



TECHNICAL MEMORANDUM 2: **BASELINE MODEL UPDATE**

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1.0 Executive Summary

The New York Metropolitan Transportation Council (NYMTC) is a regional council of governments (COG) that is the metropolitan planning organization (MPO) for New York City, Long Island, and the Mid-Hudson region. NYMTC provides a collaborative planning forum to address transportation-related issues, develop regional plans, and make decisions on the use of federal transportation funds. Socioeconomic and demographic (SED) forecasts are crucial components in the development of regional transportation plans, air quality conformity analysis, and decision-making on the use of these funds.

In order to update the 2050 SED Forecasts, NYMTC has charged WSP and Urbanomics, in collaboration with the New York City Department of City Planning (DCP), to update the existing 2050 employment, population, household, and labor force forecast models, as well as the Traffic Analysis Zone (TAZ) distribution model, to a 2017 base year using the same data sources as in the original 2050 SED forecast models and then extend the forecast period from 2050 to 2055. These models were created by the Louis Berger Group (LBG) for the original 2050 Forecasting effort and were described in detail in their accompanying technical memoranda.

For the sake of clarity, the Louis Berger Group (LBG) forecasts prepared with a 2012 baseline will be referred to in this technical memorandum as “2050 Forecast(s),” the update of these models to the 2017 baseline will be referred to as the “Update(s)”.

The ultimate purpose of this technical memorandum in draft form is to solicit reaction from the Forecast Working Group on the Update that may be used in adjusting the existing models for final acceptance. To this end, it will:

- Describe the update process for each of the models and submodels.
- Present any issues and inconsistencies that arose in the data collection and update process; as well as any changes made and the rationale behind them.
- Provide the outputs of the Update and brief analyses of the results.
- Provide recommendations for improvements to the existing models and/or the development of future models for future forecasts.

1.1 Key Findings

These findings are preliminary and current as per the Update of 7/18/2019. The only changes to the models have been to update them to the 2017 baseline. No changes have been made to the previously-set adjustment factors.

- Employment
 - The update of the National/Regional drivers (discussed in Section 4.3.1 of this technical memorandum) had a significant impact on regional employment, with Regional Employment reaching only 12.95 million by 2050 in the Update, compared to 13.39 million in the 2050 Forecasts.
 - Employment growth in the Update was further suppressed by manual adjustments made in the 2050 Forecasts to counter the more robust, earlier versions of the National/Regional drivers. The adjustments have a particular impact on New York City, for which employment is adjusted down by 30% to 55%, depending upon scenario.

- Population
 - The Update shows Regional population peaking in 2045 at 26.2 million as national and regional trends in fertility and mortality impact population levels over all.
 - Negative net migration is primarily responsible for the decrease in population between 2045 and 2050.
- Households/Average Household Size
 - Reflecting declining fertility rates, while total numbers of households reach 9.86 million by 2050, average household size tapers to 2.59 persons on a regional basis by 2050.

2.0 Forecast Update Process Overview

The 2050 Update followed the same methodology for the SED forecasts as was performed for the original 2050 forecasts as described in the NYMTC Modeling Methodology Technical Memorandum, with minor adjustments due to changes in the availability of data inputs (discussed in greater detail later in the memorandum).

Project Team Roles and Responsibilities

Task work completed by DCP in the 2050 SED forecasts was updated as originally completed, while work completed by the LBG team was updated by Urbanomics and WSP. DCP developed population and household forecasts for the five New York City boroughs while Urbanomics and WSP produced forecasts for the remaining 26 counties within the 31 county Forecast Region region as well as TAZ forecasts for the entire 28 county NYBPM region.¹

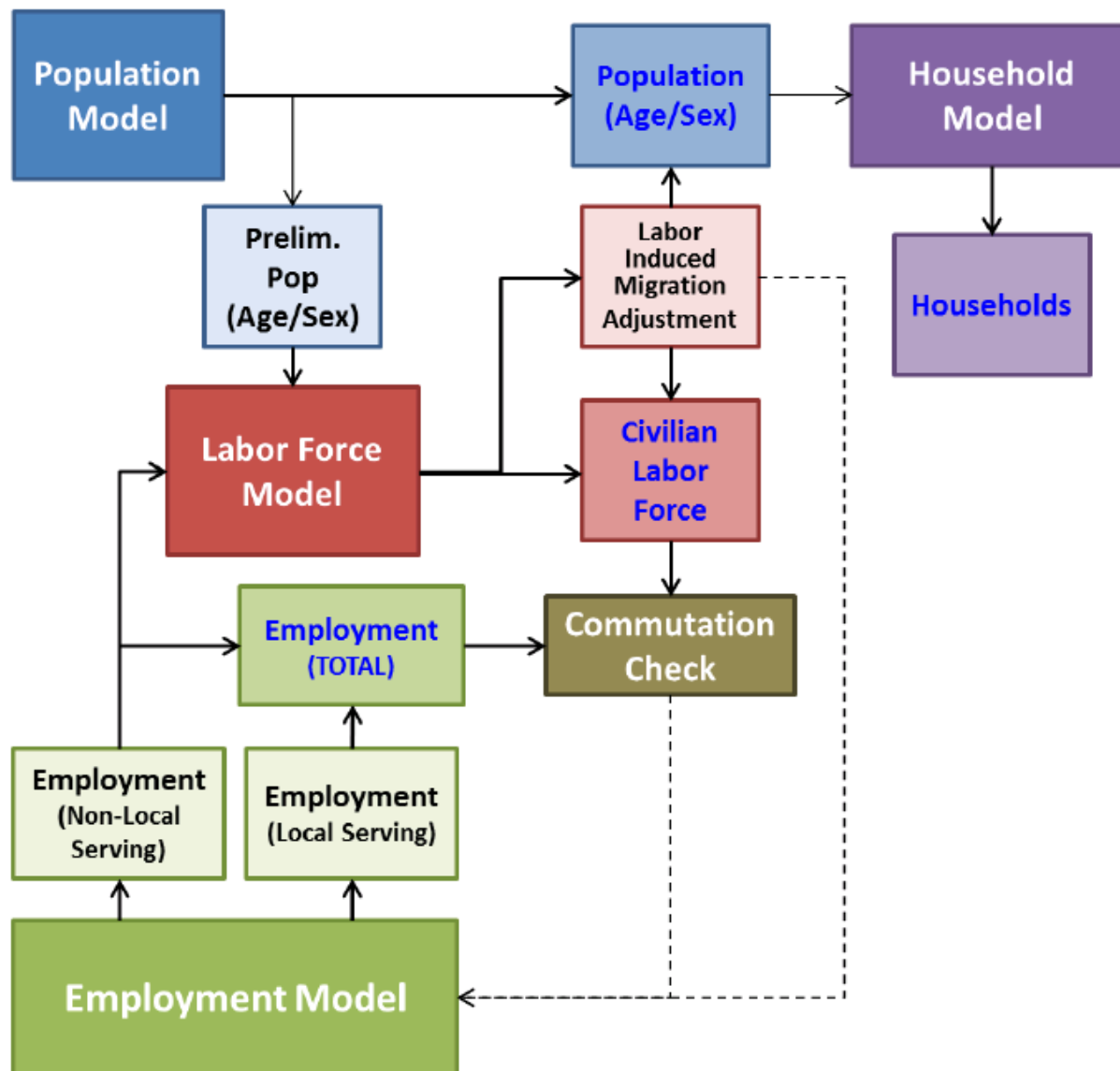
SED Model Overview

There are three Microsoft Excel-based models in the SED universe: the employment model, the population model (which also contains the labor force and household models), and TAZ model. The interrelationships between the Employment and Population models that produce the SED forecasts are presented in Figure 2. The Update followed the methodology as described in Sections 2-4 in the NYMTC Modeling Methodology Technical Memorandum (2015. *pp.* 6-95).

DCP is in the process of updating its land use analysis model prepared during the 2050 forecasting process to account for recent developments for current and future housing constraints in the New York City region. This land use model's outputs feed into New York City's cohort component population forecasting model to ensure future projected growth was restrained by realistic capacity constraints in terms of infrastructure and land availability.

¹ TAZ allocations of the county-level variables were not performed for three of the counties in the 31-County Region, including Ulster, Sullivan and Litchfield counties, as these counties are not part of the NYBPM region.

Figure 1. SED Model Overview



Source: NYMTC, 2015. *Modeling Methodology TM*, p. 3

TAZ Model Overview

The SED forecasts were used as county controls to establish many of the 16 variables required for input into the New York Best Practices Model (NYBPM). The NYBPM Region encompasses 28 of the 31 counties that make up the NYMTC 31-County Region, excluding Litchfield County of Connecticut, as well as Sullivan and Ulster counties of New York. This area encompasses 5,418 TAZs.

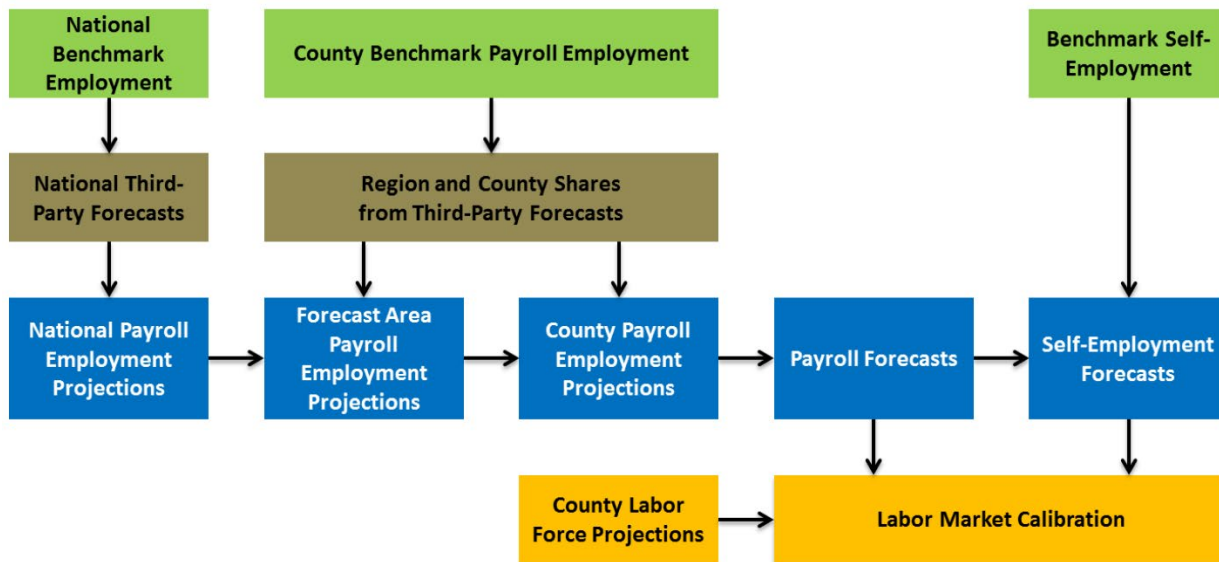
Separate methodologies were employed to produce both the New York City county forecasts and TAZ allocations compared with the suburban counties. The Update followed the methodology as described in the NYMTC Zonal Allocation Methodology Technical Memorandum (2016).

3.0 Employment Model

3.1 Methodological Overview

The NYMTC employment projections were drawn from three major submodels. First historic employment benchmarks were established for national and county payroll employment and self-employment (modules in green), then third-party forecasts were utilized to develop national employment forecasts and region/county employment shares from the third-party forecasts (modules in olive), followed by projections of payroll and self-employment for the NYMTC Region, and the sub-regions and counties within it (modules in blue). Lastly, place of work employment forecasts were calibrated against place-of-residence labor forecasts (modules in gold) established from the population forecast model (NYMTC, 2015. *Modeling Methodology TM*, pp. 6-41).

Figure 2. Overview of Employment Forecasting Methodology



Source: NYMTC, 2015. *Modeling Methodology TM*, p. 6

3.2 Data Inputs

The economic data inputs incorporated into the 2050 model and 2050 Update model are listed in Figure 4 on the following page. The 2050 Update model generally incorporated the same inputs used in the 2050 model with new vintages added for the years from 2011 to 2017. All changes to data inputs and processing of those inputs are described in further detail below in the context of the function of the data input within the employment model.

