PI+ v1.2

Data Sources and Estimation Procedures

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A. Primary Historical Data

BEA

The primary national, state, and county data source for REMI PI+ is the Bureau of Economic Analysis (BEA) State Personal Income (SPI) and Local Area Personal Income (REIS) series (which also include employment and total population). This data is available for the nation and states at the summary level (94 industries), and for counties at the sector level (24 industries).

The Bureau of Economic Analysis prepares annual and quarterly estimates of state personal income and annual estimates of state disposable personal income and employment. The state personal income accounts are detailed, timely, and comprehensive economic time series that provide comparisons among states and among industries within a state. Estimates of compensation (wages and salaries plus supplements to wages) and earnings (compensation plus proprietors' income) by place of work indicate economic activity of establishments within the state. Estimates of personal income by place of residence provide a measure of fiscal capacity. State disposable personal income provides a measure of income available for consumption and saving. Annual estimates of per capita personal income are an indicator of economic well-being of the residents of a state. State personal income is the income that is received by, or on behalf of, the residents of that state.

The Bureau of Economic Analysis also prepares annual estimates of personal income for local areas (counties, metropolitan areas, and the Bureau's BEA economic areas). Local area personal income is the only detailed, broadly inclusive economic time series for local areas that is available annually. For both the national and regional accounts, personal income is defined as the sum of wage and salary disbursements, supplements to wages and salaries, proprietors' income with inventory and capital consumption adjustments, rental income of persons with capital consumption adjustments, personal dividend income, personal interest income, and personal current transfer receipts, less contributions for government social insurance. Disposable personal income is defined as personal income less personal current taxes.

Employment

The BEA employment series for states and local areas comprises estimates of the number of jobs, full-time plus part-time, by place of work. Full-time and part-time jobs are counted at equal weight. Employees, sole proprietors, and active partners are included, but unpaid family workers and volunteers are not included.

Employment can be measured either as a count of workers or as a count of jobs. In the former case, an employed worker is counted only once; in the latter case, all jobs held by the worker are counted. The state and county employment estimates are a count of the number of jobs, so that, as with the earnings estimates, a worker's activity in each industry and location of employment is reflected in the measure.

Proprietors employment consists of the number of sole proprietorships and the number of partners in partnerships. The description "by place of work" applies to the wage and salary portion of the series and, with relatively little error, to the entire series. The proprietors employment portion

of the series, however, is more nearly by place of residence because, for nonfarm sole proprietorships, the estimates are based on IRS tax data that reflect the address from which the proprietor's individual tax return is filed, which is usually the proprietor's residence. The nonfarm partnership portion of the proprietors employment series reflects the tax-filing address of the partnership, which may be either the residence of one of the partners or the business address of the partnership.

The employment estimates are designed to be consistent with the estimates of wage and salary disbursements and proprietors' income that are part of the personal income series. The employment estimates are based on the same sets of source data as the corresponding earnings estimates and are prepared with parallel methodologies. Two forms of proprietors' income - the income of limited partnerships and the income of tax-exempt cooperatives - have no corresponding employment estimates.

Employment in industries covered by the UI programs

The estimates of about 95 percent of wage and salary employment are derived from tabulations by the state employment security agencies (ESAs) from their state employment security reports (form ES-202). These tabulations summarize the data from the quarterly UI contribution reports filed with a state ESA by the employers subject to that state's UI laws. Employers usually submit reports for each operating establishment, classified by county and industry. However, in some cases, an employer may group very small establishments in a single "statewide" report without county designation. Each quarter, the various state ESAs submit the ES-202 tabulations to the Bureau of Labor Statistics (BLS), which provides the data to BEA. The tabulations present monthly employment and quarterly wages for each county in North American Industry Classification System (NAICS) four-digit and five-digit industry detail.

BEA adds several million administrative records received from the states and the District of Columbia to its database annually. The records are checked for major errors by several computerized edit routines. One edit routine analyzes the current quarter county data for invalid NAICS codes, duplicate records, and records that contain no data. Another edit routine calculates expected county-level average employment and average wage estimates on a quarterly basis at the NAICS industry group level, based on percentage changes for that quarter in the previous two years. If the difference between the actual numbers and the estimated numbers exceeds established limits, the record is identified for further review. Anomalies that remain unreconciled after reviewing comments and other supporting data are referred back to BLS for further investigation.

The basic procedure for preparing the local area estimates of wage and salary employment for each UI-covered industry is to average the 12 monthly ES-202 employment observations and to allocate the higher-level geographic totals (counties add up to states, and states add up to the nation) in proportion to the averaged series. However, ES-202 employment does not precisely meet the statistical and conceptual requirements for BEA's employment estimates. Consequently, the data must be adjusted to meet the requirements more closely. The necessary adjustments affect both the industrial and geographic patterns of county employment.

Employment not covered by the UI programs

Railroads — The railroad industry is covered by its own unemployment insurance program, which is administered by the Railroad Retirement Board (RRB), rather than by the state UI system. Data suitable for estimating local area employment of railroads are available from the RRB only on a place-of-residence basis. Because BEA's employment estimates are designed to conform conceptually and statistically to the place-of-work earnings estimates, the RRB data are adjusted to a place-of-work basis by using journey-to-work data from the 1990 *Census of Population*. The national totals for all railroad companies combined are allocated to counties in proportion to the adjusted RRB series.

Private households — For this largely non-covered industry - mainly domestic servants - the national employment estimates are allocated to counties in proportion to place-of-work private household employment from the 1990 Census journey-to-work data.

Farm labor contractors — This industry is classified in agricultural services rather than in farms. The UI coverage in Arizona and California is complete enough to permit the use of the ES-202 data for both the state and county estimates, but most state UI programs only partially cover this industry. For these states, the county estimates of farm labor contractor employment are based on the geographic distribution of expenditures for contract labor reported in the *Census of Agriculture*.

Private elementary and secondary schools — Private elementary and secondary schools are treated as a non-covered industry because religiously affiliated elementary and secondary schools, which account for most of the employment in this industry, remain largely outside the scope of the UI program. The state estimates of private elementary and secondary school employment are primarily based on the employment reported annually by the Census Bureau's County Business Patterns (CBP). The CBP data are tabulated from the administrative records of the social security program — old-age, survivors, disability, and hospital insurance — and are more complete for elementary and secondary schools than the data prepared under the UI program. The social security program, although exempting nonprofit religious organizations — including schools — from mandatory coverage, has elective coverage provisions that have resulted in broad participation among religiously affiliated elementary and secondary schools.

