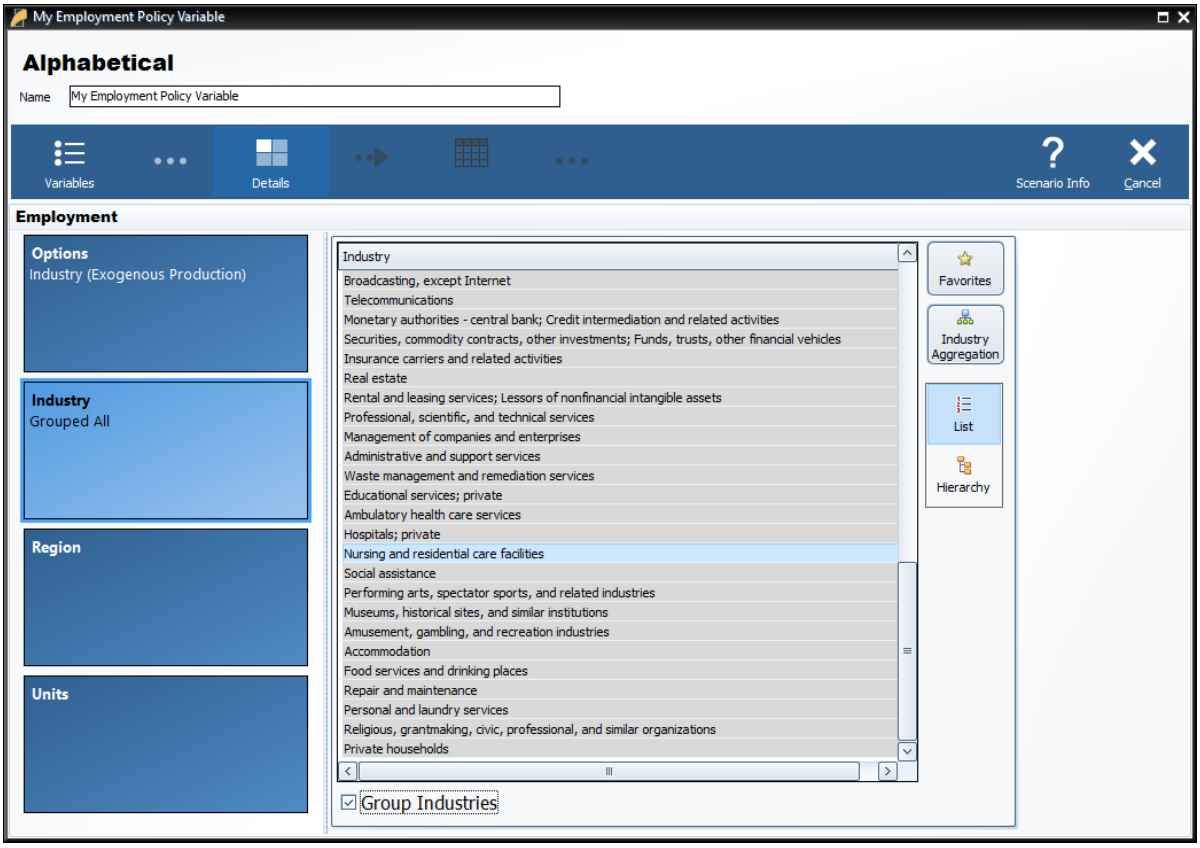
Figure 15: Policy Variable Selector – Variable List Tab



The Details tab is where you specify what the exact form of the policy variable should be. Different variables have different sets of details that must be filled out before the variable can be added to your forecast. Each type of detail information that must be specified will be represented by a tile on the left-hand side of the screen. Clicking one of these tiles will allow you to fill out some information describing your policy variable and can be done in any order. Most policy variables will require you to at least specify the regions it should affect and the unit type of the values. In the specific case of the Employment policy variable, shown below in

Figure 16, option and industry details are also required. Options only exist on some policy variables, they allow for choosing exactly how the variable should interact with other parts of the model. Selecting industry details for the Employment variable depicted below controls what industries will be impacted by the policy variable's changes to employment levels.

Figure 16: Policy Variable Selector – Details Tab (In Progress)

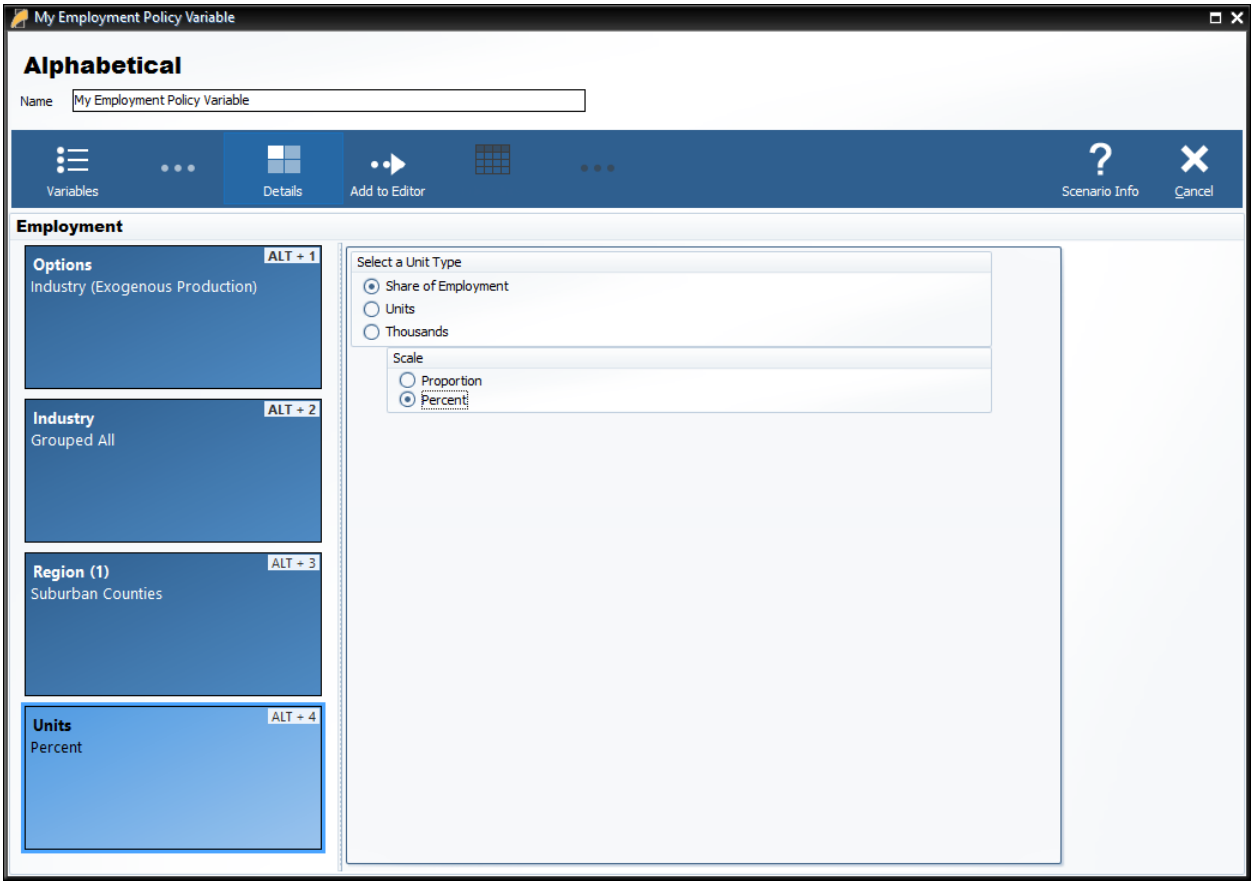


There are several ways to select specific details from the various types of detail lists, which include regions, industries, commodities, occupations, and ages. The first way is to select them from the simple flat list view. Hold down the Ctrl key to select multiple details one at a time or Shift to select a range of details all at once. If you would like to apply the same policy change to multiple details, it is helpful to check the

"Group Industries" or equivalent checkbox below the detail list. This will put all of the details into a single variable rather than creating separate variables for each selected detail.

Another way of selecting details is to use the hierarchical view. Simply click the "Hierarchy" button to the right of the detail list to see a hierarchical tree structure with checkboxes as the selection mechanism. This view is useful for selecting multiple related details all at once. For example, you could check the "Manufacturing" tree item to capture all manufacturing sub-industries. The final way to select details is to click the "Aggregation" button and select a custom or pre-defined aggregation, discussed in the "Aggregation Manager" section. Selecting an aggregation will repopulate the flat and hierarchical detail lists with the aggregated detail groups contained within the chosen aggregation. Similar to the detail grouping checkboxes, creating a variable with an aggregated detail will cause the inputted year values to be spread among the individual regions, industries, commodities, occupations, or ages as it enters the model.

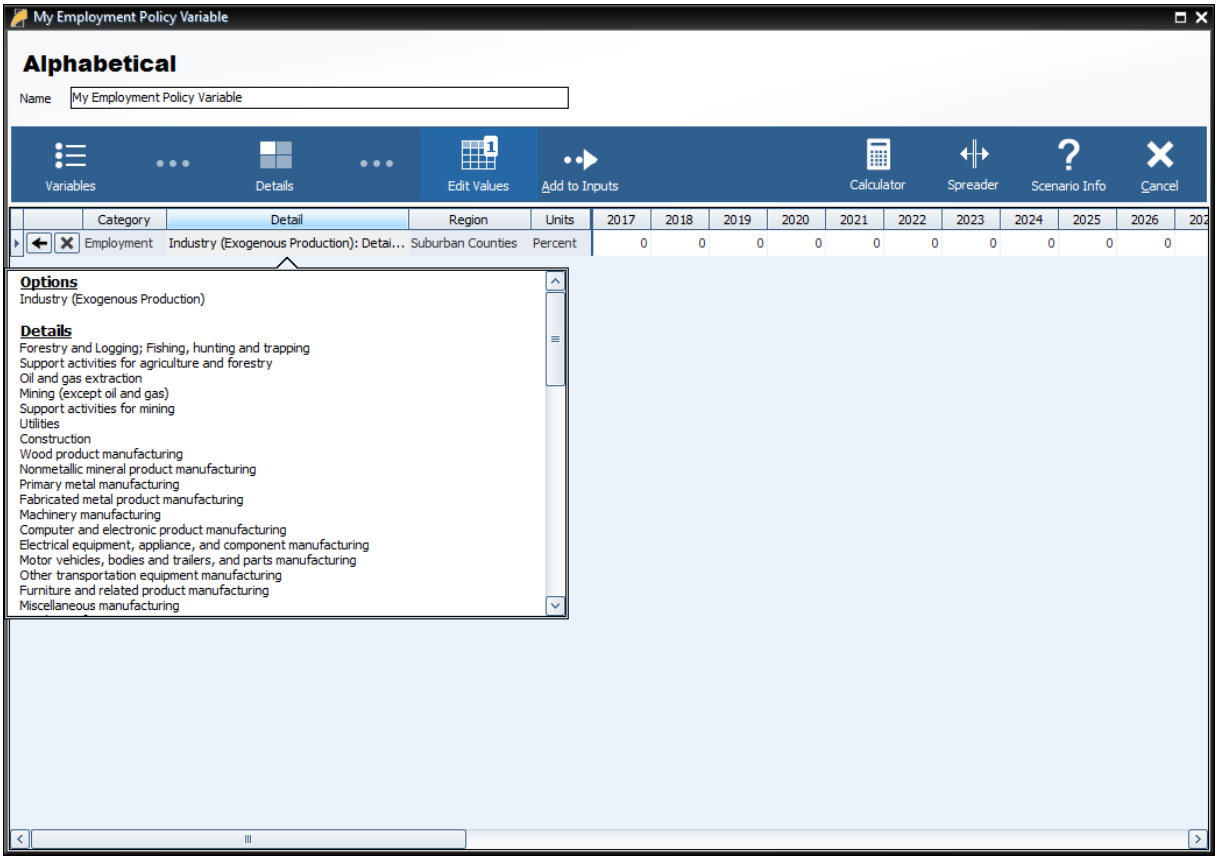
Figure 17: Policy Variable Selector – Details Tab (Completed)



Once the unit type and the rest of the options on the policy variable have been specified, you will be able to click the "Add to Editor" button to move the variable into the value editing spreadsheet. The number of

created policy variables will be displayed as a badge on the "Edit Values" button that becomes enabled once at least one variable has been added. One policy variable will be created and added to the spreadsheet for each combination of details specified on the Details tab. If you chose to check any of the grouping check boxes or chose to use aggregations, then all of those grouped details will be combined into one variable, which is depicted below for the industry dimension.

Figure 18: Policy Variable Selector – Value Editor

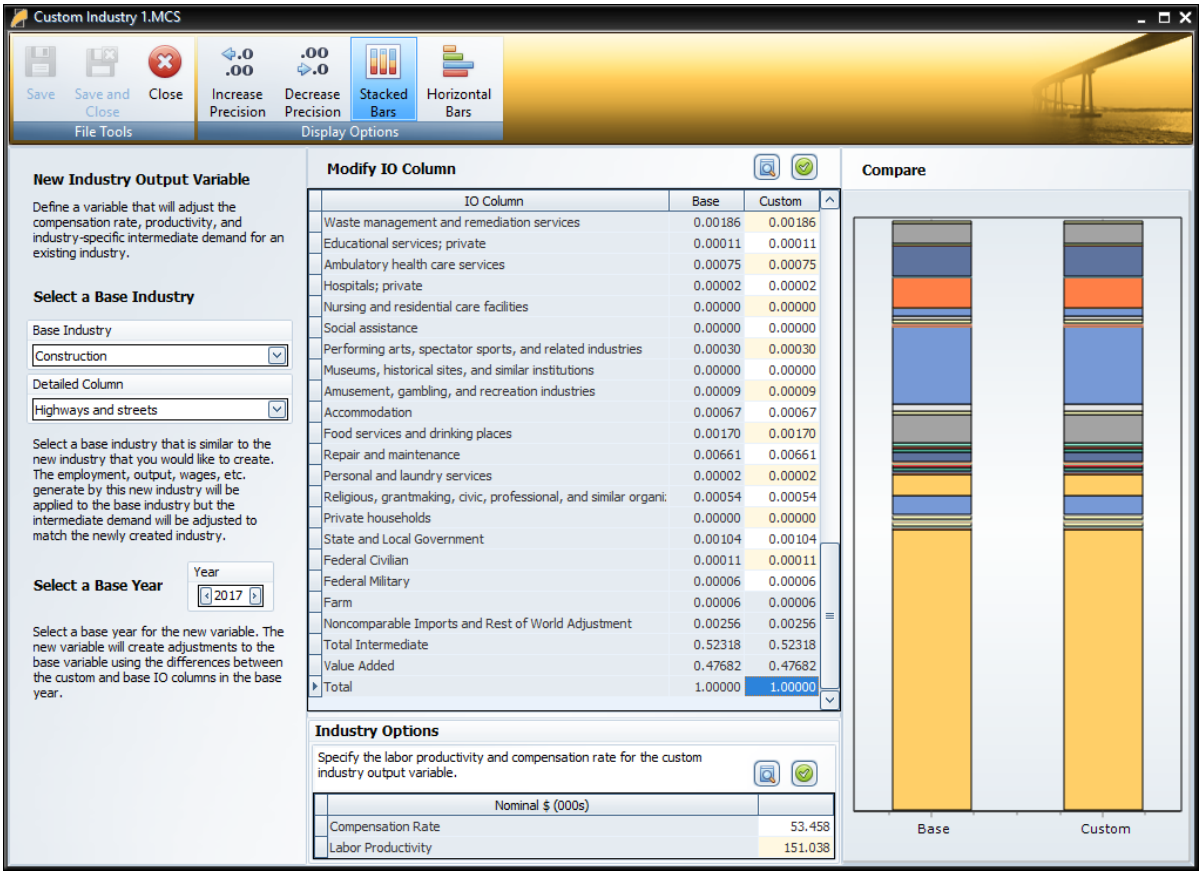


The editor will allow you to input values for each policy variable in each year. You can change the region and units by clicking on those cells in the spreadsheet, which contain combo-box editors. The Calculator and Spreader tools located on the top right of the navigation panel are useful for inputting more complicated series of values. If you need to change more options on your variable, you can click the "Redefine Details" button marked with a left-facing arrow. Variables can be deleted using the adjacent button that is marked with an "X". Once finished, add your variables to the forecast's Inputs List screen by clicking the final arrow button, "Add to Inputs". Submitted variables will appear on the Inputs List together in a group with the name specified on the Policy Variable Selector.