Figure 3. Table of Data Inputs to Employment Models

		2050 Model		2050 Update Model	
Variable Name	Publisher	Dataset	Years	Dataset	Years
Wage/salary employment by 2-digit NAICS sector	Moody's Analytics	US Baseline 30-Year Forecast	1998-2044	No Change	1998-2048
Wage/salary employment by 2-digit NAICS sector	IHS Markit	US 30-Year Trend Forecast	1998-2044	No Change	1998-2048
10-year U.S. forecast of wage/salary employment by 2-digit NAICS sector	US BLS	Employment Projections program	2002-2022	No Change	2006-2026
Wage/salary employment by 2-digit NAICS sector	US BLS	Current Employment Statistics (CES)	1998-2013	No Change	2011-2017
Agricultural and private household employment	US BLS	Current Population Survey	1998-2013	No Change	2011-2017
Wage/salary employment by 2-digit NAICS sector	US BLS	State and Area Employment Series	1998-2013	No Change	2011-2017
Wage/salary employment by 2-digit NAICS sector	US BLS	Quarterly Census Employment and Wages	2001-2013	No Change	2011-2017
Wage/salary employment by 2-digit NAICS sector	NYDOL, NJDOL, CTDOL	Not identified as a source in the 2050 Model	Not identified as a source in the 2050 Model	Quarterly Census Employment and Wages	2011-2017
Primary workers by place of work and industry	US Census Bureau	Longitudinal Employer Household Dynamics	2002-2011	No Change	2011-2017
JTW County-to-County Flows, Table 1; total employment	US Census Bureau	Census Transportation Planning Program JTW File	2006-10 5-Yr Sample	No Change	2012-16 5-Yr Sample
Industry by class of worker for the civilian employed population	US Census Bureau	American Community Survey Table C24070	2005-08 to 2010-12 3-Yr Samples	No Change	2007-11 to 2013-17 5-Yr Samples
Means of transportation to work by class of worker for workplace geography	US Census Bureau	American Community Survey Table B08528	2005 to 2012 1-Yr Samples	No Change	2007-11 to 2013-17 5-Yr Samples
Means of transportation to work by industry for workplace geography	US Census Bureau	American Community Survey Table B08526	2005 to 2012 1-Yr Samples	No Change	2007-11 to 2013-17 5-Yr Samples
Sex of workers by place of work	US Census Bureau	American Community Survey Table B08007	2006-10 5-Yr Sample	No Change	2012-16 5-Yr Sample
Sex by age by employment status	US Census Bureau	American Community Survey Table B23001	2006-10 5-Yr Sample	No Change	2012-16 5-Yr Sample
Industry by class of worker for the civilian employed population	US Census Bureau	American Community Survey Table B24070	2005-08 to 2010-12 3-Yr Samples	IPUMS' ACS Microdata 5-yr ACS samples	2007-11 to 2013-17 5-Yr Samples

3.2.1 Self-Employment Benchmarking: Discontinuation of ACS 3-Yr Self-Employment by Industry Data Table

The 2050 Forecast benchmarking process for self-employment used American Community Survey (ACS) employment data. The number of self-employed workers in incorporated and unincorporated businesses, as well as unpaid family workers was determined during the payroll benchmarking process for 13 industry categories and then expanded to the standard 20 industry categories in full 2-digit North American Industry Classification System (NAICS) detail. This conversion of employment from 13 to 20 industry categories relied on the ACS table B24070 3-year sample (NYMTC, 2015. *Modeling Methodology TM*, pp.15-18).

In 2014, the US Census Bureau halted its publication of ACS 3-year while maintaining publication of its 1-year and 5-year survey samples. ACS table B24070 1-year sample was available for the years from 2014 to 2017 however this detailed table had a high margin of error and lacked available data for the full 31-County Region. The Update relied on the University of Minnesota Population Center's Public Use Microdata Sample (PUMS) derived from the US Census Bureau's ACS series to produce an equivalent cross-tabulation of table B24070 based on the ACS 5-year survey for the 31-County Region. Following the 2050 methodology, splits of the 13 industry groups to 20 industry groups were established based on the average of five samples (2008-2013 through 2013-2017 5-year samples).

A comparison of the ACS 3-year sample and PUMS-based 5-year sample is shown in Figure 4 for the year of 2012. While most industries saw little variation in term of the distribution of self-employed workers by industry, when distribution ratios were compared between the 3-year and 5-year samples there was a variation of more than 0.2% in the construction (+0.3%) and retail trade (0.4%) industries. This variation was considered to be relatively insignificant.

Figure 4. Comparison of 2012 ACS 3-Yr and PUMS-Based ACS 5-Year Samples of Self-Employment in the 31-County Region

	ACS Table B24070 2009-12 3-Yr Sample		PUMS-Based ACS Table B24070 2007-12 5-Yr Sample		Difference	
	Count	% Share of Total	Count	% Share of Total	Count	% Share of Total
Total	1,063,143	100.0%	1,068,444	100.0%	+5,301	+0.0%
Agriculture	6,050	0.6%	5,930	0.6%	-120	-0.0%
Mining	123	0.0%	121	0.0%	-2	-0.0%
Utilities	-	0.0%	-	0.0%	+0	+0.0%
Construction	144,001	13.5%	148,263	13.9%	+4,262	+0.3%
Manufacturing	32,694	3.1%	32,315	3.0%	-379	-0.1%
Wholesale Trade	35,369	3.3%	35,223	3.3%	-146	-0.0%
Retail Trade	89,470	8.4%	94,213	8.8%	+4,743	+0.4%
Transportation & Warehousing	54,833	5.2%	53,258	5.0%	-1,575	-0.2%
Information	23,962	2.3%	24,491	2.3%	+529	+0.0%
Finance & Insurance	33,649	3.2%	33,105	3.1%	-544	-0.1%
Real Estate, Rental & Leasing	45,669	4.3%	47,692	4.5%	+2,023	+0.2%
Professional, Scientific & Technical	175,730	16.5%	174,209	16.3%	-1,521	-0.2%
Mgmt Of Companies & Enterprises	240	0.0%	337	0.0%	+97	+0.0%
Administrative, Support, Waste Mgmt	64,422	6.1%	64,203	6.0%	-219	-0.1%
Educational Services	26,394	2.5%	24,650	2.3%	-1,744	-0.2%
Health Care & Social Assistance	122,657	11.5%	122,084	11.4%	-573	-0.1%
Arts, Entertainment & Recreation	55,201	5.2%	55,918	5.2%	+717	+0.0%
Accommodation & Food Services	36,638	3.4%	37,797	3.5%	+1,159	+0.1%
Other Services	116,041	10.9%	114,635	10.7%	-1,406	-0.2%
Government	-	0.0%	-	0.0%	+0	+0.0%

Sources: US Census Bureau, American Community Survey, 2009-2012 3-Year Estimate and 2007-2012 5-Year Estimate.

3.2.2 Standardizing County Employment Forecasts: Moody's County Forecast Linear Extension from 2035-2050

The last step in employment benchmarking at the national and county levels was to apply indexed BLS, Moody's, and IHS Markit forecasts to the benchmarked series. Both Moody's and IHS Markit forecasts were published only to 2048 and therefore employment was described in the SED Forecast Modeling Methodology as being linearly extended to the final forecast year of 2050 (NYMTC, 2015. *Modeling Methodology TM*, pp. 25-28).

For the 2050 Forecast process, the Moody's county-level forecast was linearly extended from 2035 through 2050. For the 2050 Update process, the Moody's county-level forecast was linearly extended from 2048-2050.

3.2.3 Use of Iterative Proportional Fitting

An iterative algorithm commonly used in demographics and economics for purposes of estimating cell values to ensure values add up to two or more control values totals, known as Iterative Proportional Fitting (IPF) or Raking, was used in several instances for finalizing data inputs and

described in Section 2.2.2 and 2.7 of the NYMTC Modeling Methodology Technical Memorandum (2015. *pp.* 39-41). These instances included

- Processing county level industry-specific Quarterly Census Employment Wages employment data to ensure that known employment and estimated employment among suppressed industries added up to known county employment totals.
- Processing of American Community Survey employment estimates by industry to known county totals
- Processing Census Transportation Planning Program employment by industry to known county totals

Employment values that were processed in the 2050 Forecast using IPF differed marginally from employment values processed using IPF in the Update while producing the same end result of normalized cell values to seed values. This difference is likely due to the use of one of several alternative IPF algorithms possibly used but not specifically identified in the 2050 model. The Update utilized the IPF algorithm recognized for its computational speed, numerical stability and algebraic simplicity (Kratovich, 2016. *p.* 1). IPF processing performed in the Update utilized Charles Zaiontz's Real Statistics Resource Pack which contains an IPF algorithm Excel formula for two-way contingency tables (Zaiontz, 2019).

3.2.4 Benchmark County Wage & Salary Employment: Suppressions of County-Level QCEW Employment

The county employment benchmark process relied on three data sources: the US Bureau of Labor Statistics' Quarterly Census of Employment and Wages (QCEW) and the State and Area Employment (SAE) programs, and the US Census Bureau's ACS. The QCEW data, while nearly free of sampling error, was suppressed to maintain confidentiality where a specific industry/county view could reveal the details of a single firm (NYMTC, 2015. *Modeling Methodology TM*, *p.* 14).

The handling of suppressions in the QCEW data was not fully described in the NYMTC Modeling Methodology Technical Memorandum (2015. *p.* 14). A footnote indicated that IPF was utilized to fill in suppressions; however the documentation did not disclose the sources used as the county controls. For the 2050 Forecast Update, a multi-step process for estimating suppressed employment was developed.

First, suppressions were flagged for the QCEW county level employment by industry data being updated in the model (years 2011-2017). If data were suppressed by the source QCEW, values were replaced by New York, New Jersey, and Connecticut State Department of Labor revisions to QCEW. If unsuppressed data were unavailable from the state offices, the suppressed categories were estimated using the US Census Bureau's Longitudinal Employer Household Dynamics (LEHD) Origin-Destination Employment Statistics (LODES) version 7.3 program data. Suppressions identified in 2011 through 2015 were estimated by multiplying QCEW county total employment by the ratio of suppressed industry LEHD reported employment to county total LEHD employment for appropriate annual employment years. Suppressions identified in 2016 or 2017 were estimated following a similar methodology although due to the unavailability of 2016 and

2017 LEHD data, 2015 year LEHD ratios were multiplied against appropriate year QCEW county totals.

3.3 Notable Trends and Issues

3.3.1 Third Party Forecast Scenarios

Described in Section 2.1 in the NYMTC County Level Forecast Results and Analysis Technical Memorandum (2016. *pp 8-10*), three third party forecasts were utilized to develop national, region, and county share forecasts indexed to historic baseline employment. Twelve possible forecast scenarios were developed for each industry and county (3 national forecasts x 2 region shares x 2 county shares) and indexed for the Update at 2017 historic employment levels. At the NYMTC 31-County Region level, six unique forecast scenarios of payroll employment were produced (Figure 5 and Figure 6).

In terms of indexed forecast growth from the 2017 baseline period to the 2050 forecast interval, the forecast scenarios varied by roughly one standard deviation from the mean. Employment scenarios that utilized the Moody's national scenario forecasted the highest levels of growth at just over one standard deviation from the mean while scenarios that employed the BLS national forecast projected the lowest growth, just below one standard deviation from the mean.

All six employment scenarios projected double digit employment growth from 2017 to 2050 for the health care and social assistance industry sector; those based on the IHS national scenario produced forecasts of 11.1% and 11.5% while all other scenarios forecasted gains of roughly 20% or more in that sector.

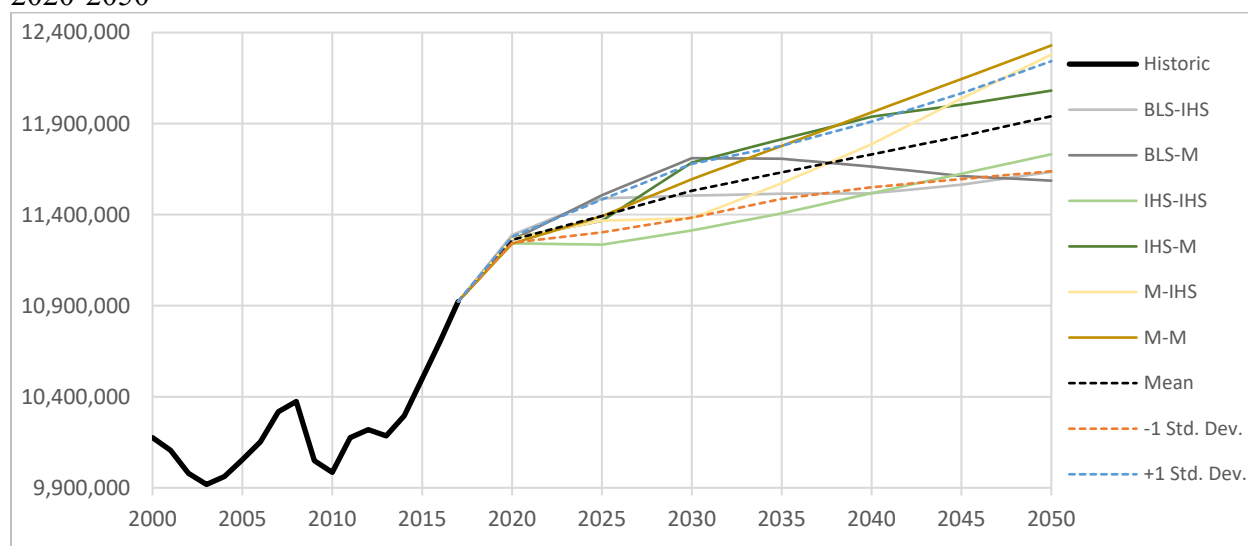
Employment scenario forecasts were mixed among the Region's other largest industry groups. At least one scenario forecasted declining employment in each of the government, retail trade, professional services, and hospitality industry groups. One or more scenarios forecasted double digit growth in each of the top industry groups. The scenario developed from the BLS national forecast and IHS regional forecast was the most pessimistic of the six with reduced growth projected across three top industries (government, retail, and professional services). The scenarios drawn from the Moody's regional forecast with the BLS or Moody's national forecasts projected employment gains across all five of the Region's top industry groups.