In about half of the states, the UI coverage of elementary and secondary schools is complete enough to permit the use of ES-202 data as the basis for the county employment estimates. For the other states, the county estimates are based on the best available series of private elementary and secondary school employment chosen from data published by state departments of education, data from the U.S. Department of Education's 1998 survey of private elementary and secondary schools, or data from CBP, which cannot be used more generally because they are frequently suppressed at the county level to prevent disclosures.

Religious membership organizations — The Federal Unemployment Tax Act permits the states to exclude religious membership organizations from mandatory UI coverage. Although most state UI laws do have some provisions for elective coverage, less than 10 percent of the national total employment of religious membership organizations is covered by UI. Therefore, the county estimates of the employment of religious membership organizations are based on CBP data. The

CBP data are adjusted by allocation to sum to the BEA national employment totals for this industry.

Military — County military employment is measured as the number of military personnel assigned to active duty units that are stationed in the area plus the number of military reserve unit members. The estimates of active duty employment for the Army, Air Force, Navy, Marine Corps, and Coast Guard are based on the annual averages of 12 monthly observations, for a given year, from reports received from each branch of service. Navy personnel assigned to ships and other mobile units and Marines assigned to Fleet Marine Force units are measured according to the units' home ports rather than their actual locations as of the reporting date.

The measure of the employment of the military Reserves — including the National Guard — is confined to members of reserve units that meet regularly for training. The state estimates are based on fiscal year-ending September 30 tabulations of military reserve pay provided by the Army, Air Force, Navy, Marine Corps, and Coast Guard.

For consistency with the BEA estimates of military reserve wages, the state totals of military reserve employment are allocated to counties in proportion to civilian population.

"Other" — In the local area employment series, this category consists of the number of U.S. residents employed in the United States by international organizations and by foreign embassies and consulates. The category differs from "rest-of-the-world" -- the corresponding category in the national employment estimates — in that "rest-of-the-world" also includes the net flow of international border workers — i.e., U.S. residents working across the border in Canada and foreign residents working in the United States. The border workers are not reflected in the county employment estimates.

The county estimates of "other" employment are made by allocating the national totals for all years to counties in proportion to estimated 1968 administrative expenses of international and foreign organizations operating in the United States. The administrative expenses series was prepared by the BEA.

Wage and salary disbursements

Wage and salary disbursements consist of the monetary remuneration of employees, including corporate officers' salaries and bonuses, commissions, pay-in-kind, incentive payments, and tips. It reflects the amount of payments disbursed, but not necessarily earned during the year.

Wage and salary disbursements are measured before deductions, such as social security contributions and union dues.

In recent years, stock options have become a point of discussion. Wage and salary disbursements include stock options of nonqualified plans at the time that they have been exercised by the individual. Stock options are reported in wage and salary disbursements. The value that is included in wages is the difference between the exercise price and the price that the stock options were granted.

All state and local area dollar estimates are in current dollars (not adjusted for inflation).

Wages and salaries for the military services

The estimates of wages and salaries for the military services consist of the estimates of cash wages (including allowances) of full-time personnel of the armed services (including the Coast Guard), the estimates of cash wages of the members of the Reserves including the National Guard, and the estimates of pay-in-kind received by the full-time and reserve enlisted personnel of the armed services.

Compensation

Compensation of employees, received, is the sum of Wage and Salary Disbursements and Supplements to Wages and Salaries.

Personal income and components

Personal Income is the income that is received by all persons from all sources. It is calculated as the sum of wage and salary disbursements, supplements to wages and salaries, proprietors' income with inventory valuation and capital consumption adjustments, rental income of persons with capital consumption adjustment, personal dividend income, personal interest income, and personal current transfer receipts, less contributions for government social insurance.

The personal income of an area is the income that is received by, or on behalf of, all the individuals who live in the area; therefore, the estimates of personal income are presented by the place of residence of the income recipients.

Supplements to wages and salaries

This component of personal income consists of employer contributions for employee pension and insurance funds and of employer contributions for government social insurance.

Employer contributions for employee pension and insurance funds

This component of personal income consists of employer payments to private and government employee retirement plans, private group health and life insurance plans, privately administered workers' compensation plans, and supplemental unemployment benefit plans.

Employer contributions for government social insurance

These contributions, which are subtracted in the calculation of personal income as part of contributions for government social insurance, consist of employer payments under the following Federal and state and local government programs: Old-age, survivors, and disability insurance (OASDI); hospital insurance (HI); unemployment insurance; railroad retirement; government employee retirement; pension benefit guarantee; veterans' life insurance; publicly-administered workers' compensation; military employee programs (veterans' life and military medical insurance); and temporary disability insurance.

The contributions are excluded from personal income by definition, but, as part of supplements to wages and salaries, are included in earnings by place of work.

Proprietors' income

This component of personal income is the current-production income (including income in kind) of sole proprietorships and partnerships and of tax-exempt cooperatives. Corporate directors' fees are included in proprietors' income, but the imputed net rental income of owner-occupants of all dwellings is included in rental income of persons. Proprietors' income excludes dividends and monetary interest received by non-financial business and rental incomes received by persons not primarily engaged in the real estate business; these incomes are included in dividends, net interest, and rental income of persons, respectively.

Rental income of persons with capital consumption adjustment

Rental income is the net income of persons from the rental of real property except for the income of persons primarily engaged in the real estate business; the imputed net rental income of the owner-occupants of non-farm dwellings; and the royalties received from patents, copyrights, and rights to natural resources.

The Capital Consumption Adjustment is the difference between private consumption of fixed capital (CFC) and private capital consumption allowances. Private CFC is a charge for the using up of private fixed capital. It is based on studies of prices of used equipment and structures in resale markets. Private capital consumption allowances consist of tax-return-based depreciation charges for corporations and nonfarm proprietorships and of historical-cost depreciation, calculated by BEA, for farm proprietorships, rental income of persons, and nonprofit institutions.

Personal dividend income

This component of personal income is the dividend income of persons. It consists of the payments in cash or other assets, excluding the corporation's own stock, made by corporations located in the United States or abroad to persons who are U.S. residents. It excludes that portion of dividends paid by regulated investment companies (mutual funds) related to capital gains distributions.

Personal interest income

This component of personal income is the interest income (monetary and imputed) of persons from all sources.