Custom Variables

There are a handful of special policy variables, available only to regional simulations, that are known as custom variables. These variables are much more customizable than regular policy variables because they allow for modifications to be made to the input-output (IO) table data that dictates how the variable will affect different parts of the economy within the model. There are custom variables for Industry Output/Sales, Government Spending, Investment Spending, Consumer Spending, Imports, Exports, and Tourism Spending. These variables can be found under the "Custom and Detailed Variables" tile in the Featured section of the Select Inputs screen and also can be added to a custom scenario. Custom variables can be created, edited, and deleted from the Policy Variable Selector's Details tab once a particular type of custom variable has been selected. Creating a new custom variable opens the Custom Variable Editor, which looks slightly different and has various options depending on which type of custom variable is being created.

Figure 19: Custom Variable Editor – Industry Output/Sales



On the left-hand panel of the Custom Variable Editor are variable-specific options and instructions. These options typically involve specifying information about what base data you would like to associate with

the custom variable such as the base year, base industry, commodity or government spending category, and so on. The base IO column data resulting from your choices is what you are able to subsequently modify using the central IO Column editor in order to finish specifying the custom variable. Additional customizations are available for certain types of custom variables, such as the options for adjusting compensation rate and labor productivity of custom industries, as shown in

Figure 19.

To aid in constructing your custom IO column, the chart on the right-hand side of the screen, which can be toggled between stacked-bar and horizontal-bar views, helps visualize the differences between the base and custom IO columns. Additionally, using the button marked with a magnifying glass in the IO column editing area, IO column reference data for each forecast year can be viewed as a table or chart and can be auto-filled into the custom column editor. The Custom Industry Output/Sales variable editor also has reference information for national and regional compensation rates and labor productivity. The right-click menu of the custom column editor has an "Apply Remainder" option (except when editing Industry Output/Sales, for which Value Added captures the remainder), which can prove useful as the IO column needs to total to one. If there are issues with any of your custom values, the button usually displaying a green checkmark in the corresponding section of the editor will change and instead warn you of the problems with what you have entered.

Once you have finished your custom variable, simply save it and subsequently use it as you would a normal policy variable. Saved custom variables appear in the Details tab of the Policy Variable Selector once you have selected that same category of custom variable. Be aware that custom variable files should not be transferred between versions of TranSight because each new release includes an updated IO table. This means that the values you attached to the custom variable will vary from the base data not only in the way that you intended them to, but also due to our updates affecting the base IO table.

Model Assumptions

In addition to directly entering policy variables, a forecast can also be changed from its baseline by another type of input: customized model assumptions. Model assumptions can only be added to control forecasts. There are five categories of model assumptions, some of which are applicable only to regional controls and some only to national controls. All five categories of model assumptions are handled by the Forecast Updates window shown in Figure 20. This window shows all of the available assumption types that can be modified for the current forecast. Each assumption type has at least one default assumption, called either the Baseline or REMI Standard assumption. Some types of assumptions have other pre-defined choices available. Figure 20 shows two such alternative Macroeconomic Update assumptions, representing higher and lower GDP growth scenarios compared to the baseline forecast. The tools menu along the top of the window has buttons for opening each assumption to view its data, copying an assumption for customization, and creating a brand-new assumption to start from scratch. You can also rename and delete assumptions and import assumption files from past versions. To select a non-baseline assumption, whether it is a REMI

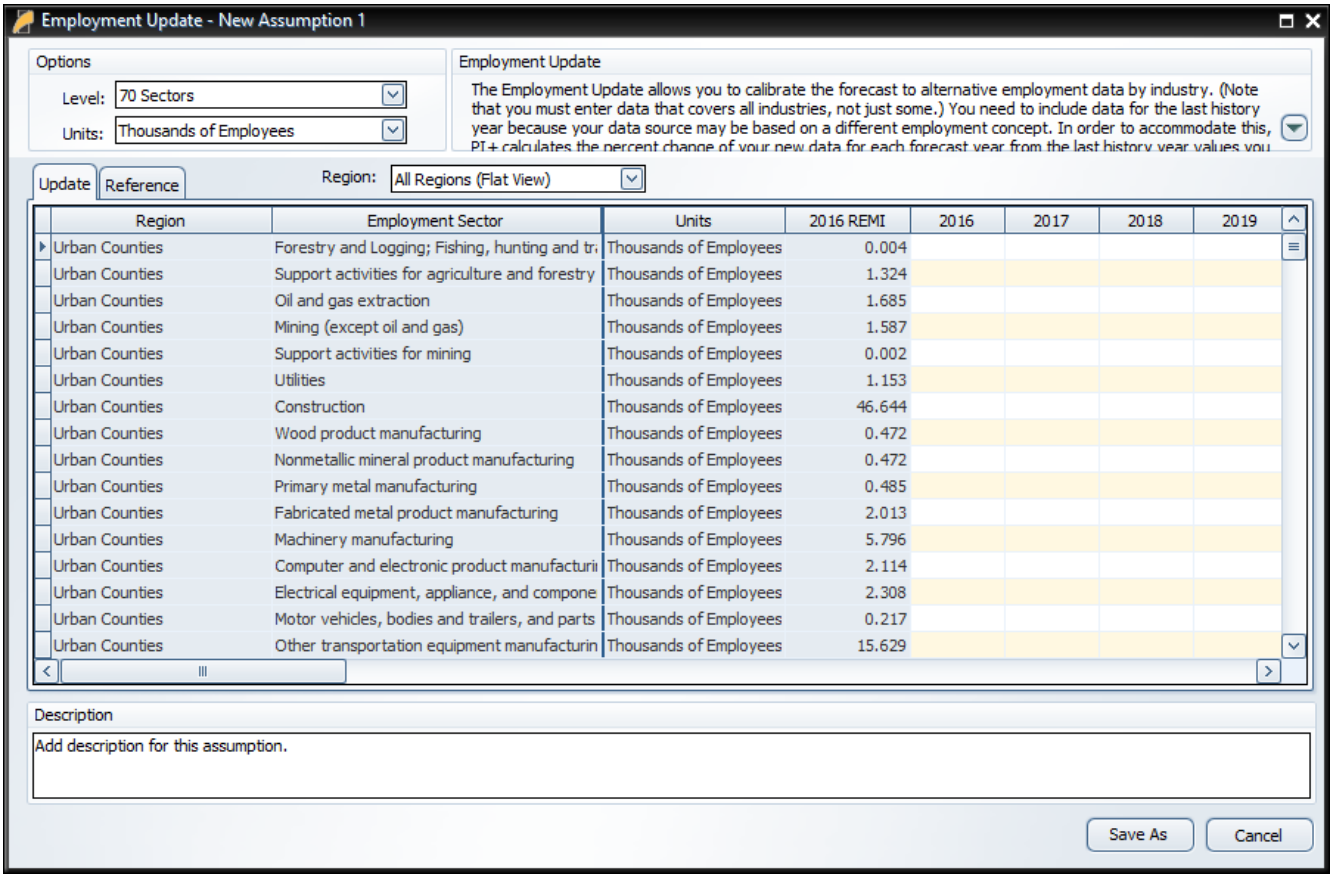
alternative or custom-made, just click the checkmark button on the assumption's card. Some types of assumptions will feature a visualization consisting of a chart and table that depict how the selected assumption affects the relevant concept.

Figure 20: Forecast Updates Manager

Employment Update

Employment updates are accessible for national and regional control forecasts and allow for calibration of a forecast to alternative by-industry employment data. You can enter employment values at different industry levels and in different units using the options at the top left of the form. You can also change how you enter values for the region dimension using the region combo-box. Regardless of the options specified, data must be entered for every industry. To check the default employment values for any of these combinations of industry, region, and unit views, open the "Reference" tab. You can also enter a description of your customized employment update in the text field at the bottom of the window.

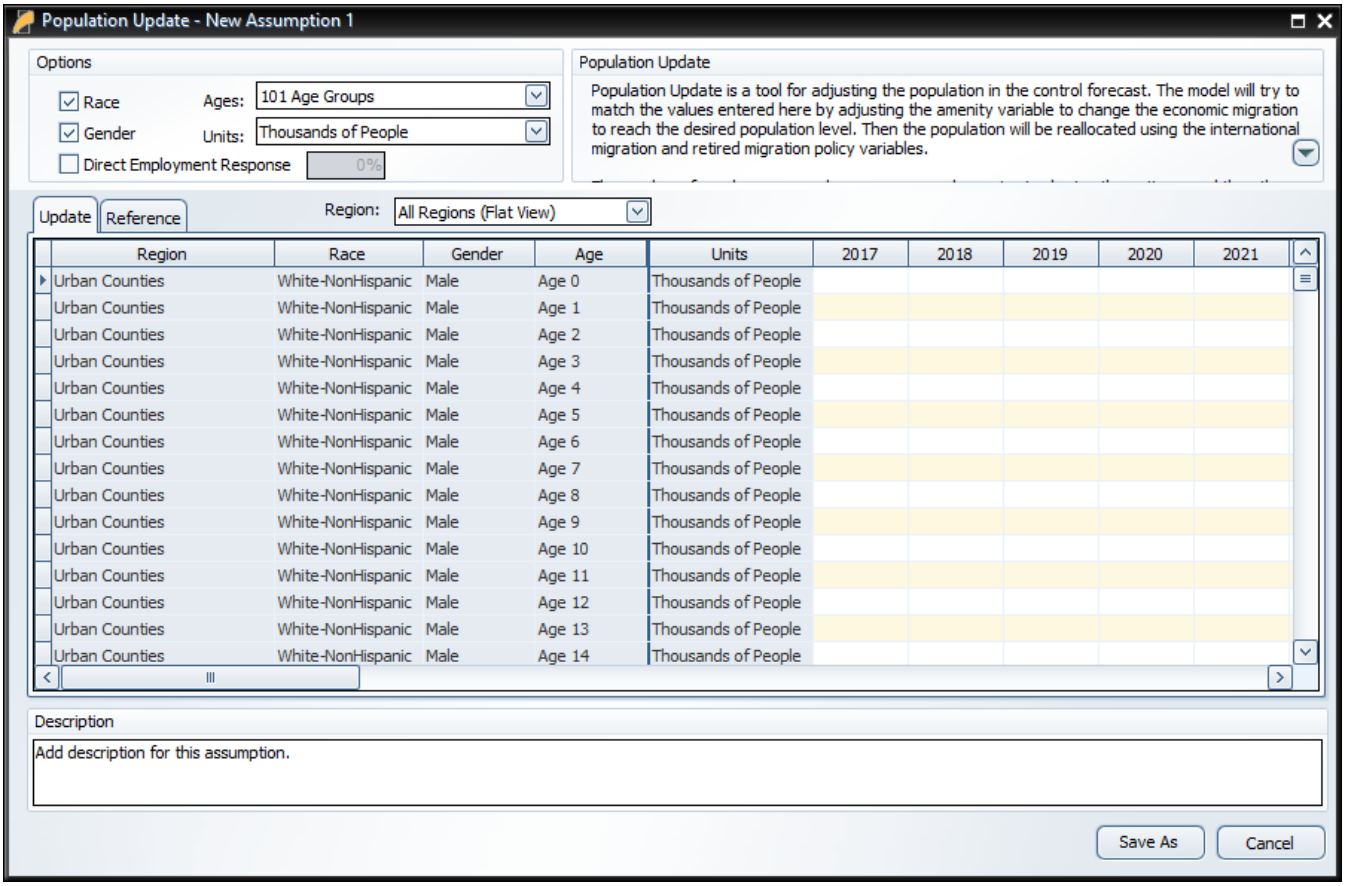
Figure 21: Employment Update



Population Update

Population updates are available only for regional controls. This type of assumption can be used to adjust regional population levels. Similar to employment updates, options for controlling the level of the details can be found at the top left of the window. Using these options, alternate population values can be entered by race and by gender, or for all races and both genders together. Different age groupings, unit types, and region groupings are also available. Again, reference values can be found on the "Reference" tab and a description can be added for the update.

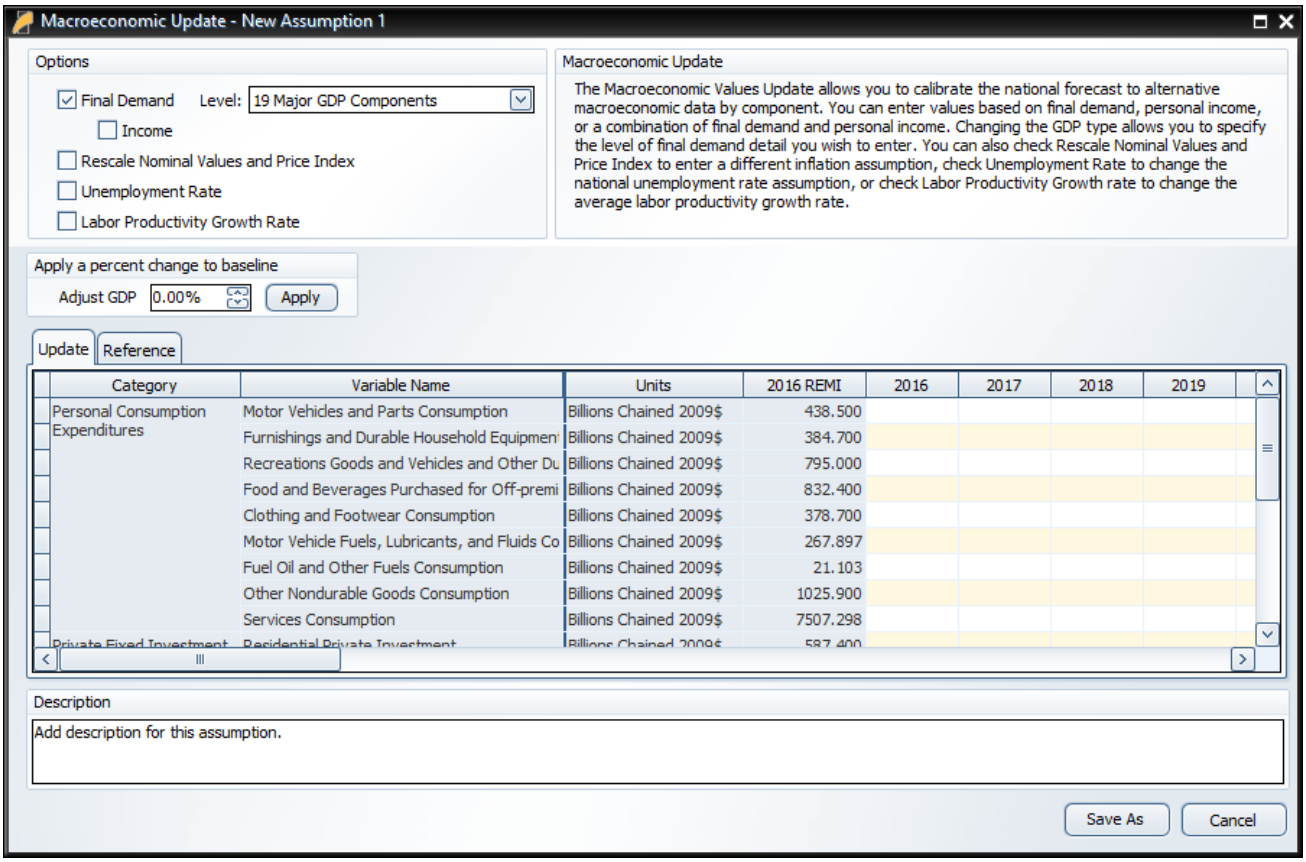
Figure 22: Population Update



Macroeconomic Update

The Macroeconomic Values Update allows you to calibrate a national forecast to alternative macroeconomic data by component. Using the options, you can enter values based on final demand, personal income, or a combination of final demand and personal income. Changing the level of the GDP type in the combo-box allows you to specify the level of final demand detail you wish to enter. You can also check “Rescale Nominal Values and Price Index” to enter a different inflation assumption, check “Unemployment Rate” to change the national unemployment rate assumption, or check “Labor Productivity Growth” rate to change the average labor productivity growth rate. There is also an “Adjust GDP” tool for automatically applying a percent change to the baseline macroeconomic values. Just like the other update types, you can always check the baseline values on the “Reference” tab and add a description.