Figure 5. Comparison of NYMTC Region Payroll Employment Forecast Scenarios by Industry: Percent Change 2017 to 2050

Employment Scenario		Industry Group					
National Driver	Regional Driver	All Industries	Health Services	Gov't	Retail Trade	Professional Services	Hospitality Services
BLS	IHS	+6.5%	+22.2%	-7.6%	-3.3%	-7.8%	+29.5%
BLS	Moody's	+6.1%	+21.8%	+4.5%	+10.6%	+7.1%	+2.0%
IHS	IHS	+7.4%	+11.5%	+2.6%	-9.7%	+37.9%	+14.6%
IHS	Moody's	+10.6%	+11.1%	+16.1%	+3.2%	+60.2%	-9.7%
Moody's	IHS	+12.4%	+20.1%	+4.1%	-5.5%	-4.2%	+70.8%
Moody's	Moody's	+12.9%	+19.7%	+17.7%	+8.0%	+11.3%	+34.6%
Mean		+9.3%	+17.7%	+6.2%	+0.6%	+17.4%	+23.6%
-1 Std. Dev.		+6.6%	+13.1%	-2.4%	-6.7%	-6.7%	-2.3%
+1 Std. Dev.		+12.1%	+22.4%	+14.8%	+7.9%	+41.6%	+49.6%

As shown in the following figures, during the historic period from 2000 to 2017 there were two major troughs in employment associated with the 2001 recession and the 2007-2009 recession. Since 2011 employment in the 31-County Region has strongly expanded. The forecast scenarios throughout the 31-County Region expect sharp near-term growth over the period from 2017 to 2020 and continued albeit slower growth in the 31 counties from 2020 to 2050. Only the scenario driven by BLS national drivers and Moody's regional drivers projected a peak in long-term growth over the forecast period with employed projected to level off and then moderately decline after 2030. Other scenarios, particularly the scenario driven by both national and regional drivers from Moody's, projected consistent moderate to high levels of growth with payroll employment expected to reach 12.3 million workers by 2050.

Figure 6. NYMTC Region Historic Payroll Employment, 2000-2017 & Forecast Scenarios, 2020-2050



Note: Scenario names in the legend contain abbreviated forecast source names labeled in the following order: National-Region.

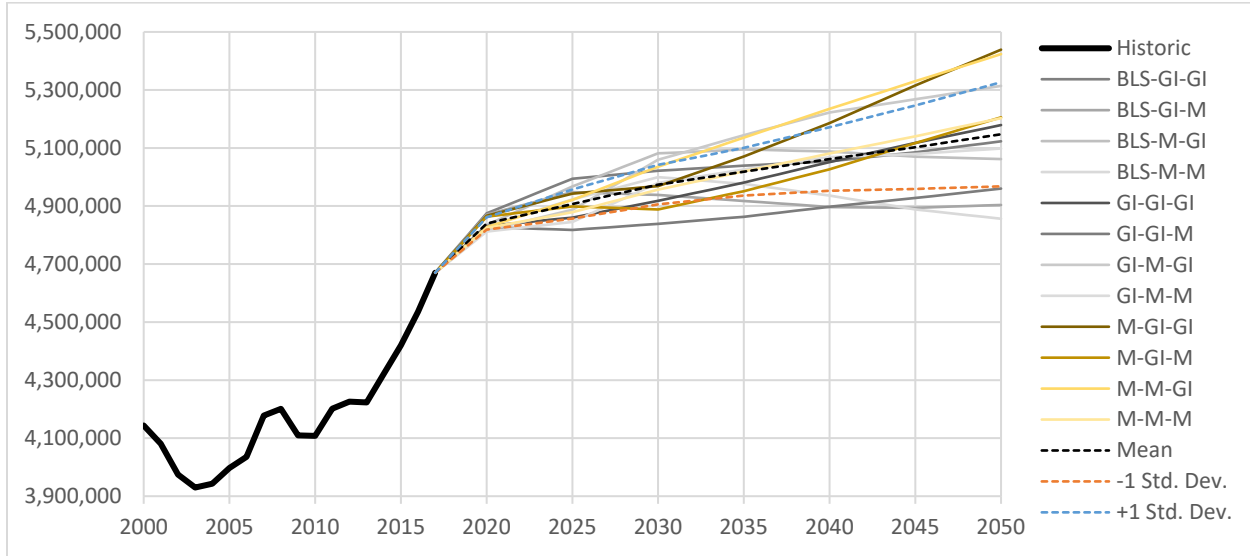
The results of the employment scenarios forecasted across the NYMTC sub-regions are shown in Figure 7. Scenarios from 2017 to 2050 derived from national forecasts from the BLS projected growth below the mean of the twelve scenarios in all sub-regions except for the Mid-Hudson and Connecticut sub-regions. Scenarios derived from the Moody's national forecast projected growth generally higher (with exceptions in Connecticut and the Mid-Hudson sub-regions) than the mean of the scenarios. The four scenarios developed from the IHS national forecasts were mixed with some forecasts above or below the mean. The range of employment scenarios for total payroll employment is illustrated for the New York City and Non-New York City Sub-Regions in Figure 8 and Figure 9.

Figure 7. Comparison of Payroll Employment Forecast Scenarios by Sub-Region: Percent Change 2017 to 2050

Employment Scenario			Sub-Regions					
National Driver	Regional Driver	County Driver	New York City	Non-NYC Sub-Regions				
				Non-NYC	Long Island	Mid-Hudson	NJ	CT
BLS	IHS	IHS	+9.7%	+4.2%	+2.6%	+4.3%	+5.0%	+3.2%
BLS	IHS	Moody's	+5.0%	+7.7%	+4.7%	+11.8%	+7.2%	+8.7%
BLS	Moody's	IHS	+8.4%	+4.4%	+4.0%	+3.8%	+5.5%	+1.3%
BLS	Moody's	Moody's	+4.0%	+7.6%	+5.5%	+11.3%	+7.7%	+6.4%
IHS	IHS	IHS	+10.9%	+4.8%	+3.5%	+2.7%	+6.3%	+3.1%
IHS	IHS	Moody's	+6.2%	+8.3%	+5.4%	+10.5%	+8.8%	+7.9%
IHS	Moody's	IHS	+13.8%	+8.2%	+7.7%	+5.3%	+10.2%	+4.9%
IHS	Moody's	Moody's	+9.2%	+11.7%	+8.9%	+13.2%	+12.9%	+9.6%
Moody's	IHS	IHS	+16.5%	+9.4%	+7.8%	+8.2%	+10.8%	+7.6%
Moody's	IHS	Moody's	+11.5%	+13.1%	+10.0%	+16.2%	+13.3%	+13.3%
Moody's	Moody's	IHS	+16.1%	+10.4%	+9.9%	+8.7%	+12.2%	+6.8%
Moody's	Moody's	Moody's	+11.4%	+14.0%	+11.3%	+16.7%	+14.7%	+12.2%
Mean			+10.2%	+8.6%	+6.8%	+9.4%	+9.6%	+7.1%
-1 Std. Dev. from Mean			+6.4%	+5.5%	+4.0%	+4.8%	+6.4%	+3.6%
+1 Std. Dev. from Mean			+14.1%	+11.8%	+9.5%	+13.9%	+12.7%	+10.5%

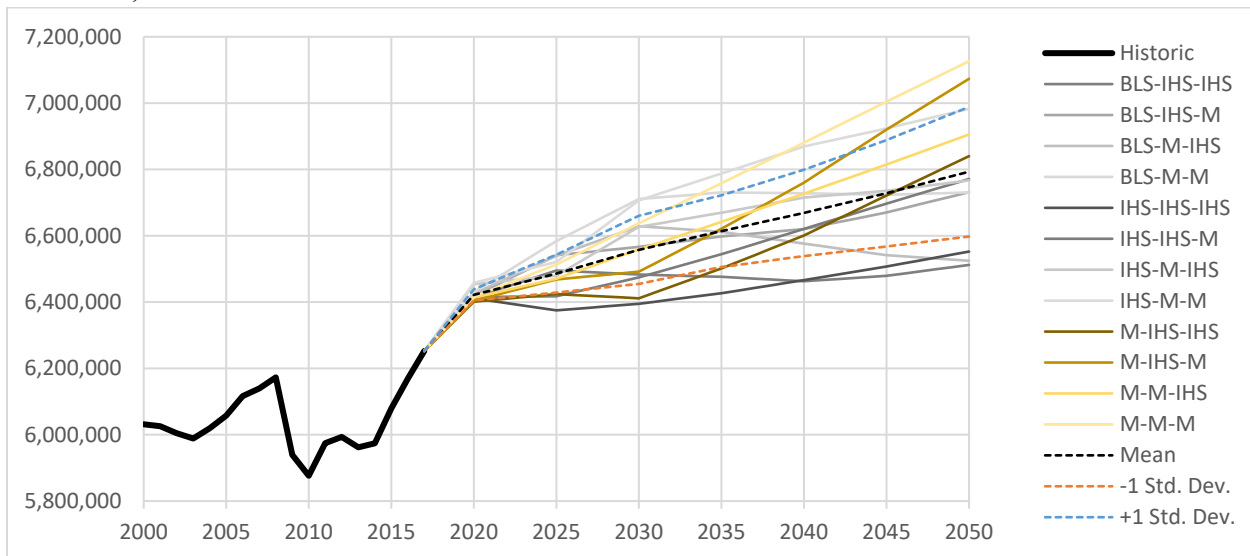
Over the historic period from 2000 to 2017, the New York City sub-region experienced a major drop in employment during the 2001 recession and less substantial decline in employment during the 2007-2009 recession followed by sharp employment growth from 2011 to 2017. The non-New York City sub-region was more heavily impacted by the 2007-2009 recession and faced a longer recovery period. The forecast scenarios were developed from a long-term forecasting perspective, short-term cyclical employment trends are not factored into the future employment scenarios.

Figure 8. New York City Sub-Region Historic Payroll Employment, 2000-2017 & Forecast Scenarios, 2020-2050



Note: Scenario names in the legend contain abbreviated forecast source names labeled in the following order: National-Region-County.

Figure 9. Non-New York City Sub-Region Historic Payroll Employment, 2000-2017 & Forecast Scenarios, 2020-2050



Note: Scenario names in the legend contain abbreviated forecast source names labeled in the following order: National-Region-County.

3.3.2 Peak-to-Peak Employment Trends in Select Industries

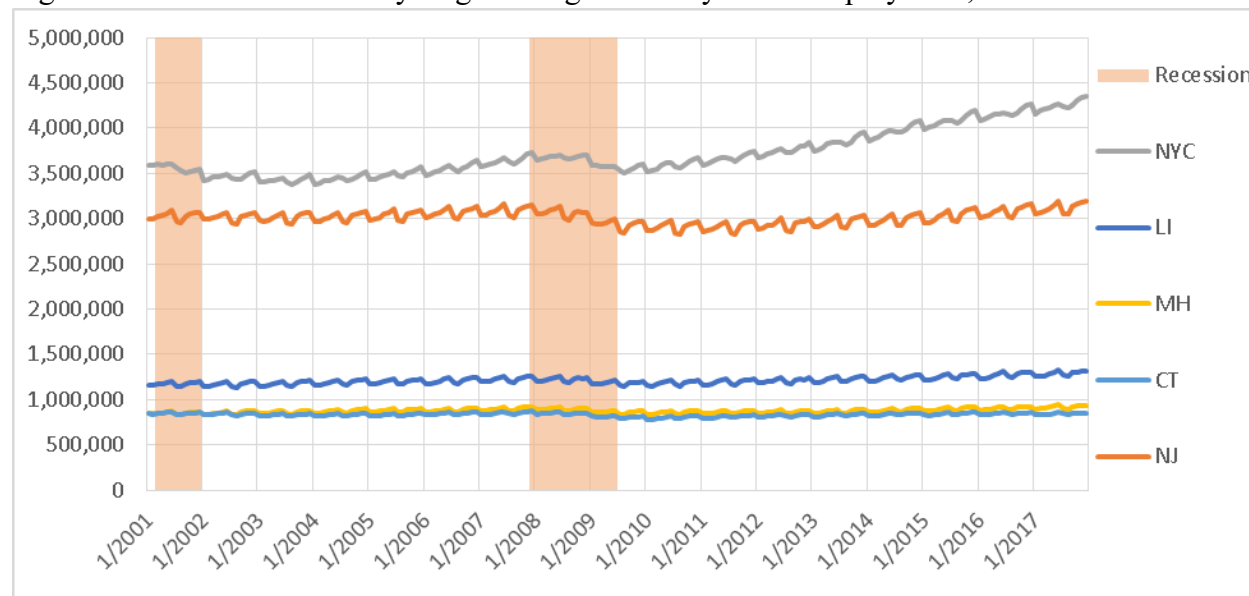
The NYMTC 31-County Region's benchmark employment was established from trends in employment sourced from the BLS's QCEW and the SAE program, which measures employment by business location as well as the US Census Bureau's ACS, which estimates workers by either of place of residence or place of work. The QCEW program offers a near-census of employment

nearly free of sampling error although suppressions for confidentiality purposes are present in counties with individual industries dominated by single employers (NYMTC, 2015. *Modeling Methodology TM*, pp. 9-14).