Personal current transfer receipts

This component of personal income is payments to persons for which no current services are performed. It consists of payments to individuals and to nonprofit institutions by Federal, state, and local governments and by businesses.

Government payments to individuals include retirement and disability insurance benefits, medical payments (mainly Medicare and Medicaid), income maintenance benefits, unemployment insurance compensation, veterans' benefits, and Federal education and training assistance. Government payments to nonprofit institutions excludes payments by the Federal Government for work under

research and development contracts. Business payments to persons consists primarily of liability payments for personal injury and of corporate gifts to nonprofit institutions.

Employee and self-employed contributions for government social insurance

These contributions, which are subtracted in the calculation of personal income, consist of the contributions, or payments, by employees, by the self-employed, and by other individuals who participate in the following government programs: Old-age, survivors, and disability insurance (social security); hospital insurance; supplementary medical insurance; unemployment insurance; railroad retirement; veterans life insurance; and temporary disability insurance.

These contributions are excluded from personal income by definition, but the components of personal income upon which these contributions are based – mainly wage and salary disbursements and proprietors' income – are presented gross of the contributions.

Adjustment for residence

The adjustment for residence is the net inflow of the net labor earnings of interarea commuters.

The state and county estimates of personal income are presented by the state and county of residence of the income recipients. However, the source data for most of the components of wage and salary disbursements, supplements to wages and salaries, and contributions for government social insurance are on a place-of-work basis.

Consequently, a residence adjustment is made to convert the estimates based on these source data to a place-of-residence basis.

The method of calculating place-of-work income requires two main sources. The first source is the net Residence Adjustment (RA), which is provided by the Bureau of Economic Analysis (BEA). A Resident Adjustment value for County X is simply the total outflow of workers' dollars minus the total inflow of workers' dollars for that county, where outflow dollars are wages earned in County X by residents of another county and inflow dollars are wages earned in another county by residents of County X. The second source is Journey to Work (JTW) data, which is calculated from the U.S. Census. This data is a comprehensive matrix of the number of employees and their average wages from each county to every other county.

While the Residence Adjustment calculation provides net dollar flows for each county, it does not tell us how much of a county's RA goes to and comes from specific counties. The JTW data provides these ratios and allows us to build models with more accurate regional dollar flows. The decennial dollar flows in the JTW matrix are normalized to annual Residence Adjustment values to keep the flows current. With this county-level data, we can then calculate intra-regional dollar flows.

Population

BEA uses the Census Bureau's midyear population estimates. Except for college students and other seasonal populations, which are measured on April 1, the population for all years is estimated on July 1.

Disclosure avoidance procedures

Like other statistical agencies, the Bureau of Economic Analysis (BEA) is legally required to safeguard the confidentiality of the information that it receives. In addition, like other agencies, it must balance its responsibility to avoid disclosing confidential information with its responsibility to release and to publish as much information as possible. It balances these responsibilities by presenting the estimates for regions, states, and local areas only at the North American Industry Classification System (NAICS) subsector level, even though it receives source data at the NAICS four- and five-digit industry levels.

Most of the data series that BEA receives from other agencies are not confidential. The agencies summarize this data to aggregate totals by program and by state or county, so that each record, or data cell, contains data for enough individuals or establishments to preclude the identification of the data for a specific individual or establishment and, therefore, to preclude the disclosure of confidential information.

However, the ES-202 tabulations that BEA receives from the Bureau of Labor Statistics (BLS) include records that would disclose confidential information. The confidential information on wages and salaries for some business firms is identifiable from the state and county estimates of wages and salaries at the NAICS subsector level that are derived from the ES-202 data.

To prevent either the direct or the indirect disclosure of the confidential information, BEA uses the BLS state and county nondisclosure file.

BEA uses as many BLS nondisclosure cells as possible, but cannot use some of them for various reasons. The most important reasons are that the industry structure published by BEA does not exactly match NAICS subsector detail provided by BLS and that BEA does not use ES-202 data for the farm sector. When BEA drops BLS nondisclosure cells, other cells must be selected to prevent the disclosure of confidential information. In order to determine which estimates should be suppressed, the total wages and salaries file and the wages-and-salaries-nondisclosure file are used to prepare a multidimensional matrix. This matrix is tested, and the estimates that should be suppressed are selected.

BLS

The second major source of historical data used by REMI is from the Bureau of Labor Statistics (BLS). These data pertain to workers covered by State unemployment insurance (UI) laws and Federal civilian workers covered by the Unemployment Compensation for Federal Employees (UCFE) program. The data for both private sector and public sector workers are reported to the BLS by the employment security agencies of the 50 States, the District of Columbia, Puerto Rico, and the Virgin Islands as part of the Quarterly Census of Employment and Wages (QCEW) program. The

QCEW, also called ES-202, was formerly known as the Covered Employment and Wages (CEW). REMI uses their annual average employment and total annual wages at the summary level for all counties and states.

The QCEW program derives its data from quarterly tax reports submitted to State Employment Security Agencies by over eight million employers subject to State unemployment insurance (UI) laws and from Federal agencies subject to the Unemployment Compensation for Federal Employees (UCFE) program. This includes 99.7% of all wage and salary civilian employment. These reports provide information on the number of people employed and the wages paid to the employees each quarter. The program obtains information on the location and industrial activity of each reported establishment, and assigns location and standard industrial classification codes accordingly. This establishment level information is aggregated, by industry code, to the county level, and to higher aggregate levels.

Employment

Employment data represent the number of workers on the payroll during the pay period including the 12th day of the month. The pay period varies in length from employer to employer; for most employers, it is a 7-day period but not necessarily a calendar week. An employer who pays on more than one basis (such as weekly for production employees and semimonthly for office employees) reports the sum of the number of workers on each type of payroll for the period.

The employment count includes all corporation officials, executives, supervisory personnel, clerical workers, wage earners, pieceworkers, and part-time workers. Workers are reported in the State and county of the physical location of their job. Persons on paid sick leave, paid holiday, paid vacation, and so forth are included, but those on leave without pay for the entire payroll period are excluded.

Persons on the payroll of more than one firm are counted in each firm. Workers are counted even though their wages may be nontaxable for UI purposes during that period (having reached the taxable limit for the year).

The employment count excludes employees who earned no wages during the entire applicable period because of work stoppages, temporary layoffs, illness, or unpaid vacations, and employees who earned wages during the month but not during the applicable pay period.

