



PI<sup>+</sup> v2.3  
TranSight v4.3  
Tax-PI v2.3  
Metro-PI v2.3

(changes from v2.2/4.2)

### *Major Economic Data Sources*

#### **Employment**

County	BEA LAPI (sector industries; 2001-2017) <sup>1</sup> CBP (detail industries; 2016)
State	BEA SPI (summary industries; 2001-2017) <sup>2</sup> CBP (detail industries; 2016)
National	BEA SPI (summary industries; 2001-2017) <sup>2</sup> CBP (detail industries; 2016) BLS EP (detail industries; 2001-2016 and 2026) <sup>3</sup>

#### **Wages**

County	BEA LAPI (total; 2001-2017) CBP (detail industries; 2016)
State	BEA SPI (summary industries; 2001-2017) CBP (detail industries; 2016)
National	BEA SPI (summary industries; 2001-2017) CBP (detail industries; 2016)

#### **Personal Income and Earnings**

County	BEA LAPI (components and summary industries; 2001-2017)
State	BEA SPI (components and summary industries; 2001-2017)

<sup>1</sup> The BEA Local Area Personal Income (LAPI) series used for v2.3/v4.3 is based on their 11/15/2018 release. The estimates for 2001-2006 are based on the 2002 North American Industry Classification System (NAICS). The estimates for 2007-2010 are based on the 2007 NAICS. The estimates for 2011-2016 are based on the 2012 NAICS. The estimates for 2017 forward are based on the 2017 NAICS.

<sup>2</sup> The BEA State Personal Income (SPI) series used for v2.3/v4.3 is based on their 09/25/2018 release. The estimates for 2001-2006 are based on the 2002 North American Industry Classification System (NAICS). The estimates for 2007-2010 are based on the 2007 NAICS. The estimates for 2011-2016 are based on the 2012 NAICS. The estimates for 2017 forward are based on the 2017 NAICS.

<sup>3</sup> The BLS Employment Projections (EP) data used for PI<sup>+</sup> v2.3/v4.3 is based on their 10/04/2017 release.

National	BEA SPI (components and summary industries; 2001-2017) BLS EP (components; 2001-2016 and 2026) RSQE (components; 2018-2020) <sup>4</sup>
<b><u>Compensation</u></b>	
County	BEA LAPI (components and summary industries; 2001-2017)
State	BEA SPI (components and summary industries; 2001-2017)
National	BEA SPI (components and summary industries; 2001-2017)
<b><u>Commuter Flows</u></b>	
County to County	BEA (gross flow of earnings by county; 2001-2017) BEA (total number of workers commuting between counties of residence and counties of work; 1990, 2000) BEA (commuting patterns between counties of work and counties of residence by major industry; 2000) ACS (residence county to residence workplace county flows; 2009-2013)
<b><u>Technology Matrix</u></b>	
National	BLS (detailed industries; 2001-2016 and 2026)
<b><u>Detailed Industry Policy Variables</u></b>	
National	BEA Benchmark 2012 IO Table
<b><u>Final Demand</u></b>	
State	BEA (consumption for major categories; 2001-2017)
National	BEA (components; 2001-2017) RSQE (components; 2018-2020) BLS EP (components and industry value added; 2001-2016, 2026)
<b><u>GDP by Industry</u></b>	
County	BEA GDP by County (3 major categories; 2012-2015)
State	BEA GDP by State (summary industries; 2001-2016)
National	BLS EP (detailed industries; 2001-2016 and 2026)
<b><u>Occupation Matrix</u></b>	
National	BLS EP (employment by industry and occupation; 2016 and 2026)
<b><u>Price Deflators</u></b>	
State	BEA Implicit Price Deflators (aggregate; 2008-2016)
National	BEA Personal Income Price Deflator (aggregate; 2001-2017)
National	BEA Commodity Prices (detailed categories; 2001-2017)
National	BLS EP (detailed industries; 2001-2016 and 2026)

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<sup>4</sup> The 18 March 2019 forecast from RSQE is used for v2.3/v4.3.