Figures 10 to 14 illustrate monthly QCEW wage and salary employment trends for selected major industry groups of the NYMTC sub-regions from January 2001 to December 2017, highlighting major business cycles including the 8-month recession of 2001 and Great Recession of 2007-2009. Figure 10 depicts total employment trends. During the 2001 recession, total employment in the NYMTC Region declined only in the New York City Region (-2.0%) as the NYMTC Region as a whole increased employment by 0.1% led by gains in the Suburban NYMTC Regions. During the inter-recession period between December 2001 and December 2007, the NYMTC Region increased employment by 4.2% with the strongest gains in the Mid-Hudson Region (+5.8%) and New York City (+5.5%).

The Great Recession of 2007-2009 had a sizable negative effect on the NYMTC 31- County Region as employment fell by 4.5% (-444,100) over that period, below the 2001 recession levels. During that time employment in the Connecticut sub-region declined by a greater relative share (-6.1% or -53,300) than all other sub-regions although all regions sustained considerable losses (-4.8% or -149,500) in New Jersey, -4.2% in NYC (-155,200) and the Mid-Hudson (-38,700), and -3.8% in Long Island (-47,400). The post-recession period from June 2009 to December 2017 has been one of swift recovery and prosperity in the New York City sub-region with employment increasing by 21.7% (+775,700), a considerably larger gain than in Long Island (+8.1% or +98,600), the Mid-Hudson (+6.3% or +55,500), New Jersey (+6.6% or +196,700), and Connecticut (+4.6% or +37,600).

Figure 10. NYMTC 31-County Region Wage & Salary Total Employment, 1/2001-12/2017

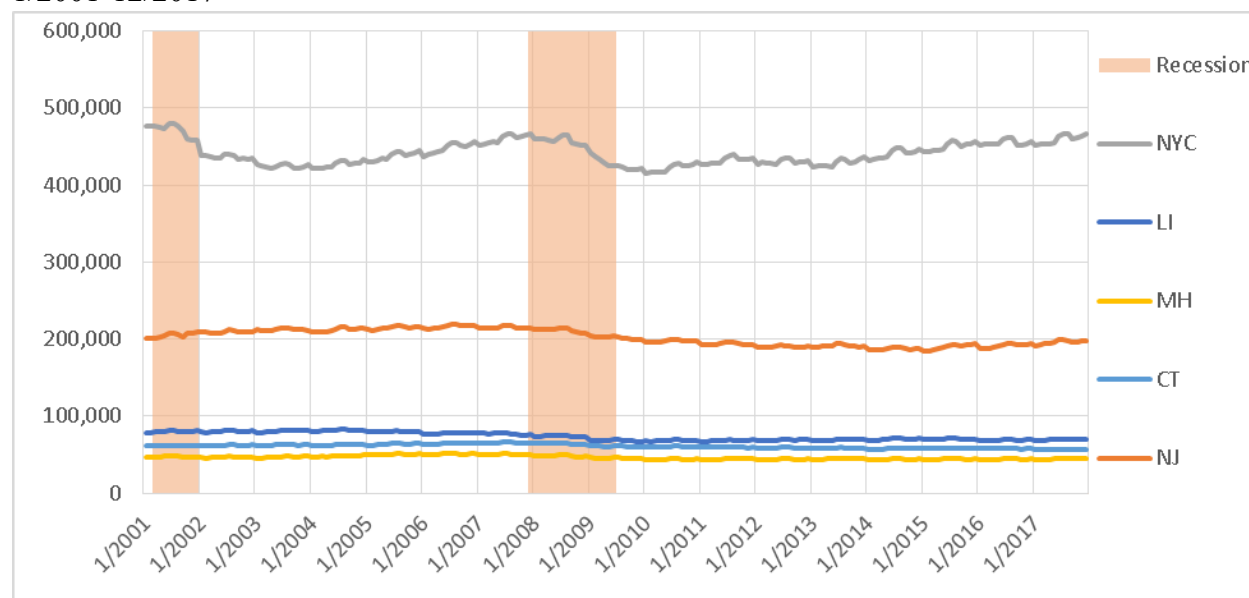


Source: US Bureau of Labor Statistics, Monthly QCEW Employment, 2001-2017

Among major industry sectors, large shifts in employment occurred in New York City following the Great Recession in the industry groups of leisure and hospitality (+48.4% or +149,900), education and health services (+30.1% or +211,000), professional and business services (+31.1% or +171,900) information (+29.2% or +43,400), and construction (+27.5% or +32,800). New York City's manufacturing sector employment shrank by 31.4% (-9,800) from the end of the 2001 recession to the start of the 2007-2009 recession with considerably lesser losses during the short periods of the 2001 recession (-8.2% or -44,700) and 2007-2009 recession (-17.1% or -16,700). The financial activities industry group declined in employment by 8.7% (-40,600) during the 2007-2009 recession but recovered from that loss during the recovery that followed.

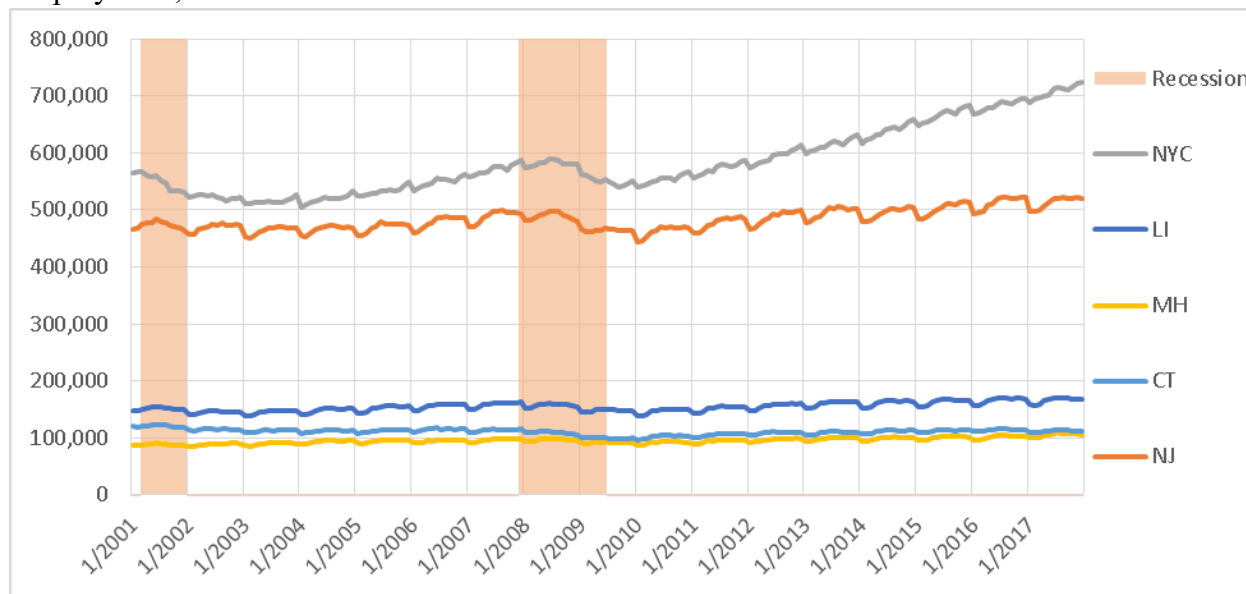
Within the NYMTC suburban counties, the recovery period of the Great Recession was marked by sharp gains in the education and health services sectors (+18.1% or +177,000), leisure and hospitality (+13.7% or +66,700), trade, transportation and utilities (+11.4% or +136,500), and professional and business services (+11.2% or +91,400) as other sectors experienced losses including information (-20.1 or -27,300) manufacturing (-10.7% or -44,300), government (-5.7% or -55,500), and financial activities (-3.0% or -11,400). It is notable that some sectors in the suburban counties, including leisure and hospitality, education and health services, have experienced positive growth across both recessions and recovery periods while others declined in both periods (manufacturing and information). Employment in professional and business services was most cyclical in nature, with losses during recessions and gains following and preceding them.

Figure 11. NYMTC 31-County Region Wage & Salary Financial Activities Employment, 1/2001-12/2017



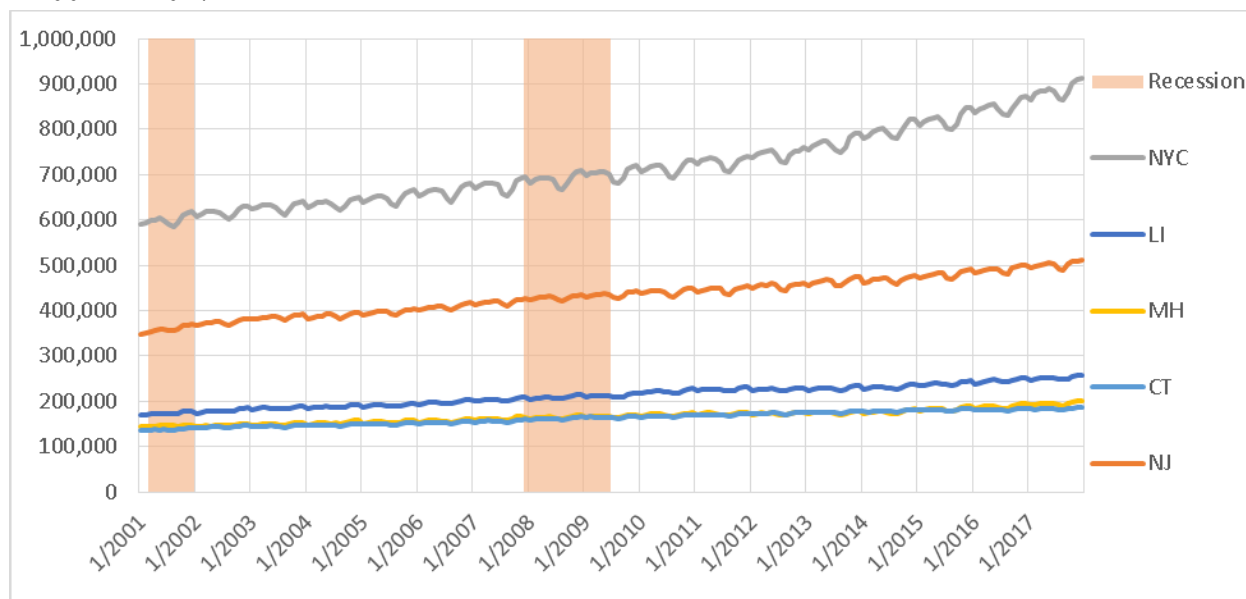
Source: US Bureau of Labor Statistics, Monthly QCEW Employment, 2001-2017

Figure 12. NYMTC 31-County Region Wage & Salary Professional & Business Services Employment, 1/2001-12/2017



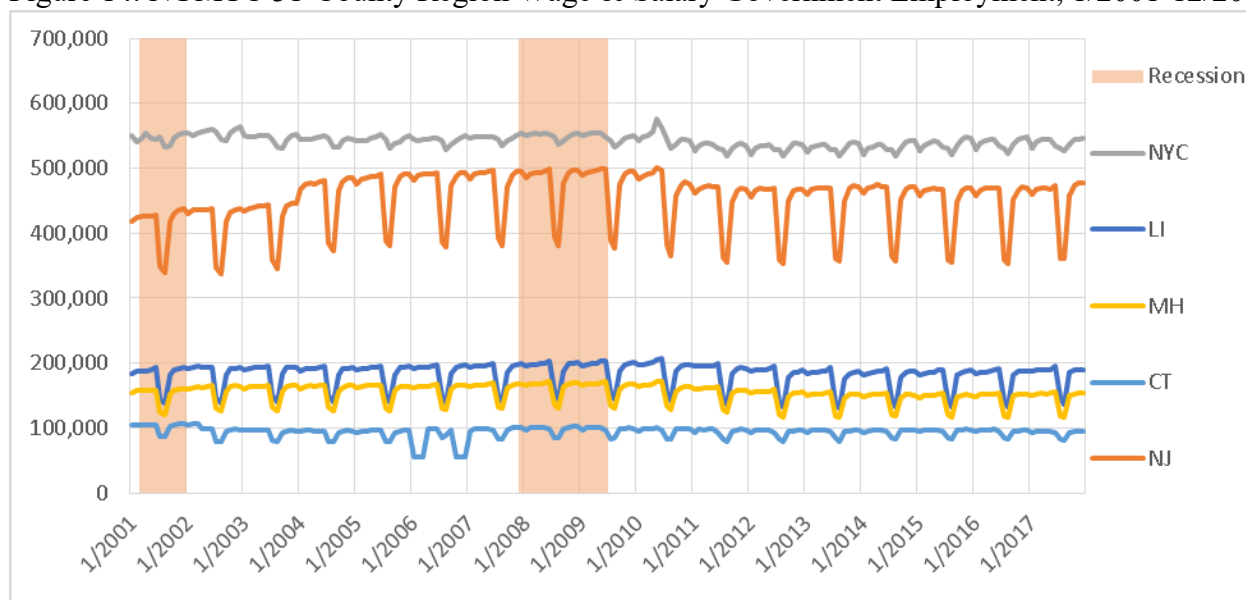
Source: US Bureau of Labor Statistics, Monthly QCEW Employment, 2001-2017

Figure 13. NYMTC 31-County Region Wage & Salary Education & Health Services Employment, 1/2001-12/2017



Source: US Bureau of Labor Statistics, Monthly QCEW Employment, 2001-2017

Figure 14. NYMTC 31-County Region Wage & Salary Government Employment, 1/2001-12/2017



Source: US Bureau of Labor Statistics, Monthly QCEW Employment, 2001-2017

3.3.2 Forecast Adjustments

The Update uses the same adjustments by county and forecast years from 2018 to 2050 as were determined in the preparation of the original 2050 Forecasts. These adjustment factors (see Figure 15 & 16), varying in level from minor to substantial, were applied to the average employment value of the 12 forecast scenarios. The value of each county adjustment was determined in response to feedback from local stakeholders to determine the appropriate level of control for forecasts deemed too aggressive or weak given local knowledge of historic trends and planned development activity (Figure 15 and Figure 16).