Total wages

Total wages, for purposes of the quarterly UI reports submitted by employers in private industry in most States, include gross wages and salaries, bonuses, stock options, tips and other gratuities, and the value of meals and lodging, where supplied. In some of the States, employer contributions to certain deferred compensation plans, such as 401(k) plans, are included in total wages. Total wages, however, do not include employer contributions to Old-age, Survivors', and Disability Insurance (OASDI); health insurance; unemployment insurance; workers' compensation; and private pension and welfare funds.

In most States, firms report the total wages paid during the calendar quarter, regardless of the timing of the services performed. Under laws of a few States, however, the employers report total wages earned during the quarter (payable) rather than actual amounts paid.

For Federal workers, wages represent the gross amount of all payrolls for all pay periods paid within the quarter. This gross amount includes cash allowances and the cash equivalent of any type of remuneration. It includes all lump-sum payments for terminal leave, withholding taxes, and retirement deductions. Federal employee remuneration generally covers the same types of services as those for workers in private industry.

Disclosure restrictions

BLS withholds publication of data when necessary to protect the identity and data of cooperating employers. Since QCEW gets reports from every employer in the United States, there are many cases where QCEW detailed data could consist of a single employer. These data are withheld or "suppressed" in QCEW publications. Totals at the industry level for the States and the Nation include the nondisclosable data suppressed within the detailed tables. However, these totals cannot be used to reveal the suppressed data.

Imputed data

To reduce the effect of the exclusion of data because of late reporting by covered private and government employers, State agencies impute employment and wages for such employers and include them in each quarterly report. Corrections to data that may be entered after a report is filed include replacement of imputations with reported data to the extent possible. Imputations are calculated at the individual establishment level, normally from historical data reported by the employer. Sometimes trends reported by employers in the same industry and information obtained from other sources also are used. If a report remains delinquent for more than one quarter and research shows that it is still active, the data for the establishment will again be imputed.

CBP

The final source of employment and wage data is County Business Patterns (CBP). County Business Patterns is an annual series that provides subnational economic data by industry and covers most of the country's economic activity. The series excludes data on self-employed individuals, employees of private households, railroad employees, agricultural production employees, and most government employees. This data is available at a very detailed level, and while it has many suppressions due to confidentiality requirements, its advantage is that when the data is suppressed, ranges for the establishments are supplied. This provides some basis from which to make a rough estimate of employees in that industry in the absence of any other information.

Establishments

An establishment is a single physical location at which business is conducted or services or industrial operations are performed. It is not necessarily identical with a company or enterprise (firm), which may consist of one or more establishments. When two or more activities are carried on

at a single location under a single ownership, all activities generally are grouped together as a single establishment. The entire establishment is classified on the basis of its major activity and all data are included in that classification.

Establishment-size designations are determined by paid employment in the mid-March pay period. The size group "1 to 4" includes establishments that did not report any paid employees in the mid-March pay period but paid wages to at least one employee at some time during the year.

Establishment counts represent the number of locations with paid employees any time during the year. This series excludes governmental establishments except for wholesale liquor establishments (NAICS 4228), retail liquor stores (NAICS 44531), Federally-chartered savings institutions (NAICS 522120), Federally-chartered credit unions (NAICS 522130), and hospitals (NAICS 622).

Payroll

Total payroll includes all forms of compensation, such as salaries, wages, reported tips, commissions, bonuses, vacation allowances, sick-leave pay, employee contributions to qualified pension plans, and the value of taxable fringe benefits. For corporations, it includes amounts paid to officers and executives; for unincorporated businesses, it does not include profit or other compensation of proprietors or partners. Payroll is reported before deductions for Social Security, income tax, insurance, union dues, etc. First-quarter payroll consists of payroll during the January-to-March quarter.

Mid-March Employment

Paid employment consists of full- and part-time employees, including salaried officers and executives of corporations, who are on the payroll in the pay period including March 12. Included are employees on paid sick leave, holidays, and vacations; not included are proprietors and partners of unincorporated businesses.

Data Withheld from Publication

In accordance with U.S. Code, Title 13, Section 9, no data are published that would disclose the operations of an individual employer. The number of establishments in an industry classification and the distribution of these establishments by employment-size class are not considered to be disclosures, so this information may be released even though other information is withheld from publication.

Estimation of Sector-Level Data Suppressions in States and Counties

There are three major data sets from the BEA Local Area Personal Income (REIS) series that need to be unsuppressed: (1) CA05 – Personal income and detailed earnings by industry; (2) CA06 – Compensation by industry; and (3) CA25 – Total Employment by industry. These data cover the more than 3000 counties within the U.S. The NAICS-based industry data begins in 2001.

First we estimate all of the state sector-level industry employment, earnings, and compensation data. Next, we repeat this process for the same concepts for the counties. In each process we find

minimum and maximum values for all suppressed values, create initial estimates for all suppressed values, and lastly we create final estimate for all suppressed values.

The minimum and maximum values are calculated based on all available data (i.e. industries add up to a known total, counties add up to a known state, states add up to a known major region, major regions add up to a known nation).

The initial estimates are created based on client-supplied data in the case of Michigan and Nevada, but only if those values fall between the minimum and maximum possible for the suppressed cell. Otherwise we use the mid-point of the possible minimum and maximum values of the suppressed cell.

The current solving methodology is to use an optimization routine to minimize a constrained quadratic loss function. However this is only possible when there is not an excessive number of suppressions. The estimates, along with the variances and constraints for all suppressed points within the data set, are passed back into the constrained optimization routine and processed one year at a time. For each year, systems of suppressions can be formed that are all linearly dependent. These systems are defined by a sector-level industry that has suppressions and a state containing the counties. We pass each system of suppressions through an optimization procedure that finds the solution set of estimates that minimizes the total variance of the system while still obeying all of the regional and industrial constraints. If all the final estimates are positive (with the exception of personal income data, which may have legitimate negative values), the solution set is accepted. This solution set is then passed into a series of RAS methods (bi-proportional adjustment of matrices) as starting estimates. The particular RAS method we use in this step is also constrained and scaled based on the minimum and maximum value for each suppression.

If the county data is too suppressed to allow the constrained optimization function to solve, we instead only use the RAS method described above with our initial estimates rather than estimates based off of the results of the constrained optimization.

The strength of the final estimates, which are made one year at a time, is that they take into account the maximum and minimum bounds of each missing value (to help ensure that detailed industries will add up to major industries, major industries will add up to a total, states will add up to major regions, and major regions add up to the nation). The weakness is that they do not take into account time series information (which may be useful if the data point suppressed in one year is not suppressed in either the preceding or following year).