## ***Major Demographic Data Sources***

### **Population**

County	BEA (total; 2001-2017)
County	Census (age, sex, race; 2000-2017)

### **Demographic Components of Change**

County	Census (2000-2017)
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### **Labor Force**

County	BLS (total; 2000-2017)
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### **Natality Rates**

Nation	Census (2001-2100)
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### **Birth Rates**

State	CDC (2001-2016)
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### **Survival Rates**

Nation	Census (2001-2100)
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### **Net International Migrants**

Nation	Census (2001-2100)
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### **Participation Rates**

Nation	BLS (2001-2026)
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### **Active Military**

Base	DoD (total; 2001-2009)
State	DoD (total; 2005-2016)
Nation	DoD (total, sex, race; 2001-2016)
County	American Community Survey (2005-2016)

### **Military Dependents**

Nation	DoD (total; 2001-2005)
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### **Prisoners**

County	Census (sex, race, facility; 1990; 2000; 2010)
	Bureau of Justice Statistics (50 largest jail jurisdictions mapped to counties; 2001-2016)
	Bureau of Prisons (facilities mapped to counties; 2005-2016)
	Various state-specific correctional websites

### **College Enrollment**

County	Census (2000; 2010)
	American Community Survey (2005-2016)
State	National Center for Education Statistics (2000-2016)
National	National Center for Education Statistics (2000-2016)

## **Converted Real Dollar Base Year from 2009 to 2012**

In July 2018 the BEA released its comprehensive update of the National Income and Product Accounts. Comprehensive updates of the National Income and Product Accounts (NIPAs), which are carried out about every five years, are an important part of BEA's regular process for improving and modernizing its accounts to keep pace with the ever-changing U.S. economy. Updates incorporate newly available and more comprehensive source data, as well as improved estimation methodologies. In addition, BEA updated the reference year for the chain-type quantity and price indexes and for the chained-dollar estimates to 2012 from 2009.

Since the BLS IO tables used in the REMI model are still based on a 2009 reference year (BLS is not scheduled to release new data until the end of 2019), GDP component data from the BEA in 2012 chained dollars is applied to these 2009-based BLS IO table coefficients in order to estimate the national historical output by industry series in 2012 dollars. Chain-Type Price Indexes for Gross Output by Industry from BEA (real output in chained (2012) dollars for 2001-2017) are used to develop historical industry deflators for adjusting between real and nominal dollars. For this reason, national industry output in both real 2012 and nominal dollars will not correspond to any published data set for this model version. Upon implementation of updated BLS IO tables and industry data in v2.4/4.4, this inconsistency will be resolved.

## **Updates to Local Area Personal Income**

From the BEA website:

“The estimates of 2017 local area personal income incorporate the results of BEA's comprehensive update of local area personal income for 2001-2016. The comprehensive update incorporates source data that are more complete and more detailed than previously available, updates to methodologies, the results of the July 2018 comprehensive update of the National Income and Product Accounts, and the results of the September 2018 comprehensive update of state personal income.”

Also, “Fewer data suppressions: Small numbers that were previously replaced by the “L” suppression code in our tables are now included in the tables. The “L” suppression code now appears only in tables denominated in millions of dollars, to indicate the presence of numbers that would appear as zero in the table due to rounding.”

## **Incorporation of BEA GDP by County Data**

The BEA now provides a limited historical time series (2012-2015) of GDP data by county for 3 major categories (private goods-producing industries, private services-producing industries, and government and government enterprises, with significant suppressions). We now take this data into account (in addition to the State GDP data for major industries previously available) when allocating national output data to counties over the historical period. There may be some significant shifts in the historical series by industry and county due to the information provided in this new data set.

## **Updated Trade Flow Parameters**

New estimation of trade flow betas and sigmas based on more recent time series data. See *Betas and Sigma Estimation Methodology.pdf*.

These new estimates may result in significant changes to industry trade flows, including RPCs, as well as model responses to changes in industry cost of production, access (distance), and subsequently the “multiplier” effects.