These adjustments are largely responsible for the sharp growth from 2010 to 2050 forecasted in New Jersey and marginal growth forecasted in the New York sub-regions. Adjustments in the New York and Connecticut sub-regions vary by forecast scenario but are consistent through the forecast period while adjustments in several counties of the New Jersey sub-region fluctuated by forecast year.

Figure 15. 2050 Forecast Adjustment Factors by County, New York & Connecticut

State	Counties	Standard Deviation Adjustment Factor (Unchanged, 2014-2050)*		
		Baseline	Low	High
NY	Manhattan, Bronx, Dutchess, Kings, Nassau	-30.0%	-55.0%	-25.0%
NY	Suffolk	0%	-25.0%	+20.0%
NY	Orange, Putnam, Queens, Richmond	+10.0%	-15.0%	+30.0%
NY	Rockland	+20.0%	-5.0%	+40.0%
NY	Sullivan, Ulster, Westchester	+10.0%	-15.0%	+30.0%
CT	Fairfield, Litchfield, New Haven	0%	-25.0%	+20.0%

Note: (*) Adjustment factors for counties in New York and Connecticut were held at the same value from 2014 to 2050. According to the 2050 Forecast Modeling Methodology Technical Memorandum dated March 12, 2015, based on feedback from local agencies, it was determined that Moody's and Global Insight forecasts were too aggressive in NYC, having been calibrated in a strong growth period. Thus, a downward adjustment was made to make growth trends past 2030 more in line with long-run historical averages. Additionally, a modest upward adjustment was made to Mid-Hudson and Long Island Counties to partially offset the downward adjustment made to New York City (except Rockland County).

Figure 16. 2050 Forecast Adjustment Factor by County, New Jersey

State	Counties	Standard Deviation Adjustment Factor by Forecast Year						Percentage Point Change, 2014-2050*		
		2014			2050			Baseline	Low	High
		Baseline	Low	High	Baseline	Low	High			
NJ	Bergen	+36.5%	+11.5%	+56.5%	+36.5%	+11.5%	+56.5%	0%	0%	0%
NJ	Essex	+63.0%	+38.0%	+83.0%	+63.0%	+38.0%	+83.0%	0%	0%	0%
NJ	Hudson	+55.0%	+30.0%	+75.0%	+55.0%	+30.0%	+75.0%	0%	0%	0%
NJ	Hunterdon	+9.0%	-16.0%	+29.0%	+29.7%	+4.7%	+49.7%	+20.7%	+20.7%	+20.7%
NJ	Mercer	+5.0%	-20.0%	+25.0%	+5.0%	-20.0%	+25.0%	0%	0%	0%
NJ	Middlesex	-41.1%	-66.1%	-21.1%	-41.1%	-66.1%	-21.1%	0%	0%	0%
NJ	Monmouth	+11.0%	-14.0%	+31.0%	+11.0%	-14.0%	+31.0%	0%	0%	0%
NJ	Morris	-34.0%	-59.0%	-14.0%	-30.6%	-55.6%	-10.6%	+3.5%	+3.5%	+3.5%
NJ	Ocean	-21.5%	-46.5%	-1.5%	-21.5%	-46.5%	-1.5%	0%	0%	0%
NJ	Passaic	+96.5%	+71.5%	+106.5%	+80.9%	+55.9%	+90.9%	-15.7%	-15.7%	-15.7%
NJ	Somerset	-53.4%	-78.4%	-33.4%	-53.4%	-78.4%	-33.4%	0%	0%	0%
NJ	Sussex	+41.0%	+16.0%	+61.0%	+41.0%	+16.0%	+61.0%	0%	0%	0%
NJ	Union	+14.5%	-10.5%	+34.5%	+14.5%	-10.5%	+34.5%	0%	0%	0%
NJ	Warren	-40.0%	-65.0%	-20.0%	-40.0%	-65.0%	-20.0%	0%	0%	0%

Note: (*) Adjustment factors in New Jersey varied for each forecast year. The percentage point change is the difference from the first adjustment factor in 2014 to the last adjustment factor in 2050. According to the 2050 Forecast Modeling Methodology Technical Memorandum dated March 12, 2015, based on feedback from local agencies, it was determined that Moody's and Global Insight forecasts for several New Jersey Counties (Bergen, Essex, Hudson, Passaic, and Sussex) were too pessimistic, having been calibrated in a period of slow or negative growth. Thus, an upward adjustment was applied to these counties to bring them more in line with long-run historical averages. Off-setting adjustments were made to other New Jersey Counties so that NJ region totals remained roughly the same as before the adjustment. Additional county-level adjustments were made within the subregion control totals based on certain environmental and land use constraints. These included consideration of Pinelands regulations and land use controls as well as the Highlands regulations.

3.4 Update Model Outputs

From 2010 to 2050 total employment is projected to expand by 1.9 million jobs (+17.5%) in the NYMTC 31-County Region (Figure 17). Through 2020, growth will be driven by a continuation of the current cyclical expansion, which will transition into a period of moderate long-term growth through 2050.

Figure 17. 2050 Forecast Update County Employment Model Outputs: Total Employment

	Update: Total Employment									
AREA NAME	2010	2015	2017	2020	2025	2030	2035	2040	2045	2050
31-County Region	11,020,530	11,561,224	12,008,481	12,339,573	12,460,437	12,587,493	12,676,078	12,762,813	12,854,530	12,953,963
Bronx County	380,497	401,055	413,186	422,548	428,566	434,834	440,443	445,795	451,013	455,955
Kings County	822,989	902,713	940,561	953,658	960,579	969,187	977,070	982,583	987,209	991,503
New York County	2,488,607	2,654,265	2,832,457	2,903,684	2,920,091	2,941,720	2,946,888	2,953,125	2,959,916	2,968,241
Queens County	708,868	753,622	787,733	796,887	795,800	793,548	792,410	789,909	786,797	784,031
Richmond County	126,268	138,472	140,688	142,592	144,449	145,865	146,814	148,202	149,654	151,042
New York City	4,527,230	4,850,126	5,114,624	5,219,368	5,249,484	5,285,154	5,303,626	5,319,614	5,334,589	5,350,772
Nassau County	590,583	613,419	631,261	650,850	662,307	672,189	679,885	686,444	692,837	699,363
Suffolk County	636,565	671,508	692,427	708,759	713,715	720,639	723,687	727,430	731,848	736,724
Long Island	1,227,148	1,284,927	1,323,689	1,359,608	1,376,022	1,392,829	1,403,571	1,413,874	1,424,685	1,436,086
Dutchess County	121,287	125,663	127,640	131,590	134,485	137,219	139,260	141,303	143,436	145,615
Orange County	150,881	154,794	158,577	165,141	168,685	172,100	174,573	177,465	180,352	183,480
Putnam County	28,439	29,425	29,905	30,826	31,214	31,510	31,591	31,702	31,861	32,023
Rockland County	116,538	122,345	129,310	134,965	138,450	142,203	144,946	147,332	149,793	152,449
Sullivan County	29,577	28,673	29,047	29,752	29,850	29,818	29,641	29,427	29,245	29,066
Ulster County	70,732	71,652	73,270	76,250	76,932	77,373	77,715	77,917	78,136	78,363
Westchester County	444,936	466,908	485,847	504,397	509,938	515,084	518,082	520,263	522,559	525,535
Mid Hudson	962,390	999,460	1,033,596	1,072,921	1,089,554	1,105,307	1,115,808	1,125,410	1,135,382	1,146,532
Bergen County	454,800	468,646	477,393	498,806	513,610	524,341	533,581	543,155	553,453	564,560
Essex County	410,788	398,558	409,911	435,356	446,497	455,412	462,441	469,708	477,242	485,282
Hudson County	289,015	302,863	316,525	344,175	356,404	368,537	379,456	389,143	398,777	408,877
Hunterdon County	56,262	60,787	60,082	61,829	61,028	60,717	60,663	60,995	61,405	61,851
Mercer County	247,294	251,046	246,405	260,112	260,820	262,620	264,199	265,757	268,095	270,992
Middlesex County	399,260	416,340	430,707	432,704	432,827	436,272	440,536	444,278	448,519	453,034
Monmouth County	287,779	290,824	297,250	305,304	303,430	302,567	302,120	302,734	303,643	304,839
Morris County	300,861	317,920	326,478	326,587	324,358	323,286	321,056	318,676	316,819	315,092
Ocean County	181,039	187,196	197,721	204,758	210,308	215,711	220,328	225,746	231,459	237,141
Passaic County	200,590	197,746	200,824	214,062	217,436	220,534	222,252	224,722	227,993	231,688
Somerset County	182,781	199,496	206,485	204,474	204,596	205,784	207,216	208,575	210,447	212,424
Sussex County	48,187	48,045	49,204	50,627	49,685	49,014	48,180	47,753	47,566	47,460
Union County	250,208	253,923	263,441	273,344	278,702	283,822	288,074	291,705	295,535	299,552
Warren County	40,045	39,397	39,586	38,772	38,131	37,737	37,457	37,103	36,682	36,176
New Jersey	3,348,908	3,432,786	3,522,011	3,650,909	3,697,830	3,746,353	3,787,559	3,830,050	3,877,633	3,928,966
Fairfield County	481,896	503,675	515,458	526,914	533,055	538,566	542,639	546,698	550,730	555,295
Litchfield County	68,609	73,635	73,473	75,770	76,104	76,310	76,421	76,548	76,710	76,910
New Haven County	404,350	416,614	425,629	434,081	438,388	442,974	446,453	450,619	454,800	459,402
Connecticut	954,854	993,924	1,014,561	1,036,766	1,047,547	1,057,851	1,065,513	1,073,865	1,082,240	1,091,607

During the cyclical expansion expected to end in 2020, gains in the Update are projected to be strongest in New York City, adding over 692,100 workers (+15.3%) from 2010 to 2020. This will amount to just over half of the gains in the 31-County Region. The Borough of Manhattan is projected to be the primary benefactor of the employment increases, receiving nearly one third of workers in the NYMTC Region or 415,100 workers. Outside of New York City, growth in employment is expected to reach 626,900 (+9.7%) from 2010 to 2020.

From 2020 to 2050 employment gains will slow to moderate levels as growth is driven by long-term growth trends in contrast to the higher growth levels observed from 2010 to 2020 driven by cyclical trends in growth and production that resulted from the recovery from the 2007-2009 recession. The sub-regions outside of New York City are projected to grow by 0.22 percent per year while New York City will grow by 0.08 percent per year. Close to half of 131,400 workers projected to be added in New York City from 2020 to 2050 will be located in Manhattan with much of the remaining growth expected in Brooklyn and the Bronx. The New Jersey sub-region will add 278,100 workers during this period, more than double the number of workers to be added in New York City. Long Island will add 76,500 workers, the Mid-Hudson sub-region will add 73,600 while the Connecticut sub-region will gain 54,800.

Figure 18. 2050 Forecast Update Output Total Employment (000s) by Sub-Region (2010-2050)

	2010	2015	2017	2020	2025	2030	2035	2040	2045	2050
New York City	4,527	4,850	5,115	5,219	5,249	5,285	5,304	5,320	5,335	5,351
Long Island	1,227	1,285	1,324	1,360	1,376	1,393	1,404	1,414	1,425	1,436
Mid-Hudson	962	999	1,034	1,073	1,090	1,105	1,116	1,125	1,135	1,147
New Jersey	3,349	3,433	3,522	3,651	3,698	3,746	3,788	3,830	3,878	3,929
Connecticut	955	994	1,015	1,037	1,048	1,058	1,066	1,074	1,082	1,092
31-County Totals	11,021	11,561	12,008	12,340	12,460	12,587	12,676	12,763	12,855	12,954

Total Employment Annual Avg. Growth Rates	2010-2015	2015-2020	2020-2025	2025-2030	2030-2035	2035-2040	2040-2045	2045-2050
New York City	1.39%	1.48%	0.12%	0.14%	0.07%	0.06%	0.06%	0.06%
Long Island	0.92%	1.14%	0.24%	0.24%	0.15%	0.15%	0.15%	0.16%
Mid-Hudson	0.76%	1.43%	0.31%	0.29%	0.19%	0.17%	0.18%	0.20%
New Jersey	0.50%	1.24%	0.26%	0.26%	0.22%	0.22%	0.25%	0.26%
Connecticut	0.81%	0.85%	0.21%	0.20%	0.14%	0.16%	0.16%	0.17%
31-County Totals	0.96%	1.31%	0.20%	0.20%	0.14%	0.14%	0.14%	0.15%

3.4.1 Comparison to 2050 Forecast

The Update projects less employment growth over the 2010-2050 period than the 2050 Forecast with a gain of 17.5% (+1.9 million) versus 21.5% (+2.4 million). In the 2050 forecast year, the difference of roughly 400,000 jobs is 3.3 percent less than previously forecast.