Estimation of Summary-Level Data Suppressions in Major Regions and States

There are four major data sets from the BEA State Personal Income (SPI) series that need to be unsuppressed: (1) SA05 – Personal income and detailed earnings by industry; (2) SA06 – Compensation by industry; (3) SA07 – Wage and salary disbursements by industry; and (4) SA25 – Employment by industry. These data cover the U.S., 50 states, District of Columbia, and eight Major Regions. The NAICS-based industry data begins in 1990.

The current solving methodology is to use an optimization routine to minimize a constrained quadratic loss function. In order to begin this process, we obtain initial estimates and variances from regressions which will be used in our loss function. The initial estimates are based on the mid-point of the possible minimum and maximum values of the suppressed cell, which have been calculated based on all available data (i.e. industries add up to a known total, states add up to a known major region, and major regions add up to a known nation). The initial estimates also take into account the known county totals (the sum of the known values for all of the counties within a state) so that the possible minimum state value exceeds the sum of the known county values. The known values and bounds are then passed into estimation software called IVEware using Multiply Imputation where a dataset for each industry is created, with each state forming one variable and data points representing the value for a given variable in a given year in that state. The minimum and maximum values of each suppressed cell are used as bounds for a specified range in which the imputed values should fall. Stepwise selection is used to select the most predictive variables for each variable while minimizing the R^2. Using multiple iterations, IVEware imputes multiple values for each suppressed data point. The mean value of these imputed values is then computed for each. These second-round estimates, along with the variances and constraints for all suppressed points within the data set, are passed back into the constrained optimization routine and processed one year at a time. For each year, systems of suppressions can be formed that are all linearly dependent. These systems are defined by a sector-level industry that has suppressions and a Major Region containing the states. We pass each system of suppressions through an optimization procedure that finds the solution set of estimates that minimizes the total variance of the system while still obeying all of the regional and industrial constraints. If all the final estimates are positive (with the exception of personal income data, which may have legitimate negative values), the solution set is accepted.

The strength of the initial estimates, which are made one year at a time, is that they take into account the maximum and minimum bounds of each missing value (to help ensure that detailed industries will add up to major industries, major industries will add up to a total, states will add up to major regions, and major regions add up to the nation). The weakness is that they do not take into account time series information (which may be useful if the data point suppressed in one year is not suppressed in either the preceding or following year). The IVEware software fine tunes the initial estimates by imputing values based on the time series, as well as the maximum and minimum bounds. The final estimates further optimize the values in order to maintain the internal consistency of the data set (industries add up to totals, states add up to major regions, etc.).

Estimation of Summary-Level Data Suppressions in Counties

This leaves us with sector-level data for employment and summary-level data for earnings and compensation, but no wage data by industry, and we need to disaggregate employment to the summary level.

The first data to be disaggregated to the summary level (REMI's 70 industries) is compensation. While some of this data is available from the BEA, there are still a large number of suppressions at this level. We bring in the BLS QCEW wage data at the county level. This data also has suppressions, so the first step is to estimate the missing values. This is initially done for all states and

industries (making sure they add up to the nation). We use the mid-point of the maximum and minimum bounds in order to start off with reasonable values for the RAS[1]. Once the BLS wage state data is filled in to be internally consistent, we then use it as totals for estimating the suppressed BLS wage county data. For this step we start each missing county value with 1[1]. Once complete, we change each BLS zero value to one (since BEA includes proprietors in their definition and BLS does not, it is possible to have zero values in the BLS data and non-zero values in the BEA data) and then run a final set of RAS procedures against the county BEA summary data and the county BEA sector data. This gives us complete summary-level industry data for every county in the US that is internally consistent with BEA's reported state and county data.

In order to disaggregate the employment to the summary level, we use our recently estimated BEA compensation data at the state and county level. The BEA compensation data is scaled by the state compensation-to-employment ratio before it is used as a starting value for estimating employment. We change any negative values in our starting estimates to a very small value (0.1) in order to prevent negative numbers from entering into the RAS, since employment cannot be negative (although under normal circumstances there should be no negative starting values). We then run a final set of RAS procedures against the state BEA summary data and the county BEA sector data. This gives us complete summary-level industry employment data for every county in the US that is internally consistent with BEA's reported state and county data.

The wages and personal income are done with a process that is similar to the employment process, but involves some additional checks and balances. As it was with compensation, some of the summary-level BEA county data does exist. For those values that are suppressed, we use our recently estimated BEA compensation data, scaled by the state compensation to wages/personal income ratio (as appropriate), as starting values. If any of the wage starting values are less than or equal to zero, we raise them to a small positive value (0.1) as they cannot be negative. If any of the personal income starting values are equal to zero, we raise them to a small positive value (0.1) because BEA suppressed values cannot be zero. We then run a final set of RAS procedures against the county BEA summary data and the county BEA sector data. This gives us complete summary-level industry employment data for every county in the US that is internally consistent with BEA's reported state and county data.

While our methodology yields the complete, detailed, and internally consistent data sets required by the model, one must keep in mind that there is always more than one possible solution, so, while we have generated "a" solution, it is not necessarily "the" solution. The government goes to great length to suppress data in such a way that the real values cannot be determined. Our solution is not perfect, but we believe for the most part that it is reasonable.

[1] The initial industry estimates of employment and wages for the state and counties of Michigan and Nevada are provided by researchers at the University of Michigan.

B. Supplementary Historical Data

Fuel Cost Data

State-specific relative fuel costs for three types of fuel (electricity, natural gas, residual fuel) are calculated for the industrial (all manufacturing) and commercial (all non-manufacturing) sectors of the model based on unit cost data obtained from the Energy Information Administration, State Price and Expenditure Report.

Fuel Weight Data

Total energy expenditure estimates by sector (residential, commercial, industrial, transportation, and electric utilities), by type (total, electricity, natural gas), and by state are obtained for a recent year from the Energy Information Administration. Residual energy is calculated as total minus electricity and natural gas. Fuel weights are then calculated for each state by sector (the proportion of total fuel expenditures that are electricity, natural gas, and residual); the weights should add up to 1. The industrial sector fuel weights are applied to the manufacturing industries, transportation to transportation industries, electric utilities to utilities industries, and commercial to everything else. The residential sector is not used.

Tax Data

To calculate the cost of capital variable, the model requires both state-specific and national-average corporate profit and property tax rates. In the absence of a consistent and complete data source, the tax rates are estimated as follows.