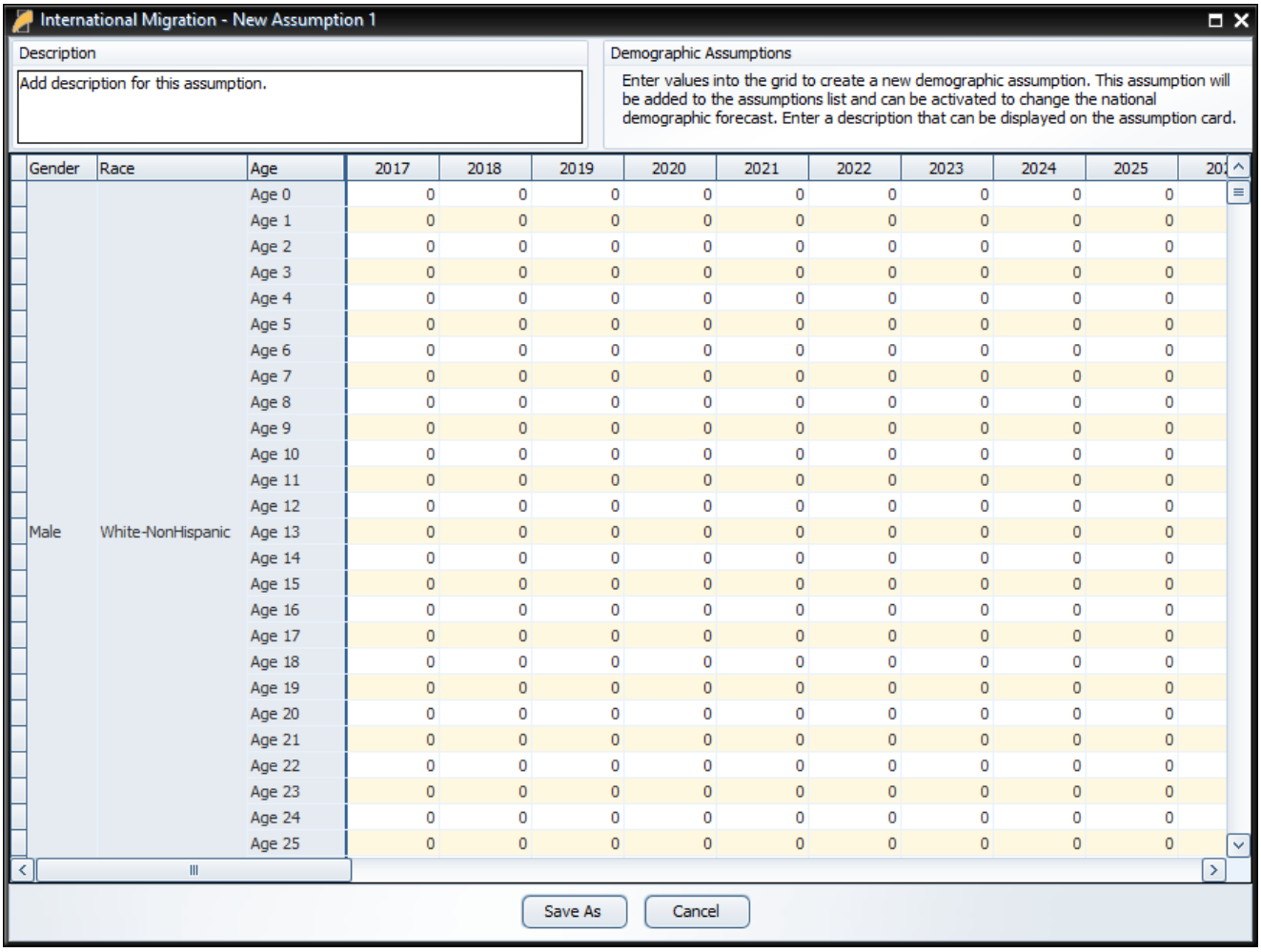
Figure 23: Macroeconomic Update



National Demographic Assumptions

National Demographic assumptions allow for modifying various demographic aspects of a national forecast. Alternate values can be entered for birth rates, survival rates, international migration, and participation rates. These custom national demographic values must be entered by gender, race, and individual age group. A description of a national demographic assumption can be added using the text field on the top left of the form.

Figure 24: National Demographic Assumption

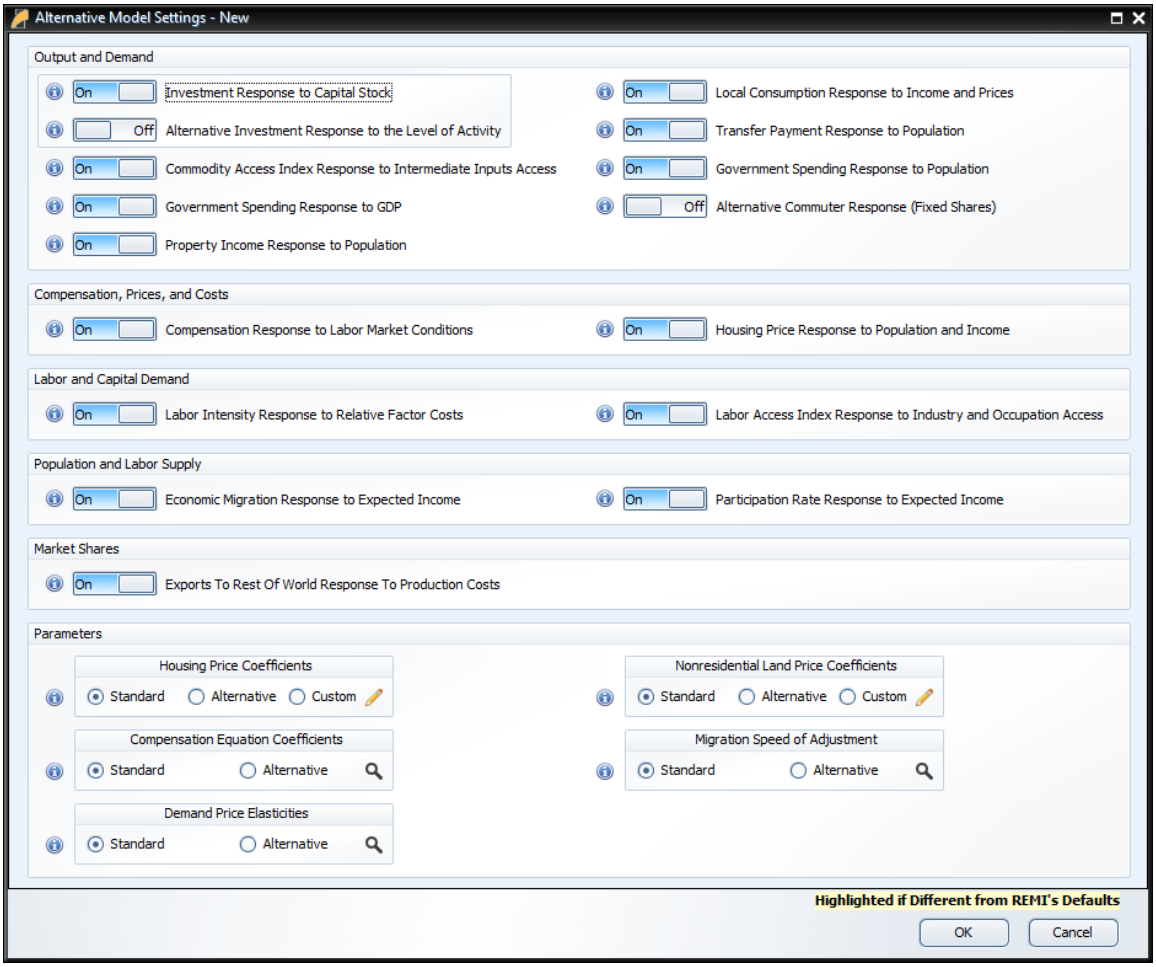


Gender	Race	Age	2017	2018	2019	2020	2021	2022	2023	2024	2025	20
		Age 0	0	0	0	0	0	0	0	0	0	
		Age 1	0	0	0	0	0	0	0	0	0	
		Age 2	0	0	0	0	0	0	0	0	0	
		Age 3	0	0	0	0	0	0	0	0	0	
		Age 4	0	0	0	0	0	0	0	0	0	
		Age 5	0	0	0	0	0	0	0	0	0	
		Age 6	0	0	0	0	0	0	0	0	0	
		Age 7	0	0	0	0	0	0	0	0	0	
		Age 8	0	0	0	0	0	0	0	0	0	
		Age 9	0	0	0	0	0	0	0	0	0	
		Age 10	0	0	0	0	0	0	0	0	0	
		Age 11	0	0	0	0	0	0	0	0	0	
		Age 12	0	0	0	0	0	0	0	0	0	
Male	White-NonHispanic	Age 13	0	0	0	0	0	0	0	0	0	
		Age 14	0	0	0	0	0	0	0	0	0	
		Age 15	0	0	0	0	0	0	0	0	0	
		Age 16	0	0	0	0	0	0	0	0	0	
		Age 17	0	0	0	0	0	0	0	0	0	
		Age 18	0	0	0	0	0	0	0	0	0	
		Age 19	0	0	0	0	0	0	0	0	0	
		Age 20	0	0	0	0	0	0	0	0	0	
		Age 21	0	0	0	0	0	0	0	0	0	
		Age 22	0	0	0	0	0	0	0	0	0	
		Age 23	0	0	0	0	0	0	0	0	0	
		Age 24	0	0	0	0	0	0	0	0	0	
		Age 25	0	0	0	0	0	0	0	0	0	

Alternative Model Settings

Different pieces of the REMI model's structure are linked together in certain ways as our best means of approximating of how the real economy generally works. In some cases, you may find that the model would better match a particular real-world scenario if some of these connections behaved differently or were removed altogether. Using the Alternative Model Settings, you can do just that by changing certain settings that control various interacting parts of the model. Depending if you are creating a national or regional control, there are different settings that are available. Certain pre-defined alternative sets of settings exist that REMI has found to be useful in the past. When making your own custom alternate model settings, simply toggle any of the on-off switches to enable or disable that particular model response. A few settings are actually parameters to model equations that can be modified. Each of these has an alternative set of values that can be viewed and selected for substitution. The default housing price and land price coefficients can also be substituted for custom values. Any setting that has been changed from the REMI default value will be highlighted for easy differentiation. Information buttons containing setting descriptions are present next to every setting.

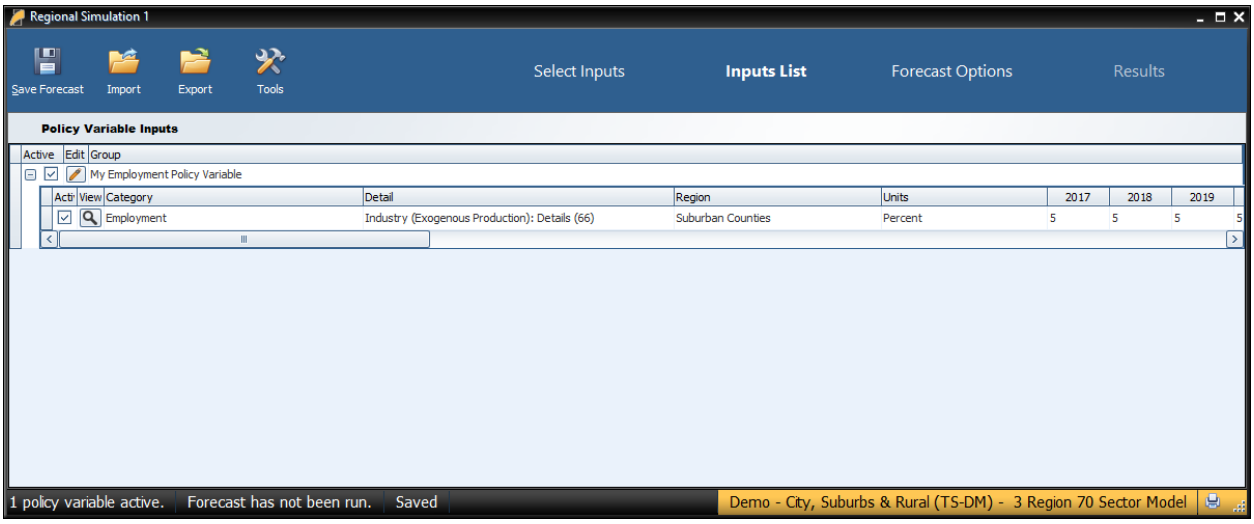
Figure 25: Alternative Model Settings



Inputs List

The Inputs List is a screen that displays the policy variable groups and contained policy variables that will be included as inputs to the model as it runs. Expand any group to see the variables inside. Unchecking a check box in the "Active" column of the list will exclude the corresponding variable or variable group from the forecast run. Another feature of the Inputs List is the ability to inspect the converted versions of a given policy variable. While there are many different ways to specify any particular policy variable, only one format can actually be used by the model, so conversion is necessary. Clicking on the magnifying glass icon on a policy variable in the Inputs List will open this converted variable window. The "Tools" button stationed on the header of the Inputs List provides some useful functionality for selecting, merging, and deleting groups of policy variables from the list. Finally, any model assumptions that have been added to the forecast will also be displayed on this screen alongside a button for quickly editing them.

Figure 26: Inputs List

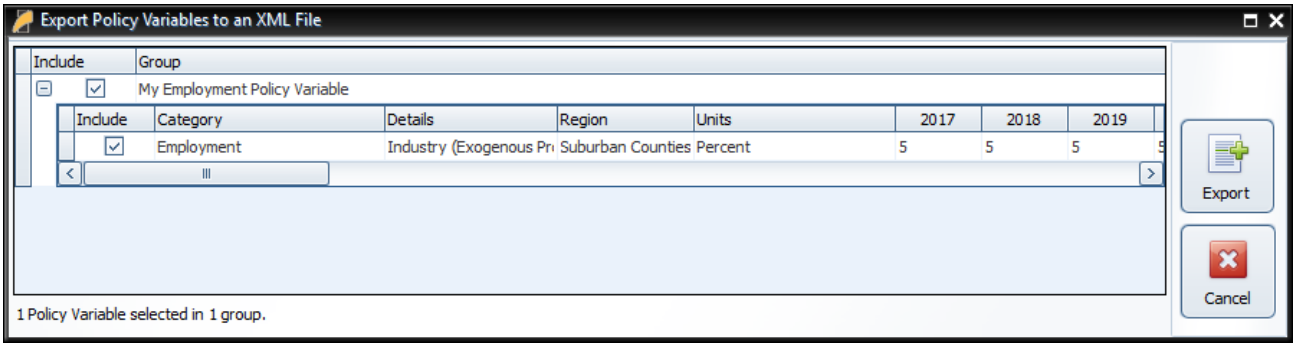


The policy variable import and export buttons are also located on the inputs list. Clicking the "Export" button will open the Export Center, which provides functionality for selecting which of the existing policy variables should exported. Likewise, clicking the "Import" button launches a file selection dialog, which, once completed, opens the Import Center. The Import Center offers similar selection functionality to the Export Center, but also has additional options for merging, duplicating, and clearing values from variables found in the export file.