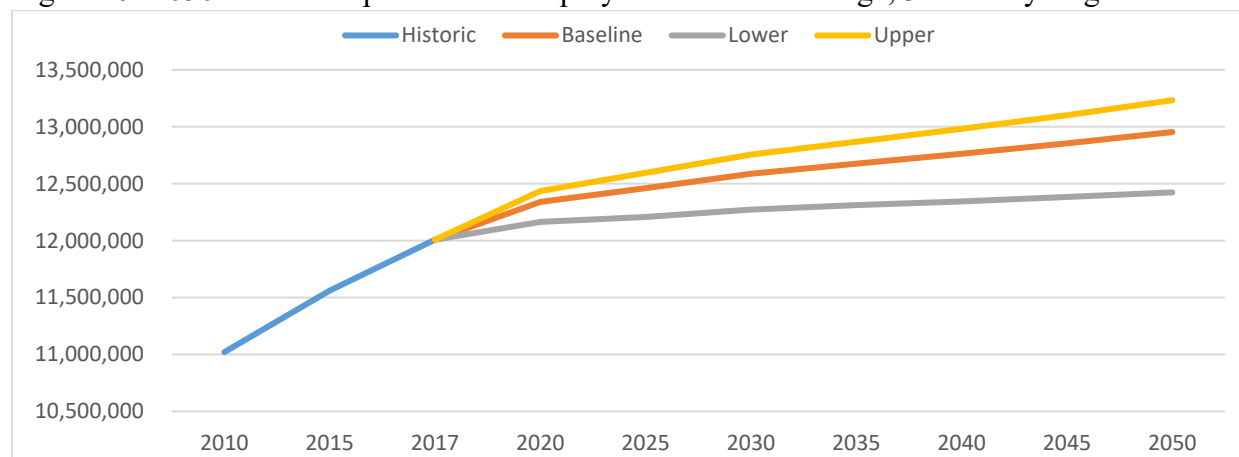
Although Manhattan is forecasted to add more jobs than any other of the 31 counties, at the sub-regional level, the geographic center for employment growth shifted in the Update from the urban core of New York City to the suburban outlying sub-regions. In New York City, the Update projects growth of just 131,400 jobs over the 2020-2050 period compared with growth of 347,800 in the 2050 forecast. In the Forecast Update, the suburban sub-regions are projected to add 483,000 workers from 2020-2050, accounting for 78.6 percent of employment growth. Although the original 2050 forecast projected far higher growth for the suburban sub-regions (+919,900), its share of the region-wide gain in employment was lower at 72.7 percent.

3.4.2 Upper and Lower Forecasts

In addition to the middle range, or baseline, forecast, upper and lower forecasts were prepared to establish a range of possible future employment levels for major industries in each of the 31 counties. The range of forecasts for the 31-County Region is shown in Figure 19 while forecast ranges for New York City and the non-New York City sub-region are shown in the following figures. The methodology for establishing the higher and lower forecasts was developed by the LBG Project Team and Forecast Working Group (FWG) and is further detailed in Section 2.3 of the NYMTC Forecast Results and Analysis Technical Memorandum (2016. *pp. 16-23*).

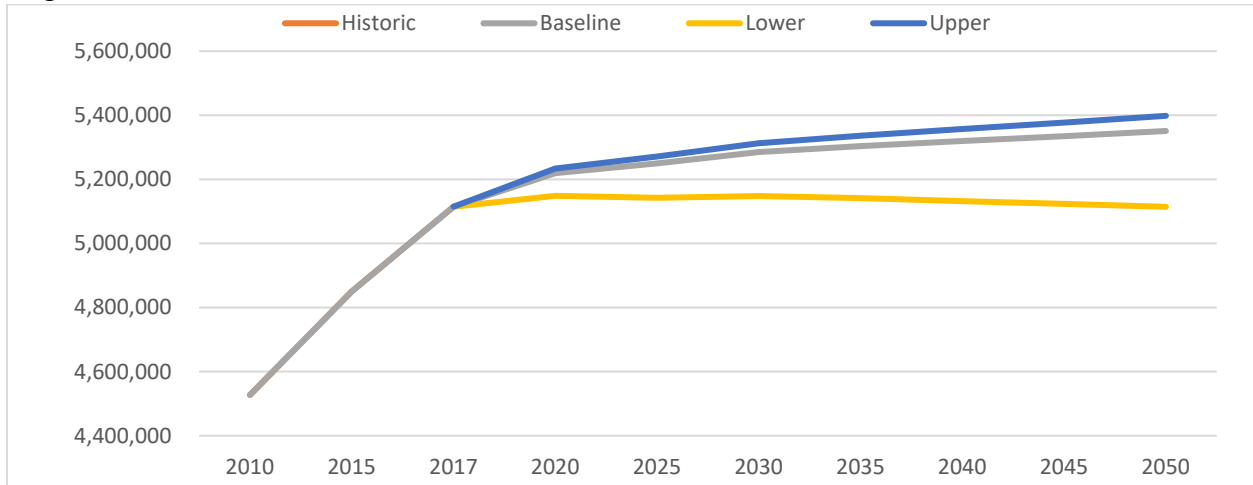
Whereas the baseline forecast is considered close to the average of the twelve linear forecasts that encompass the employment shift-share model, the lower forecast is a standard deviation of 0.25 below the baseline while the upper forecast is a standard deviation of 0.05 higher in the New York City sub-region (Figure 20) and a standard deviation of 0.2 higher in the remaining 26 counties (Figure 21). Due to the asymmetric adjustments assigned to the forecast ranges, the Update's lower forecast is 2.8 percent below the baseline while the upper forecast is 1.5 percent above the baseline at the 31-county level. In the New York City sub-region, the lower forecast in the Update is fully 3 percent below the baseline while the upper forecast is just 0.6 percent above the baseline.

Figure 19. 2050 Forecast Update Total Employment Forecast Range, 31-County Region



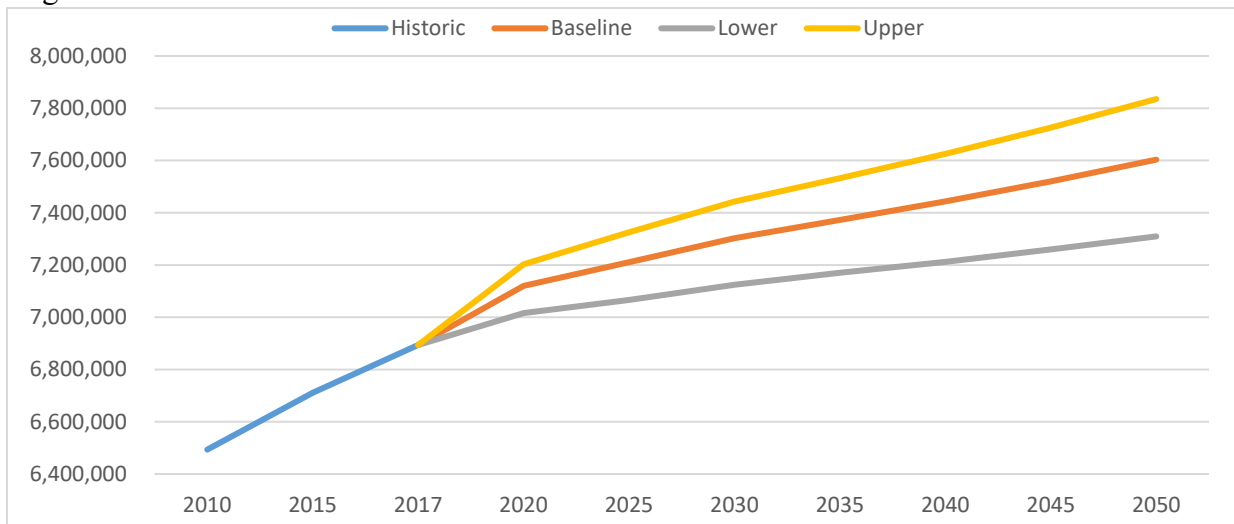
Source: Bureau of Labor Statistics' Current Employment Statistics (CES) and Quarterly Census of Employment and Wages (QCEW); American Community Survey (ACS); NYMTC 2050 SED Forecasts

Figure 20. 2050 Forecast Update Total Employment Forecast Range, New York City Sub-Region



Source: Bureau of Labor Statistics' Current Employment Statistics (CES) and Quarterly Census of Employment and Wages (QCEW); American Community Survey (ACS); NYMTC 2050 SED Forecasts

Figure 21. 2050 Forecast Update Total Employment Forecast Range, Non-New York City Sub-Regions



Source: Bureau of Labor Statistics' Current Employment Statistics (CES) and Quarterly Census of Employment and Wages (QCEW); American Community Survey (ACS); NYMTC 2050 SED Forecasts

The vast majority of workers in the 31-County Region are classified as payroll workers receiving either wages or salaries. In 2017 such workers accounted for 91 percent of total employment in the NYMTC 31-County Region. Trends in the payroll forecast (Figure 22) largely mirrored that of the total employment forecast.

Figure 22. County Employment Model 2050 Forecast Update Outputs: Payroll Employment

		Update: Payroll Employment								
AREA NAME	2010	2015	2017	2020	2025	2030	2035	2040	2045	2050
31-County Region	9,984,474	10,499,370	10,922,607	11,219,677	11,326,132	11,442,352	11,524,192	11,604,953	11,689,731	11,783,201
Bronx County	350,114	369,453	380,251	389,345	394,984	400,910	406,195	411,297	416,274	421,052
Kings County	729,854	803,540	836,696	849,765	856,244	864,511	872,015	877,517	882,163	886,667
New York County	2,285,300	2,444,347	2,615,780	2,677,520	2,691,382	2,710,647	2,714,697	2,719,864	2,725,578	2,733,080
Queens County	627,836	676,755	709,476	716,767	716,634	715,667	715,464	714,031	711,862	710,038
Richmond County	114,997	125,739	127,816	129,774	131,566	133,014	134,036	135,452	136,897	138,289
New York City	4,108,101	4,419,833	4,670,018	4,763,171	4,790,810	4,824,750	4,842,408	4,858,160	4,872,774	4,889,126
Nassau County	528,703	548,223	564,932	581,919	591,906	600,515	607,338	613,166	618,831	624,730
Suffolk County	567,321	602,285	621,074	634,690	638,820	644,972	647,845	651,384	655,432	660,052
Long Island	1,096,024	1,150,508	1,186,007	1,216,610	1,230,726	1,245,487	1,255,183	1,264,550	1,274,264	1,284,782
Dutchess County	108,441	113,436	115,735	119,022	121,554	123,967	125,790	127,630	129,545	131,540
Orange County	139,117	141,421	145,543	151,588	154,811	157,964	160,266	162,981	165,666	168,625
Putnam County	24,397	25,749	26,182	26,889	27,244	27,528	27,626	27,745	27,905	28,069
Rockland County	101,669	109,122	115,849	120,593	123,681	127,014	129,477	131,624	133,835	136,254
Sullivan County	26,008	25,509	25,665	26,611	26,689	26,664	26,517	26,341	26,194	26,057
Ulster County	60,052	62,256	63,841	66,232	66,770	67,163	67,502	67,721	67,943	68,182
Westchester County	390,063	414,758	433,487	448,884	453,739	458,308	461,067	463,135	465,309	468,209
Mid Hudson	849,747	892,251	926,302	959,819	974,488	988,607	998,245	1,007,177	1,016,398	1,026,935
Bergen County	411,785	421,284	430,535	449,873	463,103	472,781	481,194	489,983	499,455	509,732
Essex County	380,985	368,662	378,239	402,907	413,013	421,162	427,616	434,343	441,296	448,740
Hudson County	268,046	282,020	295,772	321,174	332,608	344,012	354,328	363,545	372,717	382,355
Hunterdon County	50,075	53,115	52,609	54,147	53,416	53,157	53,127	53,448	53,849	54,294
Mercer County	232,113	237,319	232,745	245,181	245,792	247,507	249,033	250,542	252,781	255,555
Middlesex County	375,008	388,309	401,397	404,360	404,299	407,600	411,620	415,122	419,048	423,265
Monmouth County	260,900	262,372	269,132	275,904	274,091	273,320	272,972	273,570	274,456	275,652
Morris County	275,776	291,622	299,863	300,683	298,379	297,368	295,295	293,111	291,373	289,798
Ocean County	161,242	166,005	175,778	181,876	186,724	191,643	195,840	200,743	205,871	211,016
Passaic County	183,961	181,477	183,759	196,199	199,298	202,156	203,807	206,181	209,303	212,865
Somerset County	167,848	185,400	191,860	190,117	190,046	191,115	192,424	193,664	195,351	197,153
Sussex County	41,274	41,935	43,551	44,409	43,571	42,997	42,291	41,951	41,828	41,784
Union County	230,920	233,011	241,763	251,335	256,167	260,867	264,802	268,186	271,758	275,532
Warren County	36,023	35,247	35,627	35,016	34,417	34,069	33,822	33,511	33,134	32,683
New Jersey	3,075,956	3,147,777	3,232,629	3,353,179	3,394,923	3,439,754	3,478,173	3,517,902	3,562,219	3,610,425
Fairfield County	425,358	445,415	455,870	465,846	470,516	474,998	478,391	481,718	484,971	488,748
Litchfield County	57,000	62,296	63,094	64,234	64,369	64,489	64,526	64,581	64,662	64,816
New Haven County	372,288	381,290	388,687	396,819	400,300	404,266	407,265	410,865	414,444	418,370
Connecticut	854,646	889,001	907,651	926,898	935,185	943,753	950,183	957,164	964,077	971,933

Source: Bureau of Labor Statistics' Current Employment Statistics (CES) and Quarterly Census of Employment and Wages (QCEW); American Community Survey (ACS); NYMTC 2050 SED Forecasts

Growth trends by industry in the NYMTC 31-County Region are detailed in Figure 23. The Region's strongest growth is projected to be located in industries with high levels of national growth, primarily industries driven by consumer demand and protected from automation or outsourcing. Industries where the Region has a competitive edge over the nation as a whole and serve regional, national or global demand are also considered to have strong growth. Examples of industries with growth forecasts where the Region exhibits a competitive advantage over the nation include professional, scientific, and technical services, education services, and accommodations and food services. Growth in health care and social assistance, administrative, support and waste

management, and construction are largely driven by local demand although supported by national growth and stable labor productivity with little risk from outsourcing or automation.