State and US corporate profit tax rates are defined as the amount of tax collections divided by the amount of corporate profits. The tax collections are found in the Government Finances (Revenue) publication and are converted from fiscal year to calendar year. Profits for states are constructed by sharing the national corporate profits to each state based on gross state product. The effective tax rate is simply the tax collections divided by the estimated profits. Corporate profits for the US are taken from the *Survey of Current Business*.

State and US property tax rates are defined as the amount of tax collections divided by the level of residential and nonresidential capital stock. Again, tax collections are taken from the Government Finances (Revenue) publication, and converted from fiscal to calendar year. Nonresidential capital stock is calculated by estimating the state's share of national nonresidential capital stock based on estimated profits (see above). Residential capital is estimated similarly, but disposable income is used as the weight. U.S. investment and capital stock data for residential and nonresidential structures are also found in the *Survey of Current Business*.

Cost of Capital Data

In addition to the tax rates described above, exogenous variables for the cost of capital equation include Moody's AAA bond rates, investment tax credit rates, and the proportion of business capital financed by bonds and loans. The latter is estimated from the *Quarterly Financial Report for Manufacturing*, while all of the other variables are taken from the *Survey of Current Business*.

Housing Price Data

State-specific median values of owner-occupied housing units are obtained from the *Census of Housing* for the year 2000. The National Association of Realtors' regional and metropolitan growth rates for median sales price of existing single-family homes are then used to estimate state housing prices after 2000. To determine the national housing price figure, from which selling price for real estate relative to the U.S. is calculated, the *Census of Housing* value is used for 2000, and the growth rate from the National Association of Realtors' national data is applied after 2000. County-specific median values of owner-occupied housing units are also obtained from the *Census of Housing* for 2000. State and metropolitan housing price values are used to extend the series beyond 2000.

C. National Forecast Data

BLS Forecast Data

The REMI model's baseline national forecast is primarily based on the BLS Employment Outlook: 2008-2018, published in the November 2009 issue of the *Monthly Labor Review*. Input-output, final demand, and value added data are developed by the U.S. Bureau of Labor Statistics in the Office of Occupational Statistics and Employment Projections.

For the 2018 projections, input-output, final demand, and value added data were developed for the years 1993-2008 and projected year 2018. Historical tables are provided in both nominal (current) dollars and in 2000 chain-weighted real dollars. The projected tables are provided in real dollars only.

Dollar value matrices are expressed in millions of dollars rounded to three decimal places. Therefore, they may not add exactly to their totals due to rounding error. In the real tables, the data do not add up to published totals like gross domestic product because of chain weighting.

These data are based on the 2002 North American Industrial Classification System (NAICS) and the U.S. Department of Commerce's Bureau of Economic Analysis (BEA) 2002 benchmark input-output tables, as published in April of 2008.

Input-output data shows the flow of commodities from production through intermediate use by industries and purchases by final users. This data is developed as a set of matrices or tables for each year.

The "USE" matrix contains the sales of commodities sold to intermediate consumers and final demand. In addition, it contains the intermediate inputs and value added factors of production to industries for the production of their product. Each column sums to its respective industry output. Each row sums to its respective commodity output.

The "MAKE" matrix details the production of commodities by industries. Each row sums to industry output and each column sums to commodity output.

The "FD" matrix is a detailed set of 203 final demand types. Each of the 203 columns is distributed across the 202 commodities identified in the input-output system. This matrix is the final demand "bridge" table, showing detailed purchases for 203 categories of expenditures for the year specified in the matrix name.

For the years 2001-2008 and 2018, REMI converts the industry-by-commodity USE matrix and the commodity-by-industry MAKE matrix into an industry-by-industry input-output table of flows, and subsequently a matrix of coefficients. The FD matrix is converted into a bridge matrix of coefficients.

For the non-benchmark years between 2008 and 2018, a linear interpolation method is used to estimate the coefficients. The 2018 coefficients are extrapolated forward to 2050 (see document *Methodology for the New National Forecast*).

The BLS includes as "special industries" noncomparable imports, scrap, and used and secondhand goods. For noncomparable imports and used and secondhand goods, there is no production in the United States, and thus no domestic commodity or industry output.

For scrap, there is domestic production, although that production is not by a "scrap" industry, but by other industries as a part of the production of their output. For REMI purposes, we need to account for these values in our industry-by-industry matrix. For scrap and used and secondhand goods, the great majority of which are automobiles, we made the assumption that most of these goods would at some point pass through the wholesale industry, so we simply aggregated them with wholesale. For noncomparable imports, we added the values (which are negative) to the industry that "used" these imported goods (the commodity by industry diagonal in the USE table), and then balanced the table by subtracting them from the commodity by imports column in the demand table.

The Office of Occupational Statistics and Employment Projections (OOSEP) develops output, price, and employment data for use in the Bureau's biennial economic and employment projections. The most recent set of projections were developed for the year 2018 with data for 202 detailed industries. The projections were published in the November 2009 issue of the *Monthly Labor Review*.

The output measures follow the definitions and conventions used by the Bureau of Economic Analysis (BEA) in its input-output tables, published every five years. These industry output measures are based on producer's value and include both primary and secondary products and services. The main data sources for compiling the output time series for manufacturing industries are the Census Bureau's *Annual Survey of Manufactures*. Data sources for nonmanufacturing industries are more varied. They include the Census Bureau's Service Annual Survey, the BEA's National Income and Product Accounts (NIPA) data on new construction and personal consumption expenditures, IRS data on business receipts, and many other sources. The constant dollar industry output estimates for the most recent years are based on BLS employment data and trend projections of productivity. The output series are benchmarked to the industry/commodity outputs from the unpublished revised BEA 2002 input-output tables, as published in April of 2008.

The annual price data are developed in a manner so as to conform to BEA's National Income and Product Accounts. For manufacturing, they are based on industry sector price index data collected by BLS, and are chain-weighted from the four-digit NAICS to OOSEP's detailed industry sectors. Nonmanufacturing prices, developed at the level of OOSEP's detailed industry sectors, use a variety of different sources, in many instances the BLS consumer price index data. In industries where such underlying price data have not yet been developed, imputations of price change are made from other data series. All aggregate series are chain-weighted from OOSEP's detailed industry sectors. This is necessitated by the benchmarking of the output series to the base year input-output tables.