Policy Variable Export and Import Centers

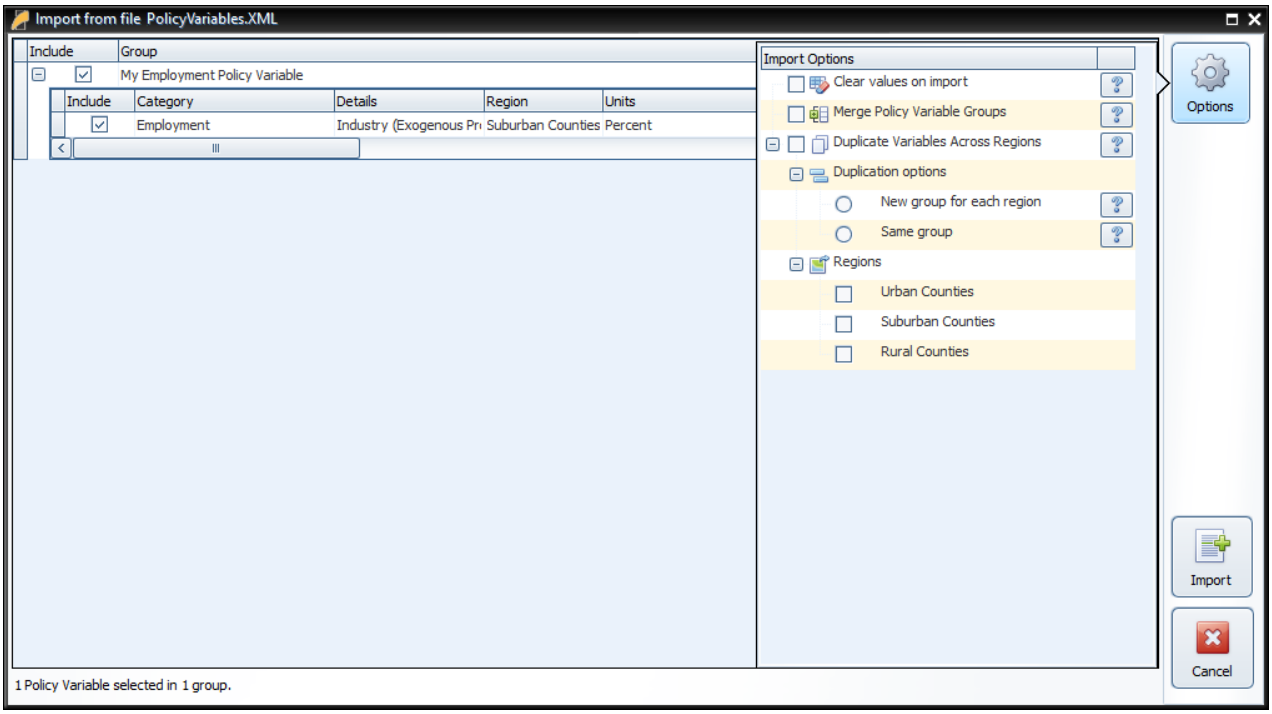
The Export and Import Centers are similar windows that provide a method for deciding which policy variables contained in the present forecast should be exported to a file or imported from a file, respectively. Simply check or uncheck checkboxes in the "Include" column to include or exclude variables.

Figure 27: Export Center



Our current policy variable export files use the flexible XML format to store the wide variety of options that can be associated with all of our different types of policy variables. Unfortunately, XML files are not easily manipulated by hand or by third-party software. As such, when working with large numbers of variables for repeated forecast runs, we recommend creating one or more templates using the PV Selector and the policy variable group merging tool and exporting them. A template would then be a large policy variable group containing all of your required variables in the correct order and with the desired options to match the format of your values. Each use of a template then just becomes a task of opening the variable group in the PV Selector and pasting in values, rather than attempting to replicate the complex structure of the policy variables in our export files, which would be highly error-prone.

Figure 28: Import Center

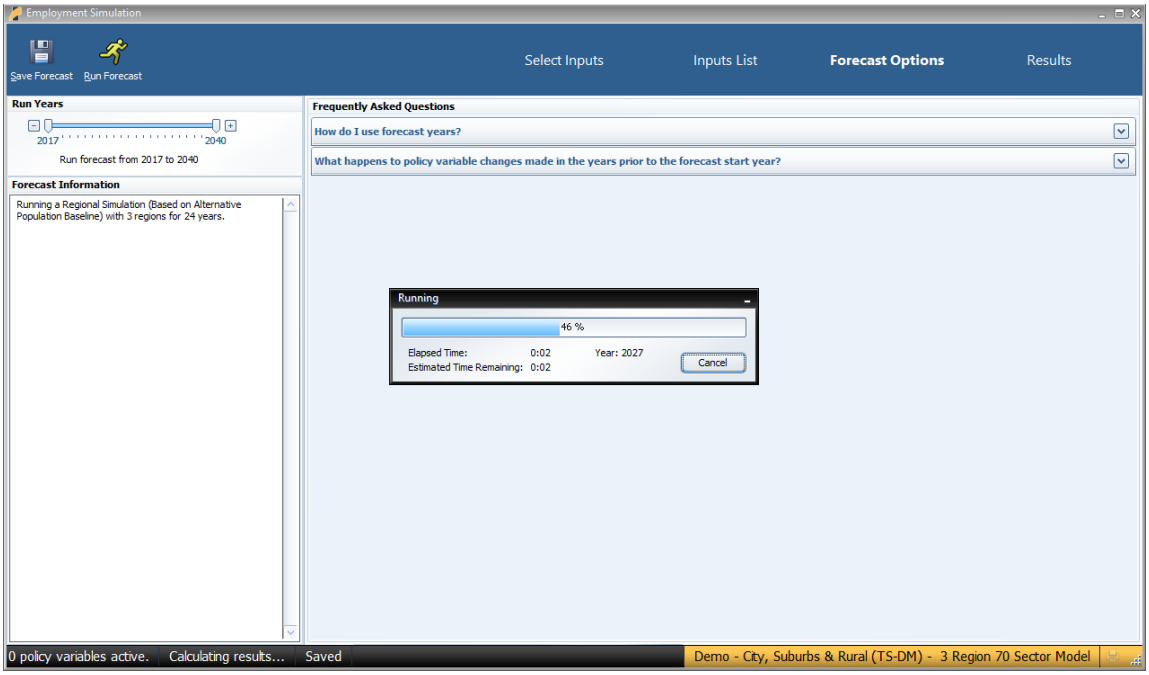


Importing with the Import Center follows roughly the same process as exporting, but with more options. There are options for merging policy variable groups, clearing the values out of the variables, and duplicating variables across all or some of your model regions. In addition to the most straightforward form of importing: from an exported XML policy variable file, you can also import policy variables from a REMI workbook file and from several legacy import file formats. Use caution with legacy formats, as your old variables may not perfectly map to new variables.

Forecast Options

Running a forecast takes place on the Forecast Options screen. Once you have finalized your policy variable inputs, you should make some final decisions about how the forecast should run. Depending on the type of forecast, some different options will be available including closure options and iteration settings. Regardless of the forecast, there will be frequently asked questions and answers about the available run options right on this screen. The "Run Years" selector shows what years the forecast will run for. Not all forecast years up to 2060 will be available in all cases. If your forecast has a parent baseline control, only the years for which that control has run will be available. Once you have chosen your options, settings, and run years, simply click the "Run Forecast" button and the model will begin calculating results, as indicated by the pop-up run progress window.

Figure 29: Forecast Options

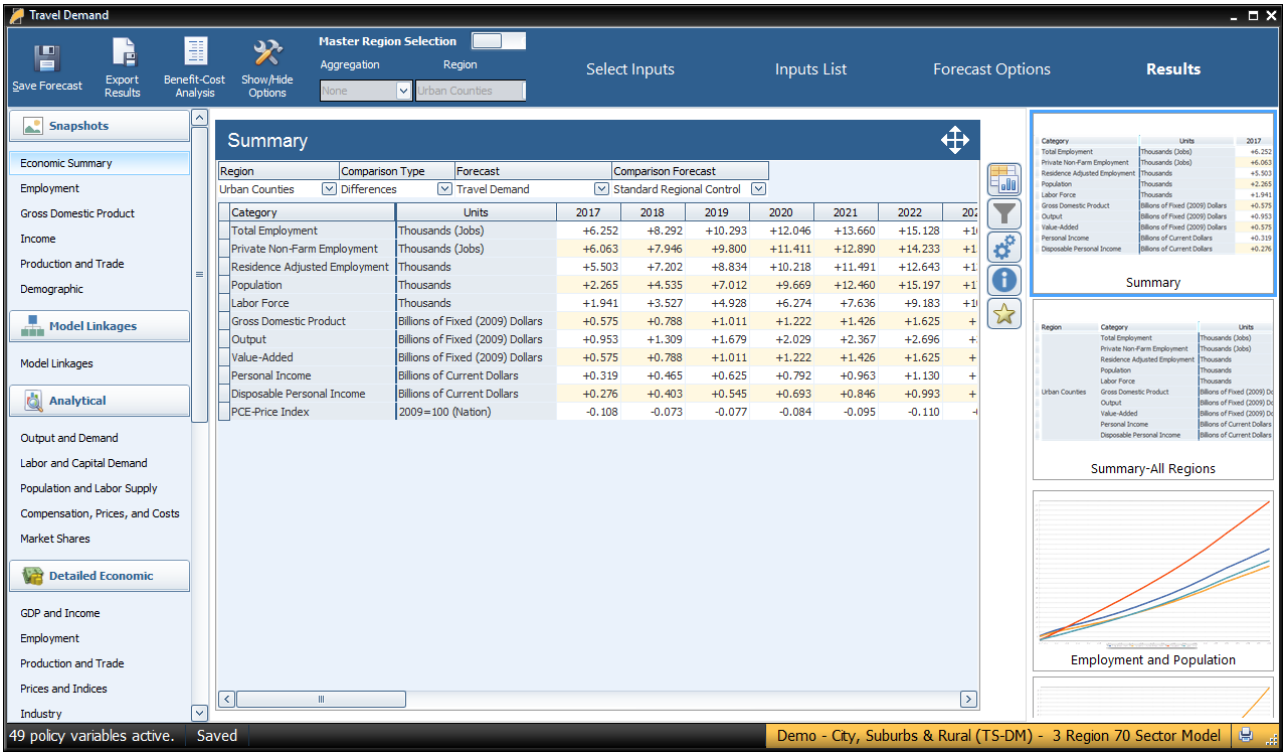


Results

Completely redesigned for version 4.2, the Results section of TranSight contains all of the results of the forecast run that were produced by the REMI model. Result data are displayed in tables, maps, and a wide variety of chart-types. The main navigation menu, on the left side of the window, provides a means for accessing all of the different categories of result visualizations that have been created by REMI. These groupings put results together by concept and help to break up the huge amount of data into more manageable sections.

There are five layouts that are used for arranging visualizations among the different categorized sections of the Results screen. The first, which is visible in Figure 30, is the gallery layout mode. In gallery mode, one visualization takes up the majority of the space on the screen and the remaining visualizations belonging to the same group are previewed on a scrolling list of tiles on the right-hand side of the screen. This tile list can be dragged with the mouse, scrolled by mouse wheel, and scrolled by hovering your mouse near the top or bottom visualization and clicking on the arrow buttons that appear. Clicking on any preview tile will slide that visualization into the central, focused view.

Figure 30: Results – Gallery Mode



The next three visualization layout types each look quite different, but all function in very similar ways.

The Model Linkages view, shown in Figure 31, consists of an interactive diagram that depicts the various links that interconnect different parts of the economy in the REMI model. Any of the outer or inner blocks of the diagram, when clicked, will bring forward a group of related results tables.

Other result categories use tile and list layout modes. These two organizational modes simply contain a list of concepts, hierarchically structured in the case of list mode, where each concept has its own tile or list item that links to the corresponding result table. Examples of these two modes are displayed in Figure 32 and Figure 33.

Model Linkages, tile mode, and list mode share similar functionality once you have selected a concept for viewing of its results. Depicted in Figure 34, you can see that the selected result table is shown by itself as part of a tabbed view. The tab bar along the top of the visualization area allows for quickly switching to view any of the other tables included in the same model block, tile group, or list section. The tab bar can be scrolled left and right using the respective on-screen arrow buttons. To go back to the starting view, use the back button on the top left.