Compared with the 2050 Forecast, the Update projects that several industries will make up a smaller share of total growth over the 2017 to 2050 period including manufacturing, wholesale trade, information, finance and insurance, educational services, and real estate. The Update projects sharper growth in the sectors of accommodation and food services, administrative, support and waste management, government, management of companies and enterprises, professional, scientific and technical services, and retail trade.

Figure 23.2050 Forecast Update Projected Baseline Payroll Employment Growth by Industry, 31-County Region

NAICS Industry	Levels		Avg. Annual Change, 2017-2050		Industry % of Total Growth
	2017	2050	Levels	Percent	
Total	10,922,607	11,783,201	+26,079	+0.2%	+100.0%
11-Agriculture	16,547	18,707	+65	+0.4%	+0.3%
21-Mining	2,855	4,841	+60	+1.6%	+0.2%
22-Utilities	44,827	40,840	-121	-0.3%	-0.5%
23-Construction	434,631	497,455	+1,904	+0.4%	+7.3%
31-33-Manufacturing	501,885	375,102	-3,842	-0.9%	-14.7%
42-Wholesale Trade	465,129	436,091	-880	-0.2%	-3.4%
44-45-Retail Trade	1,104,156	1,107,701	+107	+0.0%	+0.4%
48-49-Transportation & Warehousing	337,444	347,978	+319	+0.1%	+1.2%
51-Information	316,808	289,408	-830	-0.3%	-3.2%
52-Finance & Insurance	620,595	618,742	-56	-0.0%	-0.2%
53-Real Estate, Rental & Leasing	231,513	210,069	-650	-0.3%	-2.5%
54-Professional, Scientific & Technical	836,351	957,443	+3,669	+0.4%	+14.1%
55-Mgmt Of Companies & Enterprises	188,152	244,529	+1,708	+0.8%	+6.6%
56-Administrative, Support, Waste Mgmt	655,618	857,377	+6,114	+0.8%	+23.4%
61-Educational Services	450,147	501,356	+1,552	+0.3%	+6.0%
62-Health Care & Social Assistance	1,595,567	1,876,216	+8,505	+0.5%	+32.6%
71-Arts, Entertainment & Recreation	198,647	200,760	+64	+0.0%	+0.2%
72-Accommodation & Food Services	830,296	1,007,896	+5,382	+0.6%	+20.6%
81-Other Services	551,600	562,552	+332	+0.1%	+1.3%
92-Government	1,539,839	1,628,138	+2,676	+0.2%	+10.3%

Source: Bureau of Labor Statistics' Current Employment Statistics (CES) and Quarterly Census of Employment and Wages (QCEW); American Community Survey (ACS); NYMTC 2050 SED Forecasts

Trends in the self-employed forecast, which includes proprietors, self-employed, and unpaid family workers, (Figure 24) are similar in both the 2050 Forecast and the Update. The share of self-employment to total employment remains stable at roughly nine percent from 2010 through 2050 in both forecasts. The distribution of self-employed workers by place of work marginally

differs from payroll employment. In 2017, 40.9 percent of self-employed workers were located in New York City compared with 42.8 percent of payroll workers. The share of self-employed workers in New York City is forecast to gradually decline to 39.4% by 2050.

Figure 24. 2050 Forecast Update Projected Baseline Self-Employment by Region (2010-2050)

Self-Employment (000s)	2010	2015	2017	2020	2025	2030	2035	2040	2045	2050
New York City	419.1	430.3	444.6	456.2	458.7	460.4	461.2	461.5	461.8	461.6
Long Island	131.1	134.4	137.7	143.0	145.3	147.3	148.4	149.3	150.4	151.3
Mid-Hudson	112.6	107.2	107.3	113.1	115.1	116.7	117.6	118.2	119.0	119.6
New Jersey	273.0	285.0	289.4	297.7	302.9	306.6	309.4	312.1	315.4	318.5
Connecticut	100.2	104.9	106.9	109.9	112.4	114.1	115.3	116.7	118.2	119.7
31-County Totals	1,036.1	1,061.9	1,085.9	1,119.9	1,134.3	1,145.1	1,151.9	1,157.9	1,164.8	1,170.8

Self-Employment Rates	2010	2015	2017	2020	2025	2030	2035	2040	2045	2050
New York City	9.3%	8.9%	8.7%	8.7%	8.7%	8.7%	8.7%	8.7%	8.7%	8.6%
Long Island	10.7%	10.5%	10.4%	10.5%	10.6%	10.6%	10.6%	10.6%	10.6%	10.5%
Mid-Hudson	11.7%	10.7%	10.4%	10.5%	10.6%	10.6%	10.5%	10.5%	10.5%	10.4%
New Jersey	8.2%	8.3%	8.2%	8.2%	8.2%	8.2%	8.2%	8.1%	8.1%	8.1%
Connecticut	10.5%	10.6%	10.5%	10.6%	10.7%	10.8%	10.8%	10.9%	10.9%	11.0%
31-County Totals	9.4%	9.2%	9.0%	9.1%	9.1%	9.1%	9.1%	9.1%	9.1%	9.0%

Source: Bureau of Labor Statistics' Current Employment Statistics (CES) and Quarterly Census of Employment and Wages (QCEW); American Community Survey (ACS); NYMTC 2050 SED Forecasts

3.5 Employment Model Recommendations

The county level manual adjustments to the employment model must be revised with input from the Forecast Working Group. However, given the generally lower driver forecasts, we recommend resetting the adjustments (shown in Figures 15 and 16) to no longer universally suppress employment growth in the counties of New York, Bronx, Dutchess, Kings and Nassau and to modify the New Jersey county adjustments to be less robust. Because the commuter flow rates in the model are constants and population growth has been strong in the New York counties mentioned above, making these adjustments should positively affect labor force participation rates in New York City.

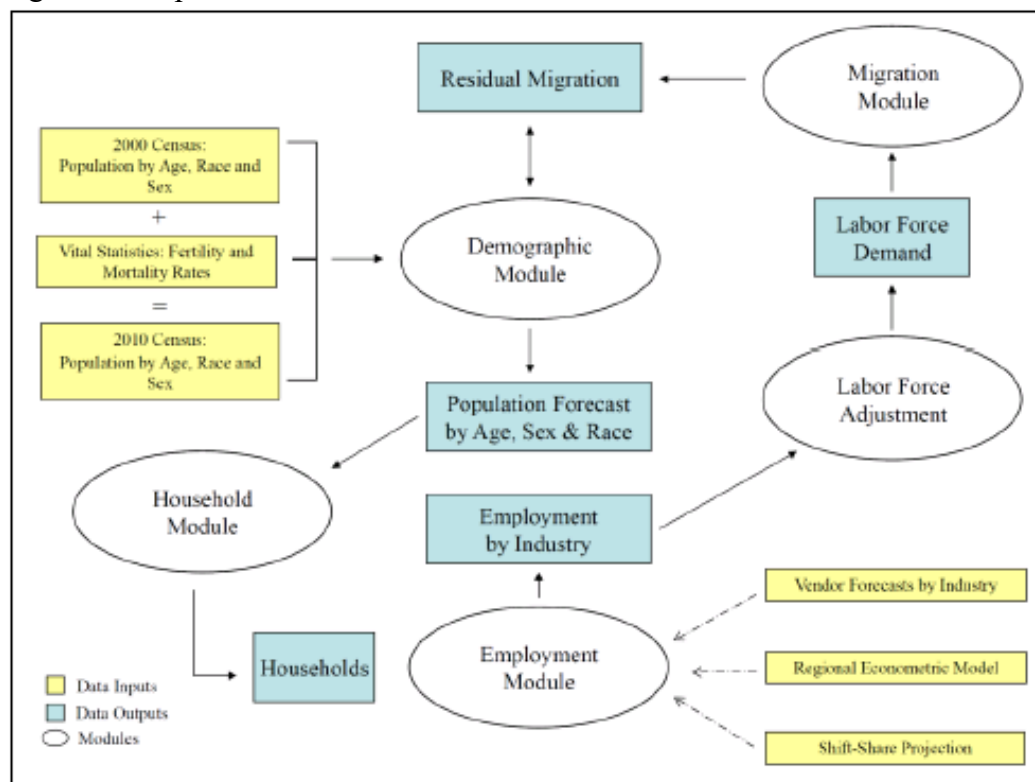
4.0 Population Model

4.1 Population Model Overview

The NYMTC Population Model is based on 5 sub-regional models (NYC, LI, MH, NJ, CT) containing individual county models, following the same methodology used in the 2050 model. These models are driven by a cohort-component approach (births, deaths, net migration) based on 1990-2010 Decennial Census data by age/sex, updated to 2015 in this effort. The model employs a demographic-economic method linked to employment demand to adjust for regional net migration in future years as diagrammed. Under the existing calibration of the Population Model,

the NYC sub-regional model is pre-empted by DCP's Population forecasts (NYMTC, 2015. *Modeling Methodology TM*, pp. 42-83). The DCP population forecasts in the final version of this technical memorandum will reflect the new forecasts to be produced by DCP by the Fall of 2019.

Figure 25. Population Model Structure for 26 Counties Outside of New York City



Source: NYMTC, 2014. *County Level Forecast Methodology WP*, p.36

In the 2050 Forecast, 2010 is the Census launch point for the Cohort-Survival components, which were then extrapolated to 2012. For the Update, 2015 is used as the launch point for the Cohort-Survival components, which are extrapolated to 2017, the launch point of the employment forecast projections.

4.2 Data Inputs

The population data inputs incorporated into the 2050 model and Update are listed in Figure 26 on the following page. The Update model generally incorporated the same inputs used in the 2050 model with new vintages added for the years from 2011 to 2017. Total population values for 2015 were sourced from the 2011-2015 American Community Survey while 2017 population values were interpolated from the historic 2015 values and the 2020 projection.² All changes to data inputs and processing of those inputs are described in further detail below in the context of the function of the data input within the population model.

² In later iterations of the forecasts, the 2017 population values are not interpolated but replaced with 2013-2017 American Community Survey estimates.