The employment data are from the BLS Current Employment Survey (for wage and salary jobs and average weekly hours), the Current Population Survey (for self-employed and unpaid family worker jobs, agricultural employment, and private household employment, except logging), and ES-202 Employment and Wages data collected from the unemployment insurance program (for industries unpublished in the CES).

Official BLS productivity measures are produced by the Office of Productivity and Technology. Although output per hour measures can be calculated from the OOSEP estimated constant dollar output and employment data, those calculations do not reflect the official BLS productivity measure. In developing the employment projections, OOSEP does not rely specifically on the output per hour implied by the output and employment data. Especially for the nonmanufacturing industries, development of constant dollar output is problematic. OOSEP discounts the reliability of the constant dollar output and the implied output per hour as an analytic basis for problem industries in favor of trend analysis of the employment data series, which is generally considered more reliable.

Between 2008 and 2018, REMI uses a labor-force-growth-trended forecast for GDP and its components (final demand). After 2018, the BLS-projected labor force participation rates and population projections estimated by REMI for the US (based on death rates, middle range birth rates, and international migration data from the Census) are used to forecast the labor force. An initial estimate of final demand is made, and then adjusted until the resulting growth in employment comes in line with the labor force. Once the BLS trended forecast is in place, and then extended to 2050, the U.S. Macroeconomic Values procedure of PI+ is run using the latest short-term national forecast from the University of Michigan's Research Seminar in Quantitative Economics (RSQE). This updates the national forecast with the current national business cycle.

RSQE Forecast Data

RSQE is an economic modeling and forecasting unit which has been in operation at the University of Michigan since 1952. RSQE provides forecasts of the U.S. national economy on a seven-times-per-year basis and forecasts of the Michigan economy on a four-times-per-year basis.

BLS Occupation Data

The National Industry-Occupation Employment Matrix is developed by the Bureau of Labor Statistics as part of its ongoing Occupational Employment Projections Program. These data, derived from the 2008-2018 National Employment Matrix, underlie information on occupational employment growth presented in the 2010-11 edition of the Occupational Outlook Handbook.

Occupational classification

The occupations covered reflect the occupational classification used in the Occupational Employment Statistics (OES) survey, the source used to generate data to develop the 2008 National Employment Matrix. The OES survey data are consistent with the 2000 Standard Occupational Classification (SOC) system. Data on the self-employed, the unemployment rate, and the percentage working part-time are based on Current Population Survey (CPS) data for equivalent occupations. A crosswalk was used to distribute CPS data to occupations in the National Employment Matrix.

Industry classification

Industries covered in the national employment matrix reflect the 2007 North American Industrial Classification System (NAICS). Self-employed, unpaid family workers, and workers who have a second job in agriculture production, forestry, fishing, or private households are listed separately in order to derive total employment.

Data suppression

Occupation and industry cells with less than 50 workers are not displayed in the search results.

Projections methodology

The Bureau of Labor Statistics projections of industrial and occupational employment are developed in a series of six interrelated steps, each of which is based on a different procedure or model and related assumptions: labor force, aggregate economy, final demand (GDP) by consuming sector and product, industrial activity, employment by industry, and employment by occupation. The results produced by each step are key inputs to the following steps, and the sequence may be repeated multiple times to allow feedback and to insure consistency.

REMI aggregates the detailed industries to 169, 70, or 23, as applicable, and the detailed occupations to 94 or 17. The fixed proportion of occupational employment is calculated by summing the employment across an industry, and then dividing each occupation by the industry total. The rates of occupational change between 2008 and 2018 are calculated by linear interpolation, then extended back historically at the same rate of change, and extended forward at one-half the rate of change.

Data Sources Behind REMI's County Model

LHYR 2008

Concept	Source	Last Available Historical Year	Notes
ECONOMIC			
Employment	BEA-REIS (23-sector)	2001 - 2008	
	BLS QCEW; CBP	1990 - 2008	CBP can be used to obtain estimate of industry employment when BLS QCEW data are suppressed
Wages	BLS QCEW; CBP	2001 – 2008	
Personal Income	BEA-REIS	2001 – 2008	
Compensation	BEA-REIS	2001 – 2008	
Commuter Flows	Journey to Work-Regional Economic Measurement Division	2000	2000 flow matrix R.A.S.'d to BEA gross flows & reconciled to BEA's net residence adjustment ($)
Unit Electricity Cost	State-level data used: Energy Information Administration	1990 – 2007	
Unit Natural Gas Cost	State-level data used: Energy Information Administration	1990 – 2007	
Unit Residual Fuel Cost	State-level data used: Energy Information Administration	1990 – 2007	
Purchased Fuel Weights	State-level data used: Energy Information Administration	2007	
Corporate Profit Tax Rate	Calculated State rate used: (collections/profits)		
Collections	www.census.gov (current), Government Finances (historical)	1990 – 2008	Corporate Net Income & Corporations in General
Estimated Profits	BLS technical coefficients matrix and REMI estimated output	1990 – 2008	
Property Tax Rate	Calculated; state rates used: (collections/cap. stock) see next two rows		This rate reflects both residential & non-residential capital
Collections	www.census.gov (current), Government Finances (historical)	1990 – 2007	
Estimated Stock	Allocation of U.S. non-residential and residential stock by the state's profit and real disp. income weights	1990 – 2008	
Personal Income Taxes	BEA State Rates	1990 – 2008	
Investment Tax Credit Rate	U.S. rate - Survey of Current Business	1990 – 2008	
Housing Prices	Census of Housing & National Association of Realtors	1990; 2000 1990 – 2008	Median values; NAR regional & metropolitan growth rates applied to interpolate intercensal years

Concept	Source	Last Available Historical Year	Notes
DEMOGRAPHIC			
Population	Census: decennial (1 yr cohort), intercensal (5 yr cohort)	2000 1990 – 2008	Reconciled to BEA for consistency
Births, Deaths, Net International Migrants	Census	1990 – 2008	Net international migrants reconciled with national totals
Natality Rates	State rate used - Center for Disease Control and Prevention, National Center for Health Statistics	1990 - 2006	
Survival Rates	Census: Population Projections of the United States by Age, Sex, Race, Hispanic Origin, and nativity: 1999-2100	1999 - 2100	National survival rates adjusted to fit regional deaths observed in history
Retired Migrants	Census 2000 Migration Data on DVD	2000	Age-specific retired migration rates are calculated using 2000 census data
Military Population	Census Department of Defense	2000 1990-2008	Personnel by Location from DoD starting in 1994. Data by Race and Sex for 2000 only.
Military Dependents	Department of Defense	1990-2005	National totals only; dependents are assigned to regions based on size of Military population.
College Population	Census	2000	Data by Race and Sex for 2000 only
Prisoner Population	Census	2000	Data by Race and Sex for 2000 only
Labor Force	Census Bureau of Labor Statistics	2000 1990-2008	Data by Race and Sex for 2000 only