Figure 31: Results – Model Linkages

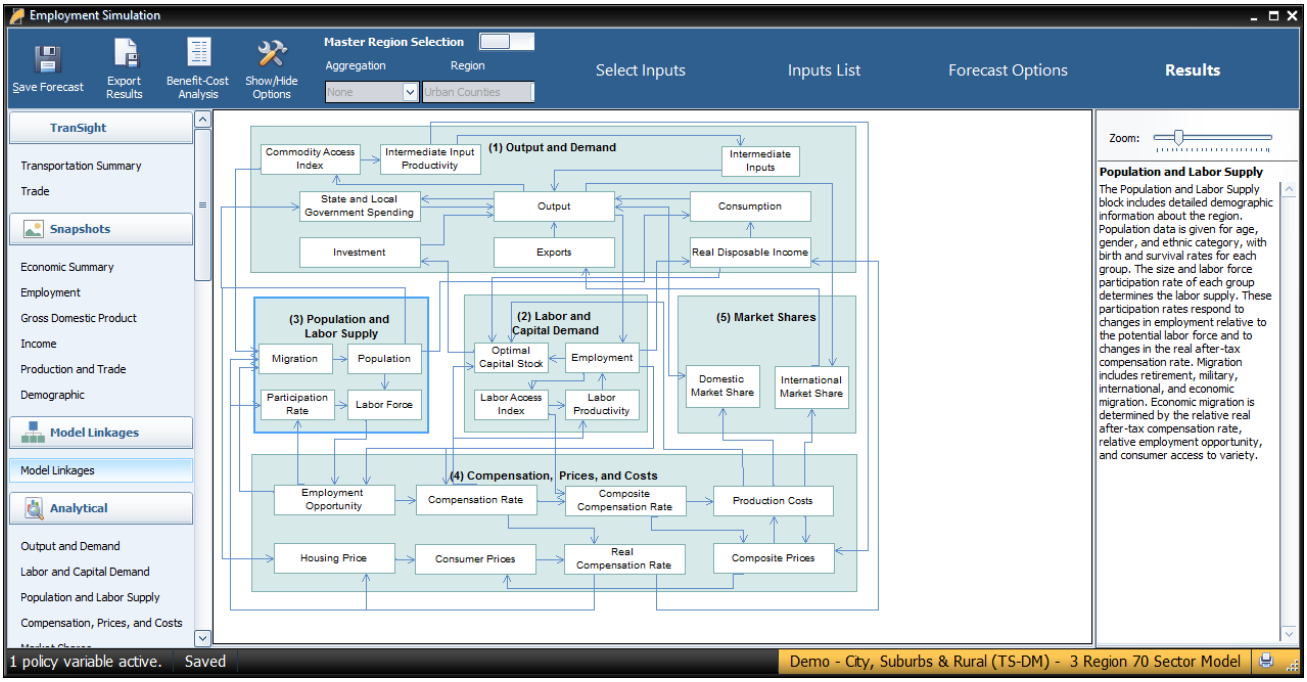


Figure 32: Results – Tile Mode

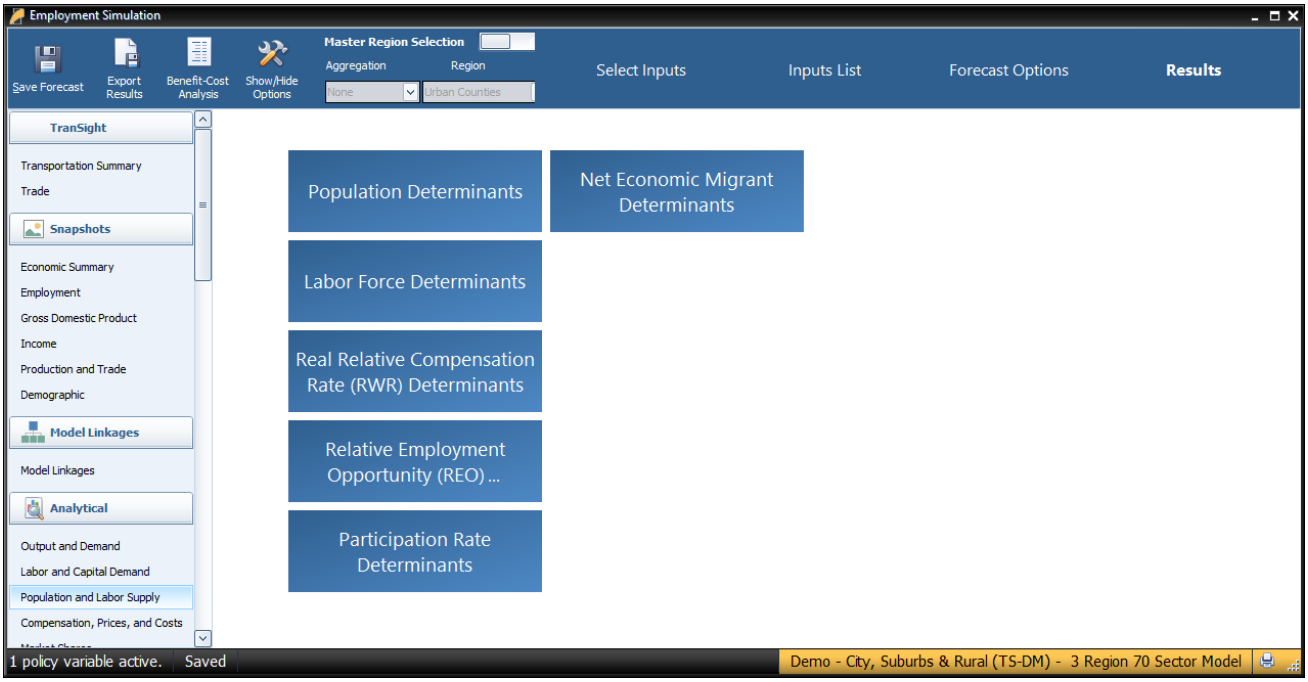


Figure 33: Results – List Mode

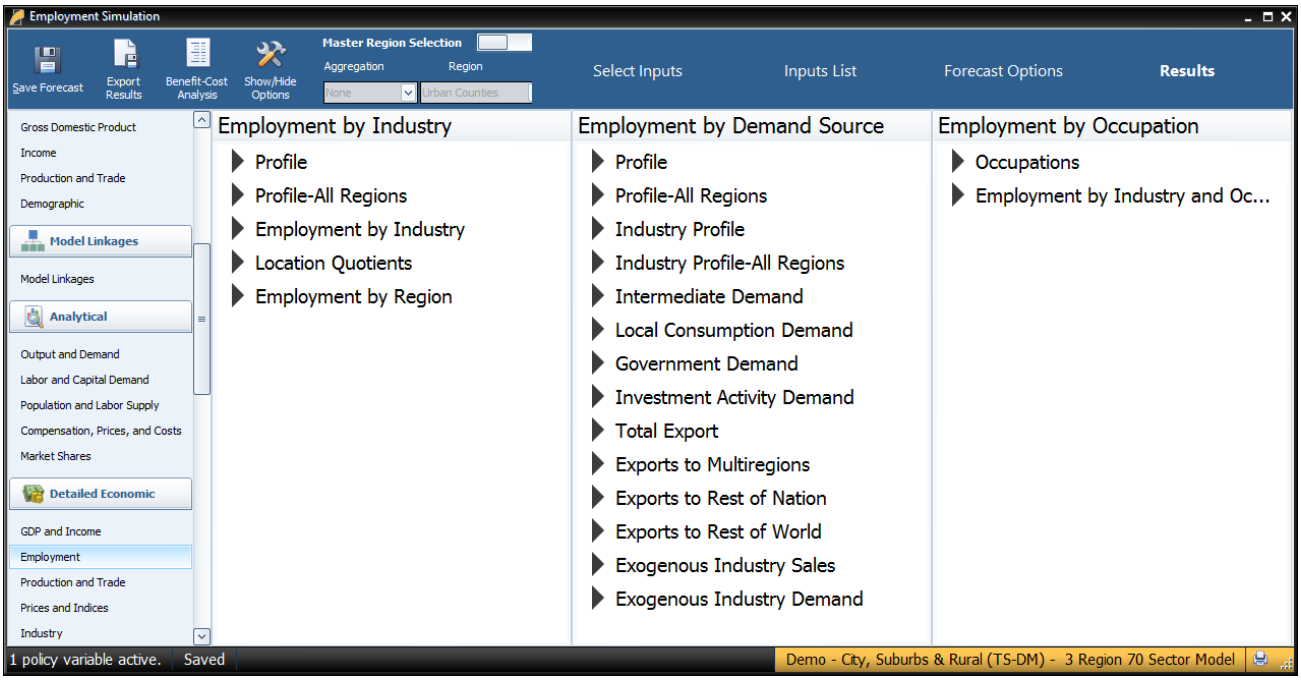
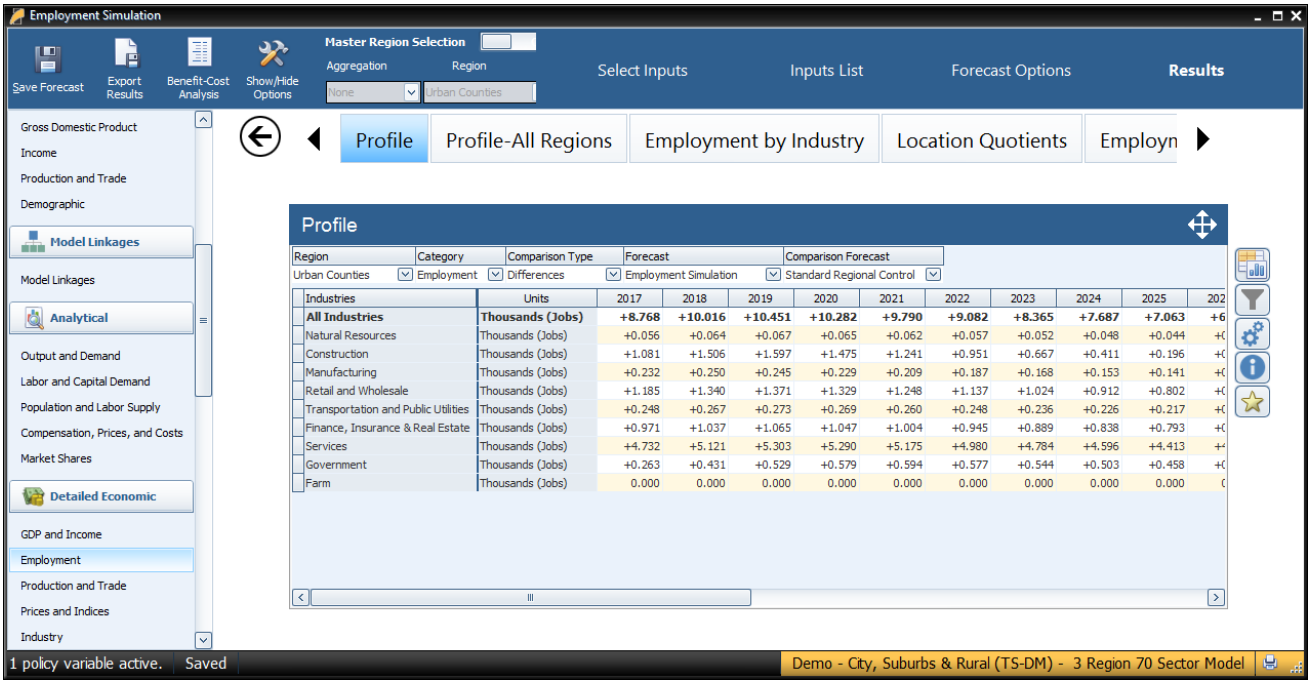


Figure 34: Results – Tabbed View

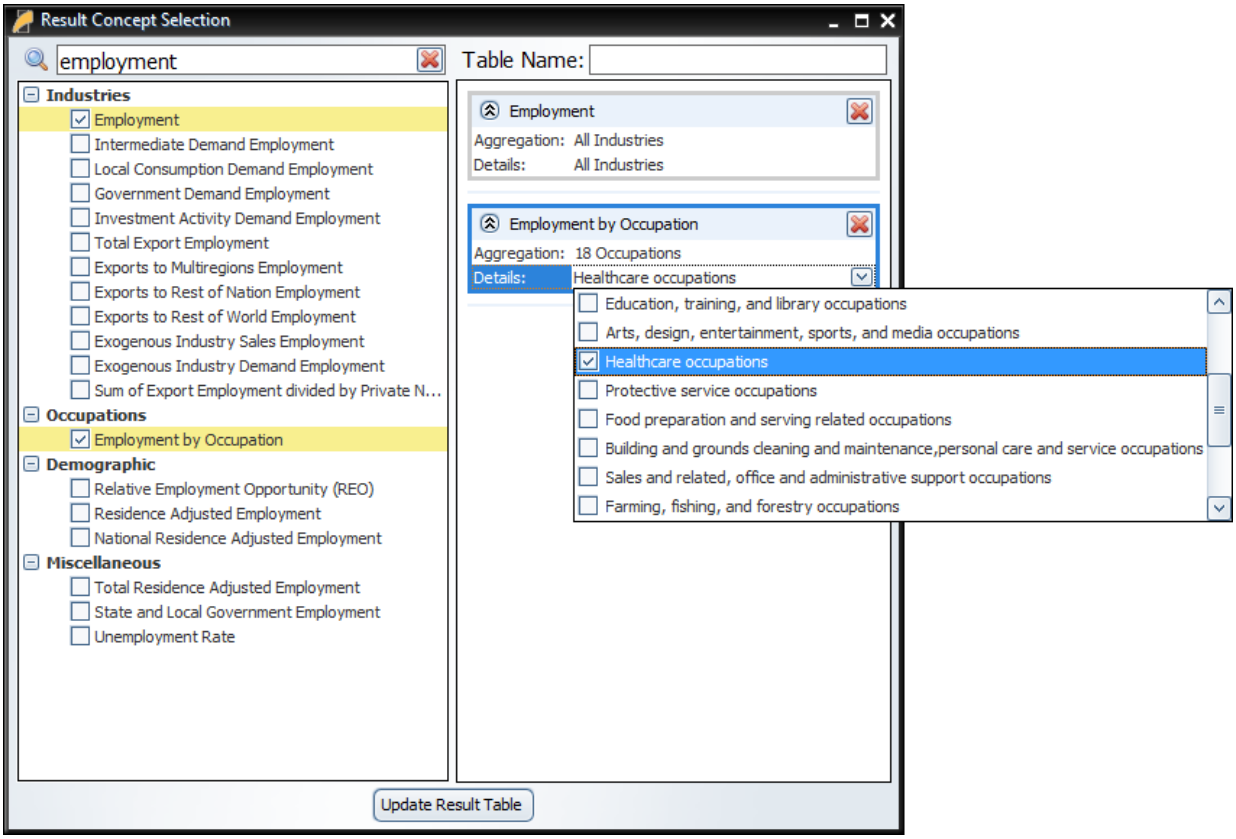


Favorites

The fifth and final layout used on the results screen is row mode that is used on the customizable Favorites section of the results. The Favorites section is intended to allow users to build their own preferred tables, charts, and maps and arrange them however they would like. Favorites are saved and can be viewed for every forecast that you run. To add a new favorite group, scroll down on the main navigation menu until you see the Favorites section and the "[Add a New Favorite]" menu item. Selecting this item will prompt for a name to be assigned to the new group and, afterwards, a table creation tool will launch.

The table creator features a full list of every result concept available to the current type of forecast, sorted by detail category. Use the search bar to filter down the long list. Selected concepts will be displayed in the list on the right for ease of keeping track of what has been selected, removing any no-longer-wanted concepts, and lastly, for specifying further information about selected concepts in certain situations. More information will be required when multiple concepts are chosen to be added to a table and they do not all have the same detail category, for example if one variable has industry details and another has age, race, and gender details. In this case, the resulting visualization will need to display values for each concept and a fixed individual detail, like Employment – Construction rather than general Employment with a combo-box filter for switching the industry. Each selected detail can come from an aggregation, if desired, and ultimately will be added to the finished table as separate line item.

Figure 35: Result Table Creator

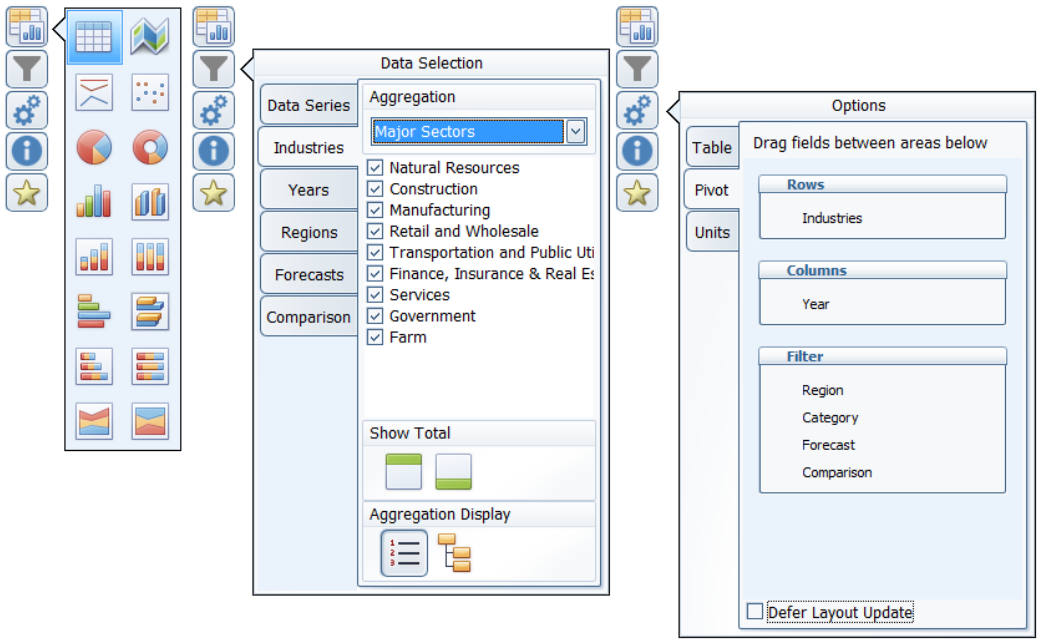


Favorite visualizations have a button on their title header panel that will let you re-open the table creator to adjust their contained data. There are several more options for Favorites that are described in the section below in the context of the many options available for interacting with visualizations.

Interacting with Visualizations

As you navigate the results and click around on visualizations, you will notice that a group of five buttons consistently appears to the right of the most recently selected data visualization. These buttons provide important ways of interacting with the selected visualization. The first three buttons each open pop-up menus that respectively allow for changing the chart-type, modifying the included data, and updating the visualization's settings. The fourth button opens a pop-up text field containing a description of the result concepts currently included in the visualization and the fifth adds a copy of the selected visualization to the Favorites.

Figure 36: Data Visualization Interaction Buttons and Menus



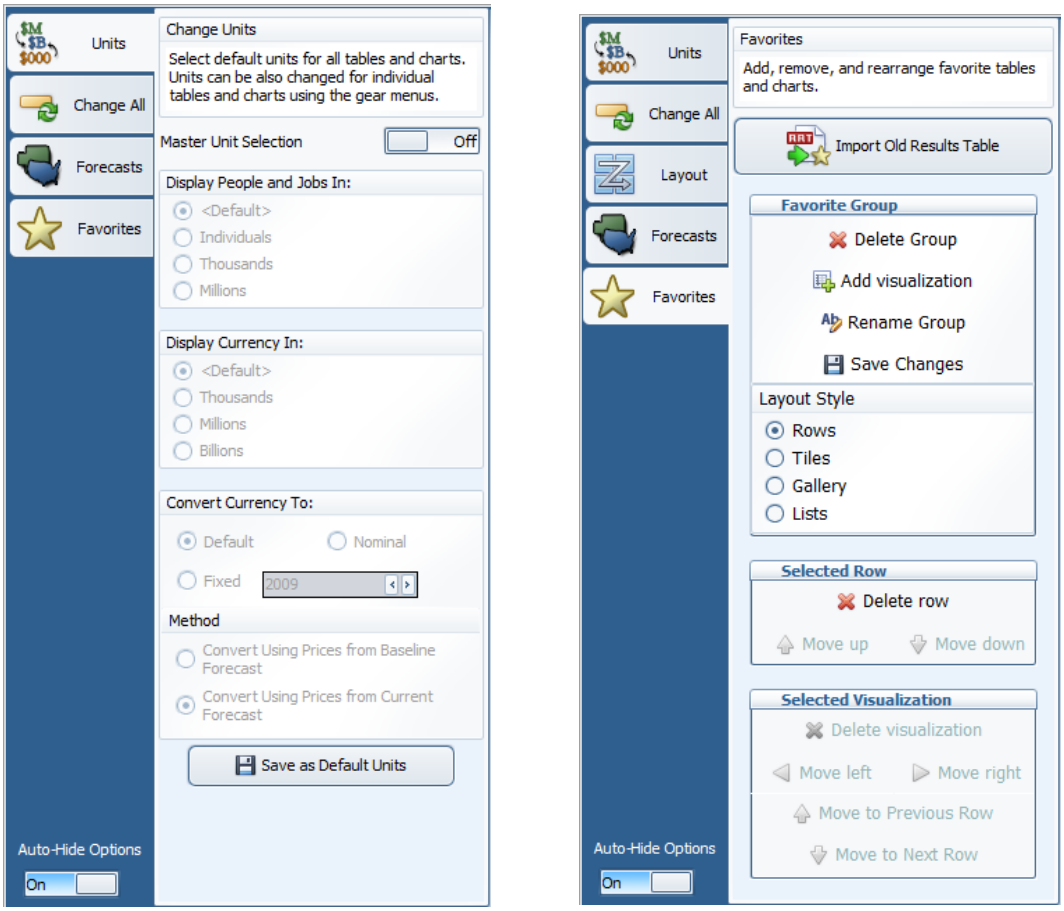
The chart-type menu lets you switch a visualization between showing a table, map, or fourteen different types of charts. Once you have selected a chart-type option, another menu will open that lets you choose between each of the different ways your data could fit into the new type of chart, with visual previews of each of the available configurations.