## **New Economic Result Variables**

These variable were previously calculated within the model, but not available for display on the result tables:

- Age Composition Effect on Consumption
- Marginal Income Effect on Consumption
- Marginal Price Effect on Consumption
- Population Effect on Consumption
- Relative Composite Price
- Relative Composite Factor Costs
- Cost of Production (moving average)
- Labor Intensity
- Labor Access Index
- Commodity Access Index
- Domestic Demand
- Domestic Supply
- Share of Foreign Imports
- Share of Foreign Exports

## **New Demographic Result Variables**

Single year of age cohort detail has been added to the following:

- Births by Age of Mother
- Birth Rates
- College Population
- Deaths
- Military Dependent Population
- Economic Migrants
- International Migrants
- Labor Force
- Labor Force Population
- Military Population
- Population
- Prisoner Population
- Retired Migrants
- Vital Population

- Participation Rates
- Survival Rates
- Migrants

### **New and Modified Policy Variables**

- Detailed Industry (Translators) updated to reflect the new BEA 2012 Benchmark IO table
- Tourism (Translators) updated to reflect the BEA 2016 Tourism Satellite Accounts
- Labor Productivity has new option for changing Labor Intensity
- Compensation has new option for distinguishing between rate (cost and income) change and amount (income only) change
- Consumer Price has a modified methodology so that the direct change to total consumption is the same with and without a change to the elasticity (only the distribution of the change to specific commodities is affected)

### **Redesign of Navigation Bar in the Results**

The Navigation Bar in the Results has been changed from an “Explorer Bar” style to a “Navigation Pane” style. This was done so that all the available groups could be seen at once without scrolling. A search box was also added to the top to facilitate quickly finding specific tables or charts (based on their name) and a Menu Settings button was added to the bottom to allow users to further customize the groups shown in the Navigation Bar within their specific model installation.

Model results are now navigated within five different groups:

- Profiles (Control)/Snapshots (Simulation)  
These visualizations are intended to provide a “big picture” view of the aggregate results. For Snapshots, a new Overview visualization has been added that displays a map of the model regions along with key economic impact results.
- Analytics  
These visualizations are intended to assist the user with understanding the model results.
- Detailed Economic  
These visualizations provide access to the most detailed economic and industry-level results.
- Detailed Demographic  
These visualizations provide access to the most detailed demographic and cohort-level results.
- Favorites  
These visualizations represent those created, selected, and/or modified by the user.

### **Impact Profile (Simulations)**

A new tool found in the Analytics group, Impact Profile provides visualizations that focuses attention of the primary region(s)/industry(ies) that were changed via policy variables. The

Ranked tab displays the ten regions or industries affected the most for a given simulation, and can be customized for the number of items shown (for example, top five instead of top ten).

### **Determinative Graphs (Simulations)**

A replacement tool for Analytical Graphs (now found in the Analytics group). Instead of organizing the graphs by model block, all are now available in one gallery view in order to facilitate quickly scanning and scrolling through them to find those of specific interest.

### **Connection Explorer**

A new tool found in the Analytics group, Explore Connections, lays out the interconnections of the REMI model in a visual, easily-navigable way. It facilitates tracking the relationships between policy changes and simulation results, one variable at a time.

### **Favorites Manager**

This new tool allows users to organize the results tables they have selected for their Favorites. New groups within the Favorite can be added and result table visualizations switched between groups with the press of a button or by dragging and dropping. Users will also be able to easily switch the Favorite display between the available Layout styles: Gallery, Rows, Lists, and Tiles.

### **Import Settings**

The new Import Settings manager provides a way for users to import settings from other models currently or previously installed on the same computer. It provides warnings if compatibility issues are detected between the version being imported from and the current model and it will attempt to correct for those differences if possible. Among the settings it can import are: Favorite Results, Year Lists, Map Colors, Chart Colors, Custom Scenarios, Custom Variables, Policy Variable Favorites, Results Preferences, and Custom Aggregations.

### **Custom Results**

This new tool for three types of customizable outside-the-model result calculators streamlines user post-processing of REMI results. There are currently three types of calculations supported:

- Adjust by Constant Factors
- Define Equation
- Weighted Spreading

### **Software Enhancements**

- New option to view result tables simultaneously with charts

- Aggregated regions can be displayed on maps
- Revised feature for changing filter options on all charts simultaneously
- Added Tree Map chart option
- Added custom color palettes for charts
- Employment update inputs can be entered for custom industry aggregations
- Population update inputs can be entered for custom age aggregations

### **Added to Documentation**

- Capital Stock and Investment for Structures
- Amenity Variable Tips