Data Sources Behind REMI's State Model

LHYR 2008

Concept	Source	Last Available Historical Year	Notes
ECONOMIC			
Employment	BEA	1990 – 2008	Total Employment series
Wages	BEA	1990 – 2008	
Personal Income	BEA	1990 – 2008	
Compensation	BEA	1990 – 2008	
Commuter Flows	Journey to Work – Regional Economic Measurement Division	2000	2000 flow matrix R.A.S.'d to BEA gross flows and reconciled to BEA's net residence adjustment ($)
Unit Electricity Cost	Energy Information Administration	1990 – 2007	
Unit Natural Gas Cost	Energy Information Administration	1990 – 2007	
Unit Residual Fuel Cost	Energy Information Administration	1990 – 2007	
Purchased Fuel Weights	Energy Information Administration	2007	
Corporate Profit Tax Rate	Calculated (collections/profits) see next two rows		
Collections	www.census.gov (current), Government Finances (historical)	1990 – 2008	Corporate Net Income & Corporations in General
Estimated Profits	BLS technical coefficient matrix and REMI estimated output	1990 – 2008	Estimated series is normalized for bottom-up consistency to reported U.S. profits.
Property Tax Rate	Calculated (collections/capital stock) see next two rows		This rate reflects both residential and non-residential capital
Collections	www.census.gov (current), Government Finances (historical)	1990 – 2007	
Estimated Stock	Allocation of U.S. non-residential and residential stock based on the state's profit and real disp. income weights.	1990 – 2008	
Personal Income Taxes	BEA	1990 – 2008	Includes federal, state & local collections
Investment Tax Credit Rate	U.S. rate - Survey of Current Business	1990 – 2008	
Housing Prices	Census of Housing & National Association of Realtors	1990; 2000 1990 – 2008	Median values; N.A.R. regional and metropolitan growth rates applied to interpolate intercensal years

Concept	Source	Last Available Historical Year	Notes
DEMOGRAPHIC			
Population	Census: decennial (1 yr cohort), intercensal (5 yr cohort)	2000 1990 – 2008	Reconciled to BEA for consistency
Births, Deaths, Net International Migrants	Census	1990 – 2008	Net international migrants reconciled with national totals
Natality Rates	Center for Disease Control and Prevention, National Center for Health Statistics	1990 - 2006	
Survival Rates	Census: Population Projections of the United States by Age, Sex, Race, Hispanic Origin, and nativity: 1999-2100	1999 - 2100	National survival rates adjusted to fit regional deaths observed in history
Retired Migrants	Census 2000 Migration Data on DVD	2000	Age specific retired migration rates are calculated using 2000 census data
Military Population	Census Department of Defense	2000 1990 – 2008	Personnel by Location data from DoD starting in 1994. Data by Race and Sex for 2000 only.
Military Dependents	Department of Defense	1990 – 2005	National totals only; dependents are assigned to regions based on size of Military population.
College Population	Census	2000	Data by Race and Sex for 2000 only
Prisoner Population	Census	2000	Data by Race and Sex for 2000 only
Labor Force	Census Bureau of Labor Statistics	2000 1990 – 2008	Data by Race and Sex for 2000 only

Data Sources Behind REMI's U.S. Model

LHYR 2008

Concept	Source	Last Available Historical Year	Notes
ECONOMIC			
Employment	BEA	1990 – 2008	Total Employment series
Wages	BEA	1990 – 2008	
Personal Income	BEA	1990 – 2008	
Compensation	BEA	1990 – 2008	
Occupational Matrix	BLS	2008; 2018	Details 94 occupations, linearly interpolated
Productivity	BLS	1993 - 2008; 2018	Calculated from detailed E & Q data
Technology Matrix	BLS	1993 - 2008; 2018	Make & Use matrices converted to industry-by-industry matrices. Interpolated for in-between years.
Industry Deflators	BLS	1993 – 2008	Nominal & real Q to calculate deflators
Final Demand	BLS	1993 - 2008; 2018	Interpolated by growth in labor force for in-between years.
Commodity Prices	Survey of Current Business: NIPA	1990 – 2008	
Unit Electricity Cost	Energy Information Administration	1990 – 2007	
Unit Natural Gas Cost	Energy Information Administration	1990 – 2007	
Unit Residual Fuel Cost	Energy Information Administration	1990 – 2007	
Purchased Fuel Weights	Energy Information Administration	2007	
Corporate Profit Tax Rate	Calculated (collections/profits) see next two rows		
Collections	*www.census.gov* (current), Government Finances (historical)	1990 – 2008	Corporate Net Income & Corporations in General
Profits	Survey of Current Business	1990 – 2008	Moving average to convert from fiscal year to calendar year.
Property Tax Rate	Calculated (collections/capital stock) see next 2 rows		This rate reflects both residential & non-residential capital
Collections	*www.census.gov* (current), Government Finances (historical)	1990 – 2007	
Estimated Stock	Survey of Current Business	1990 – 2008	
Personal Income Taxes	BEA	1990 – 2008	Includes federal, state & local collections
Investment Tax Credit Rate	Survey of Current Business	1990 – 2008	
Business Cycle	RSQE	2009 – 2012	
Housing Prices	Census of Housing & National Association of Realtors	1990; 2000 1990 – 2008	

Concept	Source	Last Available Historical Year	Notes
DEMOGRAPHIC			
Population	Census: (1 yr. cohort)	1990 – 2005	Reconciled to BEA for consistency
Births, Deaths, Net International Migration	Census	1990 – 2008	
Natality Rate, Survival Rate, Net International Migration Forecasts	Census: Population projections of the United States by Age, Sex, Race, Hispanic Origin, and Nativity	1999 – 2100	
Labor Force	BLS	1990 – 2008	
Labor Force Participation Rates Forecast	BLS	2000 – 2050	
Military Population	Census; Department of Defense	2000; 1990 – 2008	
Military Dependents	Department of Defense	1990 – 2005	
College Population	U.S. Department of Education; National Center for Education Statistics	1990 – 2008	
Prisoner Population	Census; U.S. Department of Justice	2000; 1990 – 2008	