If you want to change what data is being shown on a visualization, look in the data selection menu accessed using the second button from the top with the filter icon. This menu has several tabs that each focus on a separate aspect of the data included in the visualization. In the data series tab, you can toggle whether any of the included data series are visible in the chart, remove them altogether, and add new data series using the result table creator. On the other tabs, which vary depending on what details are associated with the data series being displayed, you can change what details are being shown. You can choose to hide or show each region, year, comparison forecast, comparison method, and other detail. There are also options for changing the aggregation level of the displayed details, adding totals, and introducing hierarchy to the layout of the result table in order to see values for multiple aggregation levels at the same time.

The options menu, shown furthest to the right in Figure 36, has a few more options for modifying the current visualization. For certain chart-types you can choose to enable sorting, pick alternate color schemes, and change the decimal precision of listed values. You can also change the displayed units and use the pivoting tool to restructure the chart entirely by dragging different dimensions of the result data into the different pivot-able destinations afforded by the chart-type. For example, in the pivot menu shown above, industries are currently being displayed down the rows of a table, years along the columns, and the remaining detail types in the filter combo-boxes. This can be altered in any way by dragging these data dimensions between the different groups, although putting too many dimensions onto the rows or columns of a table or either of the two axes on a chart might cause the visualization to take a very long time to finish updating.

There are several other ways of interacting with and modifying visualizations outside of the main visualization buttons. Master region selection, which is located at the top of the window on the header panel, should be turned on when you would like to have all visualizations display a certain region or aggregated region group. Another useful feature is the full-screen button. This button can be found on the top right corner of any visualization's title area and will toggle full-screen mode for that visualization.

Figure 37: Results Options – Units and Favorites



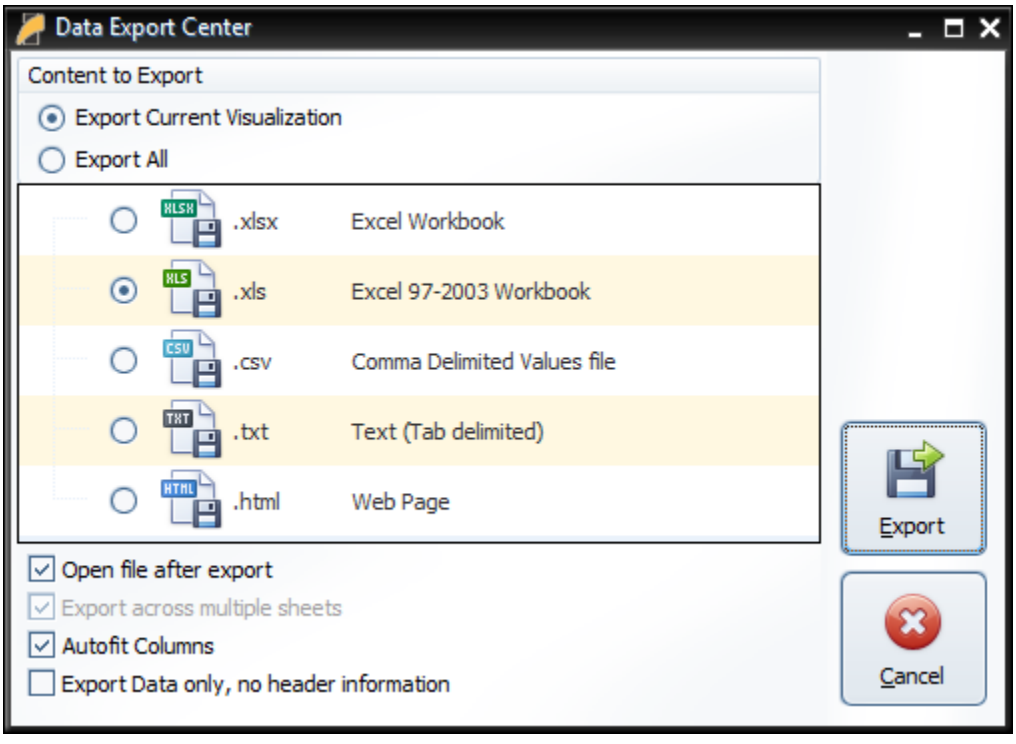
Even more options can be found by clicking the "Show/Hide Options" button on the header panel. This button will expand or collapse a pop-out options menu originating from the right-hand side of the screen. This global options menu has functionality for changing some settings on all visualizations simultaneously as well as controls for managing Favorites. Shown above in Figure 37, the first tab contains master unit selection, which is analogous to master region selection but for unit types. If you would like to change the units that are used by visualizations by default, you can make those changes and save them here. The second tab of the global options menu has master year selection and master value-precision selection. The third tab contains a list of your forecasts. Here you can choose to select additional forecasts, aside from the forecast whose results are being viewed and its parent control(s), to show up in the comparison forecast drop-down

menu on each visualization. The final tab, focused on Favorites, has quite a few useful features. First is result importing, with this button you can attempt to import result tables from past versions into your Favorites. The remaining features manage your existing Favorites groups and the contained visualizations. You can rename and delete groups, add and remove visualizations from groups, switch the layout style of a group, and move visualizations or rows of visualizations around within a group. Depending on your preferences, you might find it useful to change the state of the "Auto-Hide Options" toggle switch located on the bottom left of the options panel. By default, clicking outside of the options panel will automatically close it, making for easy one-time changes. However, when you are making repeated use of the options you may want to disable that functionality.

Exporting Results

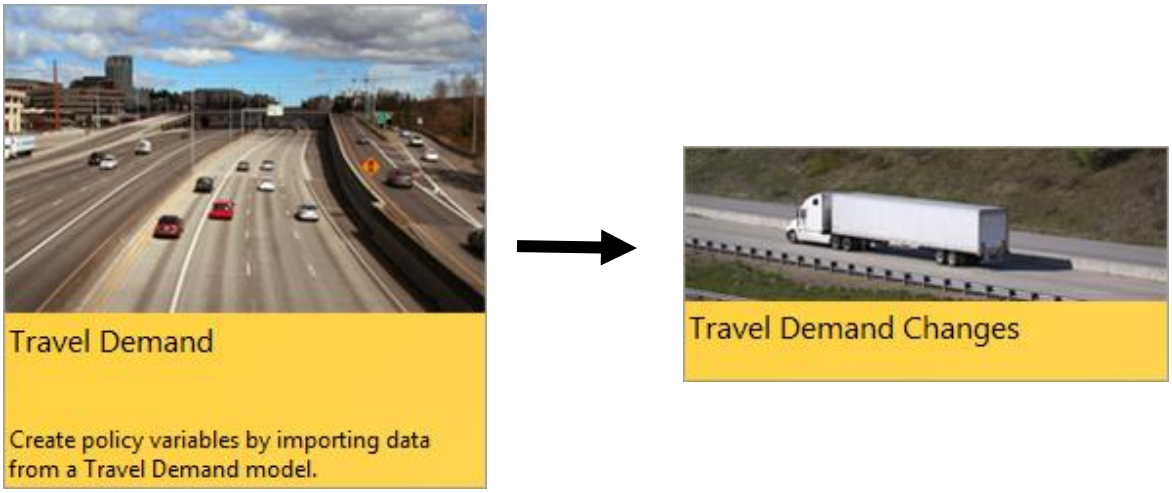
In order to export forecast results from TranSight, you will need to locate the "Export Results" button on the navigation header bar, between the save and options buttons. This button launches the "Data Export Center", which is the home for all result exporting. The interface of the export center has options for deciding what content should be exported, as well as the export file format, and some additional settings. When exporting multiple visualizations to an Excel Workbook, visualizations are each placed on a separate spreadsheet tab.

Figure 38: Result Export



IV. Modeling a Transportation Scenario

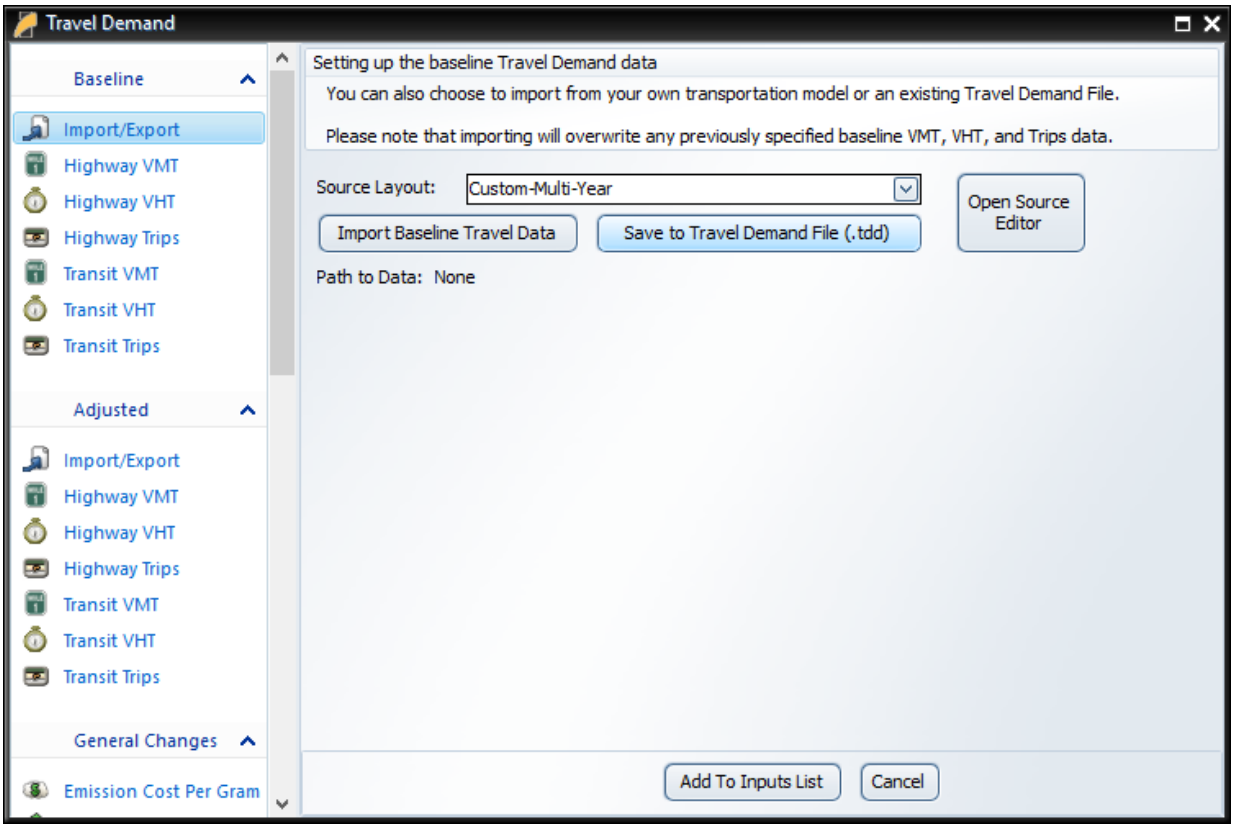
In REMI 2.0, the way to model a Transportation Scenario originating from an exogenous travel demand model (or data entered manually) is to click on **Travel Demand** in the forecast navigation screen, and then on **Travel Demand Changes**. The Travel Demand Study dialogue will appear, displaying the available inputs.



Travel Demand Study

The Travel Demand Study imports the data from Travel Demand Models for use in TranSight. You can view Baseline and Adjusted Simulation data; the Baseline Simulation is the "no-build" scenario forecasting what will happen without the proposed changes, and the Adjusted Simulation is the "build" scenario forecasting what will happen if the changes occur. You can also apply different parameters to the Adjusted Simulation data, such as lower accident rates to reflect a build scenario that would also bring safer traffic conditions.

It is also possible to import the same data for the Baseline and Adjusted Simulations and simply make Parameter Changes to see the impact it would have on your existing network.



Importing Data

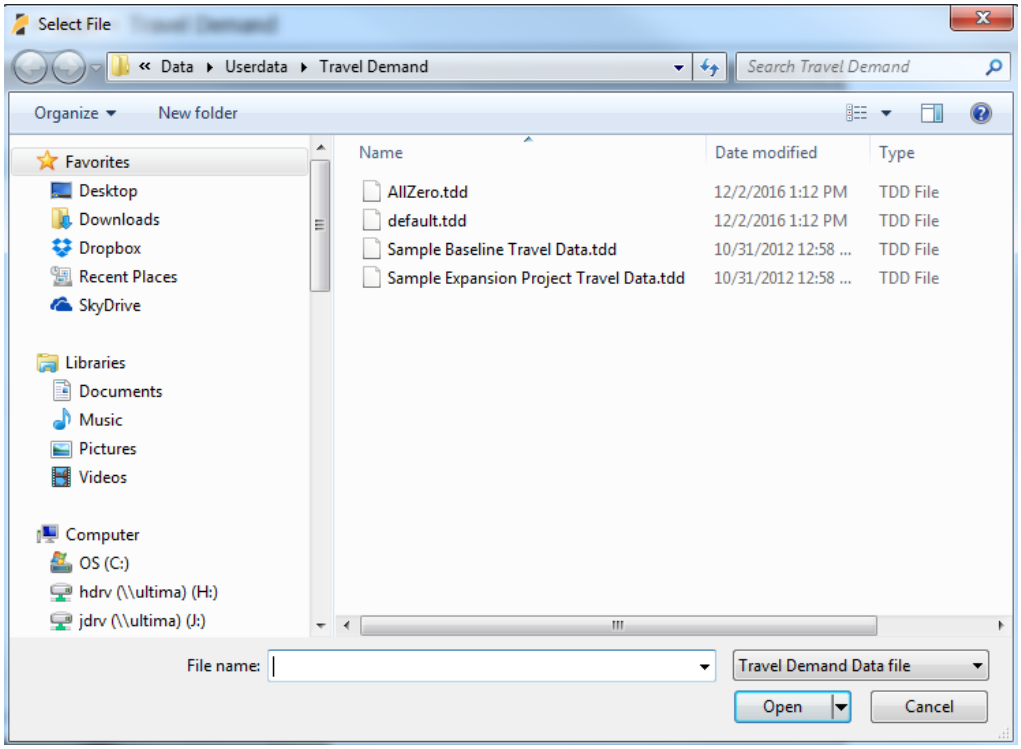
TranSight links travel-demand models to REMI's economic model engine. Importing travel-demand model information is easy, because TranSight automatically converts all the data into policy variables.

Under the **Baseline** header, click on **Import/Export**, if it isn't already selected.

1. Select your travel-demand model in the **Model Type** drop-down list.

Note: For some import types further phase-in ratios may be needed. If that is the case an array to enter that data will appear below the drop-down list. As with most tables you can right click on the cells to access the **Calculator** to assist with data entry.

2. Click the **Import Baseline Data** or **Import Adjusted Data** button below the **Model Type** drop-down list. This will open a new window which will either let you choose a single file or a folder, depending on the number of files required by the Model Type you chose.



3. Navigate to the folder containing your simulation data.
4. Select it and click the **Open** button.
   Note: If selecting a folder you may need to select one of the files within the folder for the import to work. TranSight will then convert the data into a format it can use.
5. After import the **Path to Data:** line should change to reflect the file/folder you have imported.
6. Repeat this process for the **Adjusted Import/Export**.

   Note: If you lack an Adjusted scenario with your Travel Demand data you can also click the **Copy from Baseline** button and manually adjust the values. Right clicking the table and using the **Calculator** can aid in the process.

Enter or Adjust data manually

If you do not have access to a Travel Demand model, you can manually enter your own data from spreadsheets. Even with a Travel Demand model you may wish to modify data you have imported.

Perform the following steps for both your baseline and/or adjusted simulation(s):

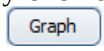
1. Copy and Paste or type in the VMT data for each region-to-region combination, time period, and mode. You are entering the miles, hours, and trips per year for each year of the simulation. You can right click on the table and choose the **Calculator** from the menu to assist with data entry.
2. Repeat step 2 for all concepts (VMT, VHT, Trips) and transportation types (Highway and Transit) that you have data for.
3. Once you entered your data or made your changes you may also wish to save it using the **Save to Travel Demand File (.tdd)** button on the appropriate **Import/Export** page.

Baseline and Adjusted Simulations and Computed Difference

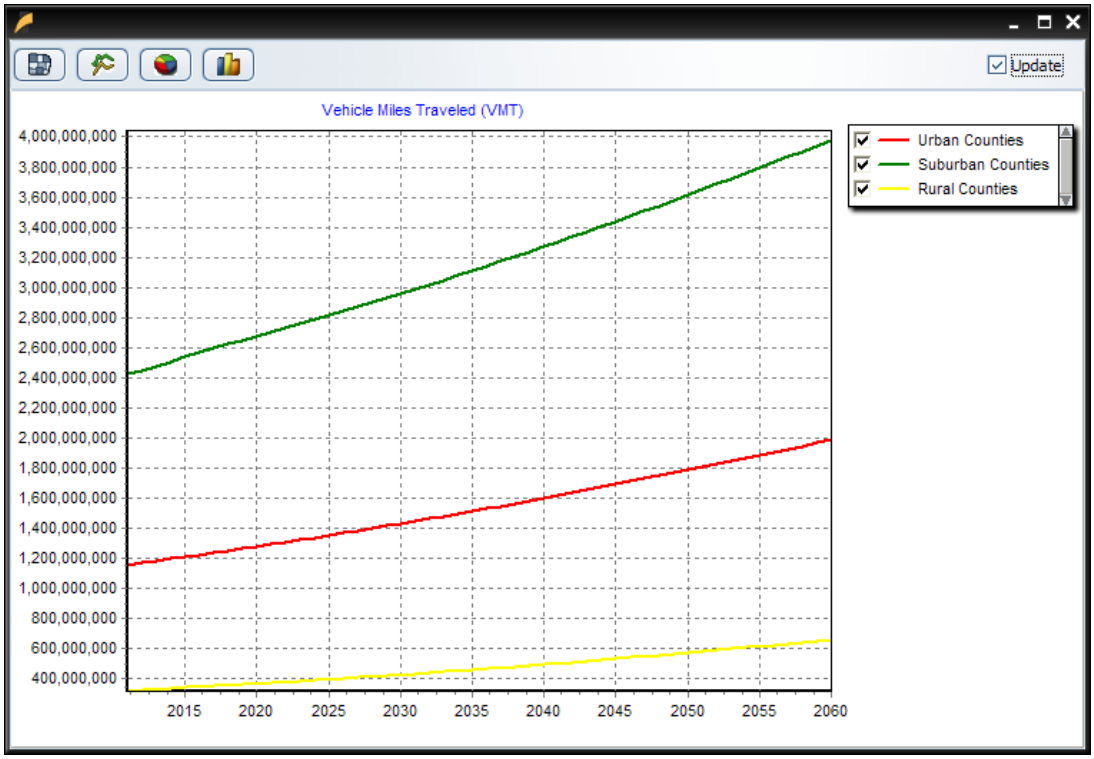
TranSight takes the data for the Baseline and Adjusted Simulations directly from your travel-demand model. The Baseline data should normally come from a travel-demand model simulation that includes no transportation projects, or otherwise represents a reference case against which comparisons are made to alternative scenarios.

The Adjusted data should come from a travel-demand model simulation that incorporates one or more upgrades to the transportation network.

The Computed Difference is simply the calculated difference in VMT, VHT, and VTT between the Adjusted Simulation and the Baseline Simulation. To view the Calculated Differences, select **Differences** and click **View**:

- All graphed data, baseline, adjusted, and calculated, will be based on the currently selected dimensions (such as Road Mode and Time Period). You can also adjust the layout of the dimensions on the table by right clicking on them to move them to the rows or columns.
- To copy data from any of the tables to the Clipboard (so that you can paste it into another program, such as a spreadsheet), select the cells you wish to copy and use Ctrl+C.
- To see more or fewer decimal digits of detail, right-click and select **Precision +** to increase precision or **Precision –** to decrease precision.
- To graph the Baseline or Adjusted data simply click on the icon for the graphing tool . To Graph the Calculated Differences, click on the 

button.



By default it will display as a **Line Chart**. You can also swap the **Pie Chart** or **Bar Chart**, although for Travel Demand data the **Line Chart** will usually be the most useful view.

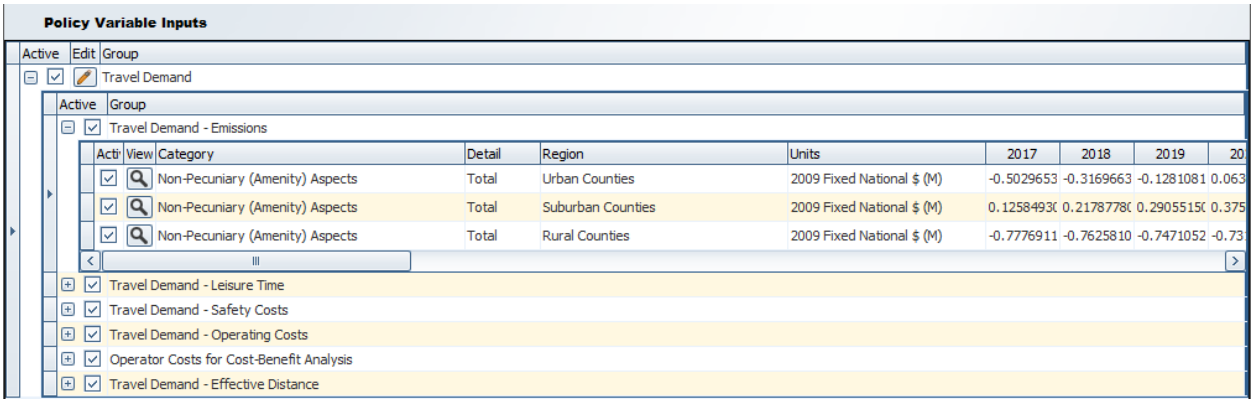
Right-click on a desired chart and select **Copy** to copy an image of the chart to the Clipboard; you can paste it into a graphics program such as Paint or Photoshop.

If you have the **Update** checkbox checked then you can keep the chart window open and it will continue to reflect further changes you make to the dataset it was based on. For Calculated Differences this is currently not an option due to the additional calculations necessary.

The Add To Inputs List Button

When you're ready to add the Policy Variables created by the Travel Demand Study dialogue and return to the Insert ribbon, click the **Add to Inputs** button. You should now notice that the policy variables list has been filled with a **Travel Demand** policy variable group under which you can find the following groups of policy variables:

- **Emissions**: The change in pollution-related health costs (summed across the five major motor-vehicle pollutants) due to the change in VMTs caused by the transportation project. The Amounts tab shows the change in grams of emissions (for each of the five pollutants) due to the change in VMTs.
- **Leisure Time**: The value of leisure time either saved or lost due to the change in VHTs caused by the transportation project. A negative number on this table represents time (and cost) savings for that region.
- **Safety Costs**: The change in accident-related costs (including health and the value of lost life) due to the change in VMTs caused by the transportation project.
- **Operating Costs**: The change in fuel costs and non-fuel costs due to the change in VMTs caused by the transportation project (non-fuel costs include such factors as vehicle maintenance).



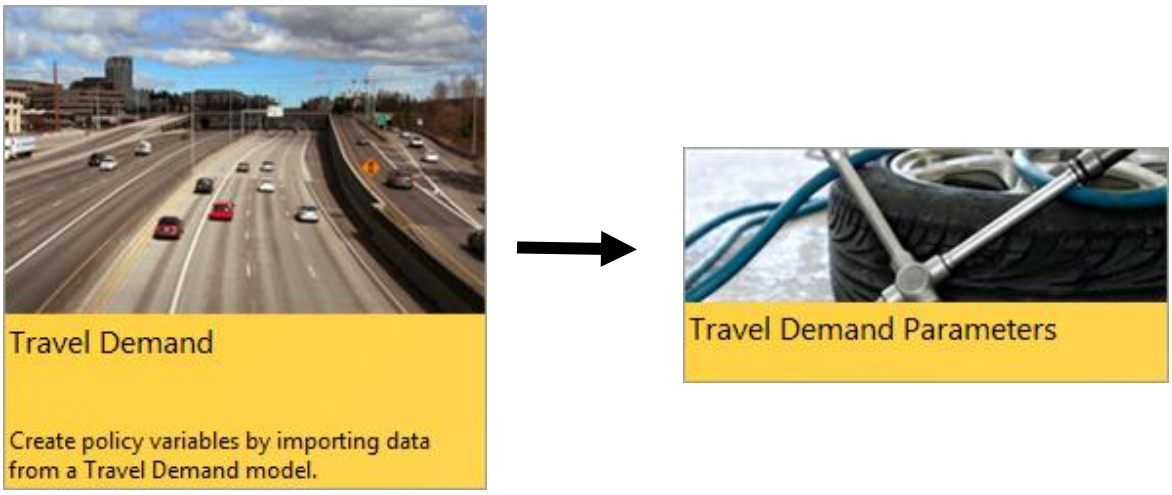
Note that no changes to either policy variables or values may be made here, except to make them inactive or active by unchecking/checking the box . Only active variables will be included when the simulation is run. This option makes it easy to run multiple simulations with different combinations of variables included. Doing so isolates the direct impact of individual variables.

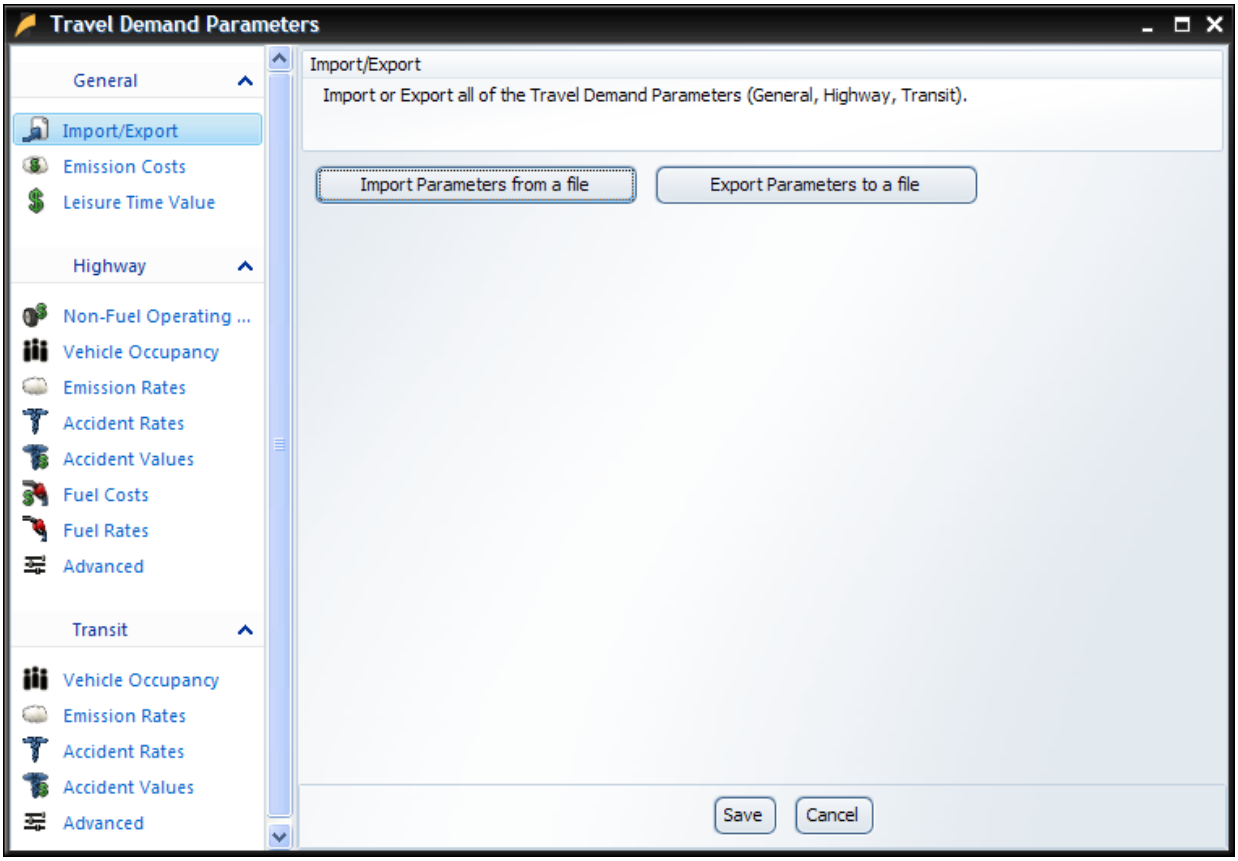
Simulation Parameters

For a number of costs affected by transportation projects, TranSight includes data derived from national sources. This data includes:

- Fuel and Non-Fuel Operating Costs.
- Fuel Efficiency
- Vehicle Occupancy
- Pollutant Emissions Rates and Costs
- Value of Time
- Accident Rates and Costs

You don't need to change these values, but if you have more accurate local data it is recommended that you use those values instead. To view and edit this data click **Travel Demand** in the forecast navigation screen and then click **Travel Demand Parameters**. When updating these parameters make sure the units match those specified.





1. General Group

The General group contains importing and exporting functions as well as parameters that apply to all travel types:

- **Import/Export** – Lets you import previously saved Parameters from a file or Export them for later use.
- **Emission Costs** – Cost per gram for five pollutants (Volatile Organic Compounds, Nitrogen Oxides, Carbon Monoxide, Sulfur Oxides, and Particulate Matter).
- **Leisure Time Value**– Value of Leisure Time ($US) for each model region.

2. The Highway Group

The Highway group contains parameters and advanced settings related to highway traffic:

- **Non-Fuel Operating Costs** – Mileage-related vehicle maintenance in Dollars per mile by vehicle mode and region.
- **Vehicle Occupancy**– Average Vehicle Occupancy (passengers per vehicle) by vehicle mode.
- **Emission Rates** – Grams per mile for five pollutants (Volatile Organic Compounds, Nitrogen Oxides, Carbon Monoxide, Sulfur Oxides, and Particulate Matter) by speed and vehicle mode.
- **Accident Rates** – Accidents per million VMT by time of day categorized by Fatalities, Injuries, and PDO (Property Damage Only).

- **Accident Values** –Accident value in $US categorized by Fatalities, Injuries, and PDO (Property Damage Only).
- **Fuel Costs** – Fuel costs in Dollars per gallon by region and by vehicle mode categorized by Pre-tax Fuel Price, Federal Excise Tax, State Excise Tax.
- **Fuel Rates** – Average mpg speed and vehicle mode.
- **Advanced** – These are weights for specific equations in TranSight. More details on their use can be found at the top of the form and by clicking on the arrow to expand the text.

3. The Transit Group

The Transit group contains parameters and advanced settings related to transit traffic:

- **Vehicle Occupancy**– Average Vehicle Occupancy (passengers per vehicle) by vehicle mode.
- **Emission Rates** – Grams per mile for five pollutants (Volatile Organic Compounds, Nitrogen Oxides, Carbon Monoxide, Sulfur Oxides, and Particulate Matter) by vehicle mode.
- **Accident Rates** – Accidents per million VMT by mode and categorized by Fatalities, Injuries, and PDO (Property Damage Only).
- **Accident Values** –Accident value in $US by vehicle mode and categorized by Fatalities, Injuries, and PDO (Property Damage Only).
- **Advanced** – These are weights for specific equations in TranSight. More details on their use can be found at the top of the form and by clicking on the arrow to expand the text.

4. Exporting and Importing Parameters

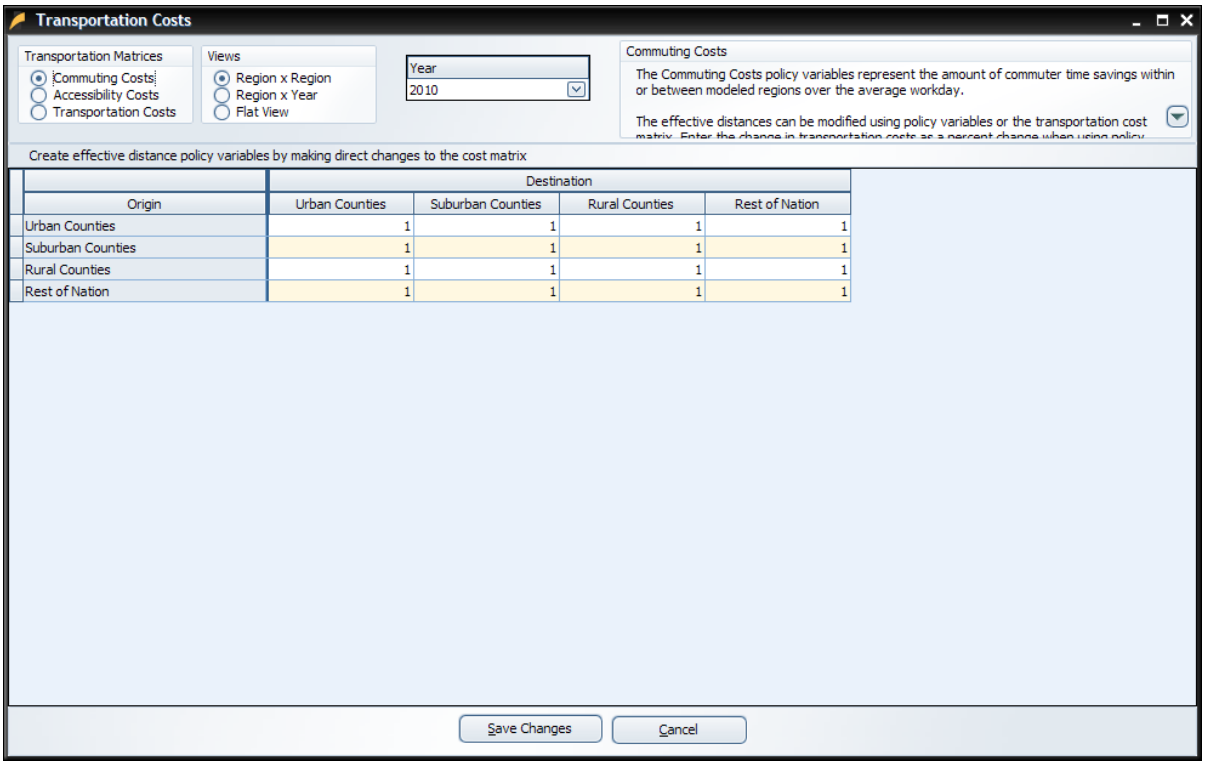
Importing the changes that you make in the various Travel Demand Parameters windows is not strictly required; when you change the values in these windows and click Save, TranSight uses these values with your current Simulation until you change them again. However, sometimes you may want to use your changes in a different Simulation or compare results based on two or more sets of values. To make this process easy, TranSight lets you export the Travel Demand Parameters to a file for later recall. The original settings for each tab are set whenever you create a new Simulation

To save the changes you make to the values in the various Travel Demand Parameters, use the **Export Parameters to a file** button from **Import/Export** in the **General** section of the Travel Demand Parameters window. This will save it to a .mcs file.

If you have several datasets that you've saved, you can select one by using the **Import Parameters to a file** button from **Import/Export** in the **General** section of the Travel Demand Parameters window.

Cost Matrices

You can also view/edit the changes to the Transportation cost matrices by clicking on **Highway** in the forecast navigation screen and then **Effective Distance**. Next, choose to edit the values **As Cost Matrix**. This will take you to the Transportation Costs Editor.



There are three cost matrices you can view/edit by choosing the appropriate radio button below **Transportation Matrices**:

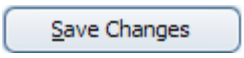
- **Commuter Costs** - describes the amount of commuter time savings within or between modeled regions over the average workday.
- **Accessibility Costs** - describes access to more diverse consumer goods and services by households, as well as access to a broader array of intermediate inputs by employers.
- **Transportation Costs** - describes the amount of cost savings in transporting goods and services due to an increase in transportation efficiency.

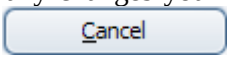
These matrices are used to calculate the amount of cost savings induced by improvements in the transportation network. The numbers in the table represent the percentage of savings across the transportation system for specific pairs of regions (including within each region), relative to the baseline:

- 1 = no change from the baseline
- Below 1 = cost savings relative to the baseline
- Above 1 = cost increases relative to the baseline (e.g., during a construction period)

For example, 0.99 represents a 1% cost savings across the transportation system for that region or pair of regions.

You can also change the view to better allow you to see or edit the changes made.

Once you are done making any changes to the matrices, you can click the 

button. If you do not wish to save any changes you have made or were simply viewing the results of the Travel Demand Study, click the 

button instead.

Additional Highway Inputs

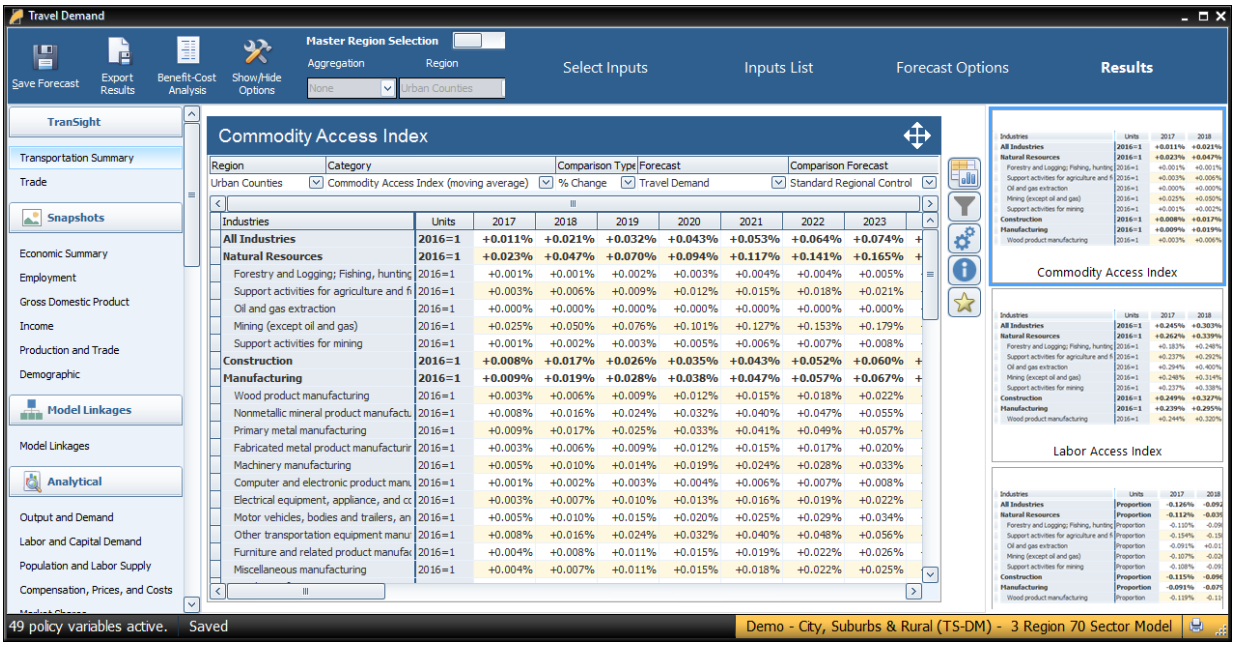
After you have run the Travel Demand study, you may wish to add additional policy variables to further detail the changes created by the project. Back on the screen under the **Highway** button of the forecast navigation screen, there are four additional categories of data inputs:

- **Quick Study**
  A change in construction and operation & maintenance expenditures can be entered, as well as the funding source and the change in network speed.
- **Design and Construction**
  A change in road or transit construction activity can enter the model as Demand or Sales/Employment.
- **Operation and Maintenance**
  A change in construction activity reflecting road or transit operation and maintenance spending can enter the model either as Demand or Sales/Employment.
- **Government Funding**
  Funding options for transportation-related projects typically involve a combination of several sources, including federal, state, and local governments, as well as specific consumer and business taxes/fees.

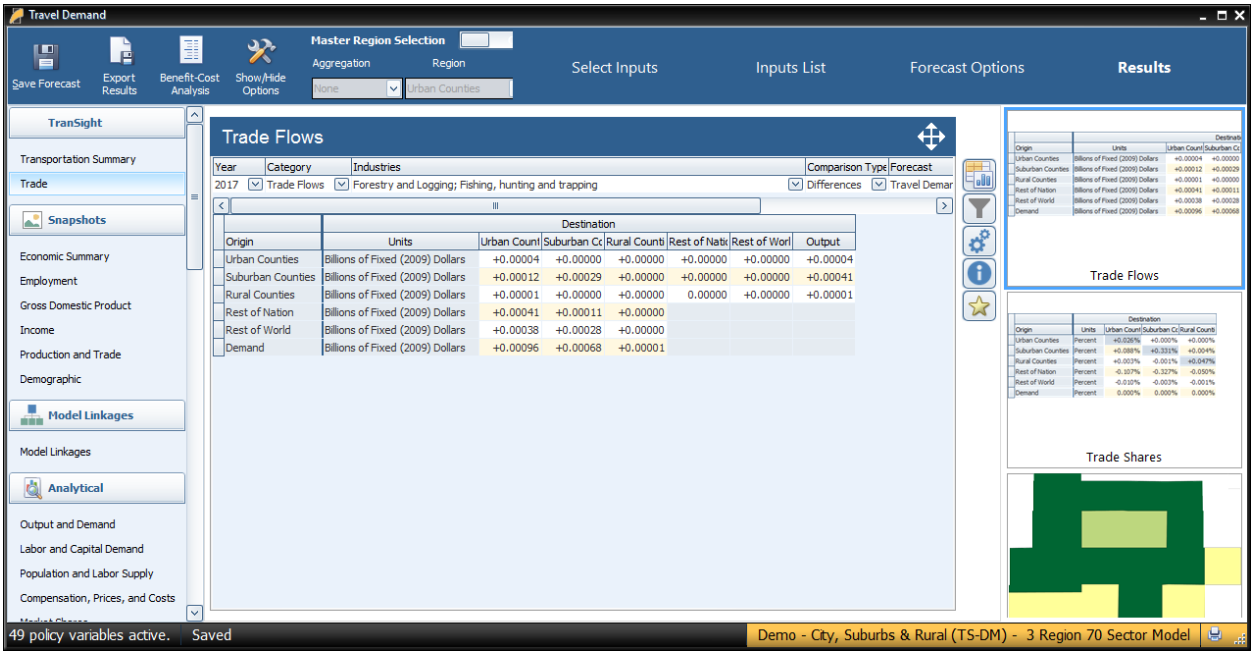
TranSight Results

On the top of main navigation menu, under the TranSight heading you will find TranSight specific result visualizations that have been created by REMI. While much of the data contained within could also be viewed in a TranSight model, the ones shown here have been selected as a collection of information most relevant to transportation studies.

Transportation Summary

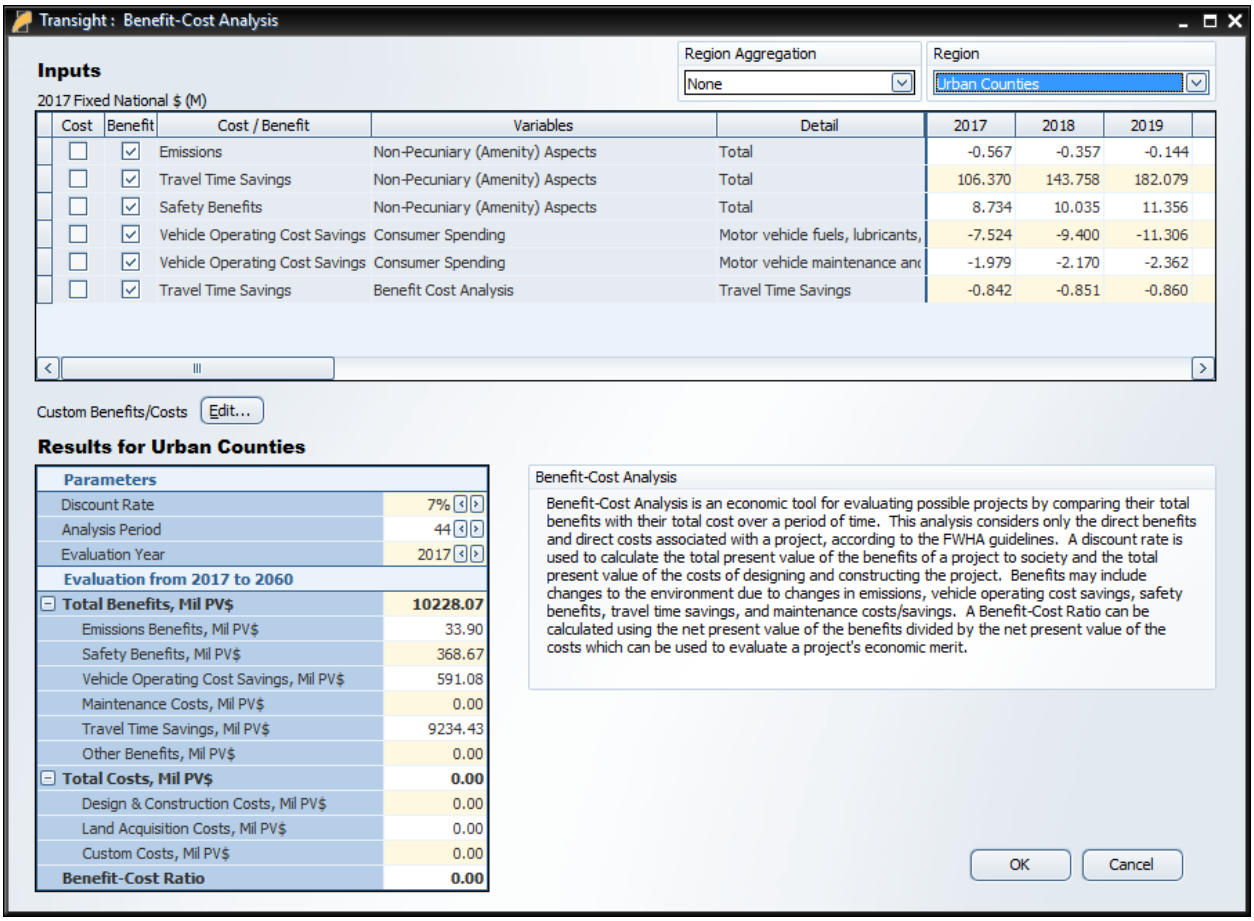


Trade



Benefit-Cost Analysis

Another useful tool available is the Benefit-Cost Analysis table. It is available only after running a travel demand scenario. In the results tab, click “Transportation” and then “Benefit-Cost Analysis”.



Benefit-Cost Analysis is an economic tool for evaluating possible projects by comparing their total benefits with their total costs over a period of time. This analysis considers only the direct benefits and direct costs associated with a project, according to the FWHA guidelines. A discount rate is used to calculate the total present value of the benefits of a project to society and the total present value of the costs of designing and constructing the project. Benefits may include changes to the environment due to changes in emissions, vehicle operating cost savings, safety benefits, travel time savings, and maintenance costs/savings. A Benefit-Cost Ratio can be calculated using the net present value of the benefits divided by the net present value of the costs which can be used to evaluate a project's economic merit.

The top portion of the Benefit-Cost Analysis screen shows the inputs to the benefit-cost calculations. They are the policy variables included in the travel demand scenario categorized by cost or benefit type. Additional benefits and costs may be added using the Edit button below the inputs grid.

The lower portion of the Benefit-Cost Analysis screen calculates the present value of those direct benefits and costs by category along with the Benefit-Cost Ratio. The discount rate, analysis

period, and evaluation year for these calculations can be specified in Parameters section of the table.