Figure 26. Table of Data Inputs to Population Model

		2050 Model		2050 Update Model	
Variable Name	Publisher	Dataset	Years	Dataset	Years
Total Population	US Census Bureau	Decennial Census & ACS 5-Year Sample	2005, 2010, 2012	American Community Survey 5-Year Sample	2015, 2017
Hispanic or Latino Origin by Race	US Census Bureau	Decennial Census & ACS 5-Year Sample	2005, 2010, 2012	American Community Survey 5-Year Sample	2015, 2017
Sex by Age (5-yr cohorts)	US Census Bureau	Decennial Census & ACS 5-Year Sample	2005, 2010, 2012	American Community Survey 5-Year Sample	2015, 2017
Population in Households	US Census Bureau	Decennial Census & ACS 5-Year Sample	2005, 2010, 2012	American Community Survey 5-Year Sample	2015, 2017
Population in Group Quarters	US Census Bureau	Decennial Census & ACS 5-Year Sample	2005, 2010, 2012	American Community Survey 5-Year Sample	2015, 2017 for Total GQ Population.
Total Households	US Census Bureau	Decennial Census & ACS 5-Year Sample	2005, 2010, 2012	American Community Survey 5-Year Sample	2015, 2017
Annual Estimates of the Components of Resident Population Change	US Census Bureau	Annual Estimates Program	1990-2013	American Community Survey 5-Year Sample	2010-2017
Group Quarters Population by sex and 5-yr age cohort	US Census Bureau	Decennial Census & ACS 5-Year Sample	2000, 2010	American Community Survey 5-Year Sample	2015, 2017
Annual births by age of mother	NYC Dept of Health & Mental Hygiene, NYS DOH, CT DOH, NJ DOH		1990-2013	CDC reporting were used in the absence of updated NYS data. NJ, CT, NYC sources remain the same.	2010-2017
Total Fertility Rates and Birth Rates, by Age of Mother and Race: United States	US CDC	Table 1-7. Total Fertility Rates and Birth Rates, by Age of Mother and Race: United States	1940-99	No Change	Latest release, if available
Total Fertility Rates and Birth Rates, by Age of Mother and Race: United States	US CDC	National Vital Statistics Reports Volume 62, Number 1 June 28, 2013 Births	2010-2011	No Change	2018 (2016 data)
Net International Migrants by County	University of Wisconsin	Age-Specific Net Migration Estimates for US Counties, 1950-2010. Applied Population Laboratory, University of Wisconsin	2013	No Change	2010 ratios were used

Annual deaths by sex and 5-year age cohort	NYC Dept of Health & Mental Hygiene, NYS DOH, CT DOH, NJ DOH		1990-2011	CDC reporting were used in the absence of updated NYS data. NJ, CT, NYC sources remain the same.	2010-2017
Age for Selected Survival Rates, by Sex and Calendar Year	US Social Security Administration			No Change	1900-2100
Life Tables for the United States Social Security Area		Actuarial Study No. 120		No Change	1900-2100
Expectation of life by age for the nation	US CDC	National Vital Statistics Reports, Volume 63, Number 7 November 6, 2014, United States Life Tables	2010	US CDC	Latest release
Cross-tabulations of population age and enrollment status	IPUMS	1 Yr ACS	2010	ACS 5-Year Sample	2013-2017
Projections of Education Statistics to 2021, 40th ed.	NCES			NCES	2017-2026
Table 3. Projections of the Population by Sex and Selected Age Groups for the United States	US Census Bureau	2014 National Population Projections Tables	2014	No Change	2017 (2017-2060)
Projected Population by Age, Sex, Race, and Hispanic Origin	US Census Bureau	2014 National Population Projections Tables	2014	No Change	2017 (2017-2060)
Alternative Forecasts	DCP	Population Forecasts	2010-2040	No Change	rebenchmark 2015, 2020 only, full update to come
Alternative Forecasts	NJTPA	Total Pop NJTPA	2010-2040	No Change	2015-2045
Alternative Forecasts	NJTPA	NJTPA County Allocation	2010-2040	No Change	2015-2045
Alternative Forecasts	NJ DOL	NJ DOL Pop Forecast	2012-2032	No Change	2014-2034
Alternative Forecasts	CT SDC	CT SDC Pop Forecast (2012)	2010-2030	No Change	2015-2050
Alternative Forecasts	CDOT	CDOT Pop Forecast	2010-2040	No Change	No Change
Alternative Forecasts	Cornell	Cornell NY Pop Forecast	2010-2040	No Change	No Change
Population Forecast by Race-Ethnicity	NYMTC	2040 SED Forecast	2040	No Change	2012 (2012-2050)

4.3 Issues and Trends

4.3.1 Vital Statistics

Data requests were made from the State and NYC Departments of Health (the original sources used in the 2050 Forecast) for the birth and death data required for the Cohort-Component portions of the Population model. Connecticut, New Jersey, and New York City responded with data; however, New York State did not. In the absence of State data, vital statistics including resident births and deaths were acquired for the non-NYC New York counties from the US Center for Disease Control. This data set had a number of suppressed categories/age groups. As such, IPF was used to estimate the suppressions against total births and deaths by county. It should be noted that New York State Department of Health births data was later received and incorporated into subsequent iterations of the forecast.

It was also noted that current datasets of births and deaths from each source did not completely correspond to the historical data from earlier in the decade entered in the 2050 Forecast population model. To adjust for the rebenchmarking, data for the years 2010-2014 were reentered into the Update model along with the new 2015-2017 data as available.

4.3.1 Adjustment Factors

As with the employment model, there are numerous adjustment factors built in to the population model. These include:

- Shares of Group Quarters
- Terminal Survival Rates
- Labor-Induced Migration Assumptions
- New York City Labor-Induced Migration Assumptions
- Migration Scenarios (set to historical averages)
- Military Personnel Shares
- Labor Force Participation

The Update maintains the 2050 Forecast settings. However, each of these factors provides an opportunity to adjust the population model results to be more reflective of local knowledge. In particular, the labor-induced migration assumptions and labor force participation rates may be adjusted to reflect more recent trends. That, coupled with the changes to the adjustments to the employment model suggested in Section 3.5, should offset some of the oddities in the model results.

4.4 Population Model Update Outputs

As shown in Figure 27 on the following page, between 2017 and 2050, the NYMTC 31-County Region is projected to increase from 22.75 million to 25.97 million residents, given recent past trends in natural increase and net migration coupled with a downward trajectory in the long term rate of employment growth. This decline of nearly 250,000 from the prior 26.21 million forecast has occurred without further change to the Model's assumptions regarding trends in the

components of population growth. As such, the revision suggests the Region will comprise only 6.5% of the 400 million population base of the nation by mid-century.

Like the nation, the Region's projections assume that fertility rates will continue to decline, that life expectancy will rise modestly, and that net migration will taper off especially in relation to the induced demand for labor. However, without a population forecast disaggregated by race, ethnicity, and foreign origin, the Population Model is not capable of responding to differentials in fertility, mortality and in-migration associated with these characteristics that might contribute to greater growth.

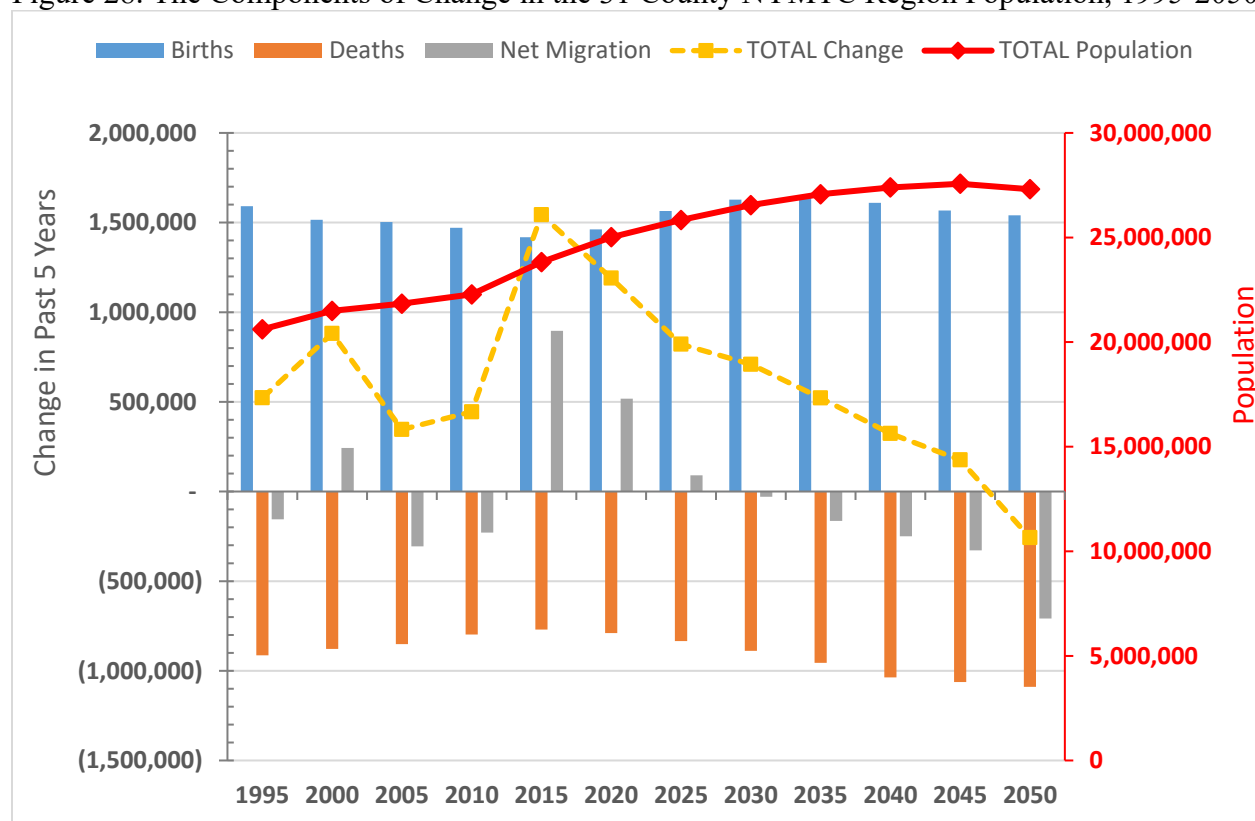
Figure 27. County Model 2050 Forecast Update Outputs: Total Population

AREA NAME	Update: Total Population									
	2010	2015	2017	2020	2025	2030	2035	2040	2045	2050
31-County Region	22,282,010	22,637,494	22,779,687	23,738,140	24,443,931	25,128,738	25,662,563	26,020,580	26,204,337	25,974,073
Bronx County	1,385,108	1,416,463	1,429,004	1,443,877	1,485,275	1,518,998	1,550,492	1,579,245	1,599,597	1,619,344
Kings County	2,552,911	2,618,423	2,644,627	2,707,679	2,706,246	2,754,009	2,799,347	2,840,525	2,870,318	2,898,080
New York County	1,585,873	1,616,455	1,628,688	1,655,299	1,661,574	1,676,720	1,686,292	1,691,617	1,695,476	1,701,598
Queens County	2,250,002	2,291,030	2,307,442	2,330,875	2,353,431	2,373,551	2,394,353	2,412,649	2,425,614	2,438,647
Richmond County	468,730	474,969	477,465	479,553	493,440	497,749	500,519	501,109	502,519	503,351
New York City	8,242,624	8,417,340	8,487,226	8,617,283	8,699,966	8,821,027	8,931,003	9,025,145	9,093,524	9,161,020
Nassau County	1,339,532	1,354,612	1,360,644	1,487,480	1,560,850	1,616,349	1,648,178	1,657,345	1,640,405	1,583,703
Suffolk County	1,493,350	1,501,373	1,504,582	1,592,424	1,644,344	1,692,267	1,714,017	1,717,157	1,703,459	1,659,870
Long Island	2,832,882	2,855,985	2,865,226	3,079,904	3,205,194	3,308,615	3,362,194	3,374,502	3,343,864	3,243,573
Dutchess County	297,488	296,928	296,704	309,912	324,041	336,416	345,553	350,495	352,147	342,340
Orange County	372,813	375,384	376,412	405,499	433,561	461,275	484,903	504,674	518,534	518,599
Putnam County	99,710	99,488	99,399	106,113	110,130	113,864	116,567	118,044	117,911	115,177
Rockland County	311,687	320,688	324,288	345,466	366,161	384,845	398,251	407,393	411,393	403,197
Sullivan County	77,547	76,330	75,843	77,343	77,811	77,366	75,575	73,154	70,464	68,057
Ulster County	182,493	181,300	180,823	188,454	193,603	197,134	198,347	197,122	194,469	189,608
Westchester County	949,113	967,315	974,596	1,052,284	1,100,060	1,143,055	1,176,169	1,194,048	1,198,821	1,183,581
Mid Hudson	2,290,851	2,317,433	2,328,066	2,485,070	2,605,367	2,713,954	2,795,366	2,844,931	2,863,739	2,820,558
Bergen County	905,116	926,330	934,816	989,011	1,041,439	1,081,445	1,110,457	1,121,156	1,124,591	1,085,026
Essex County	783,969	791,609	794,665	843,393	887,559	924,379	949,336	968,569	979,819	966,790
Hudson County	634,266	662,619	673,960	733,647	783,671	831,001	863,501	884,354	898,010	877,294
Hunterdon County	127,351	126,250	125,810	127,902	126,871	127,341	127,976	128,384	128,031	124,425
Mercer County	367,511	370,212	371,292	372,434	386,301	401,484	416,078	427,842	438,598	438,693
Middlesex County	809,858	830,300	838,477	876,132	901,161	927,687	950,754	969,263	978,176	968,352
Monmouth County	630,380	629,185	628,707	658,615	667,171	676,057	682,129	683,408	682,327	666,614
Morris County	492,276	498,192	500,558	524,137	531,137	537,610	536,161	532,520	527,968	519,918
Ocean County	576,567	583,450	586,203	617,337	656,930	695,149	747,076	779,666	807,888	811,204
Passaic County	501,226	507,574	510,113	537,927	563,606	589,491	605,193	626,344	642,260	639,006
Somerset County	323,444	330,604	333,468	342,383	348,036	352,545	357,469	362,039	365,845	362,416
Sussex County	149,265	145,930	144,596	151,381	150,260	150,349	149,944	150,118	149,229	147,287
Union County	536,499	548,744	553,642	582,748	611,748	638,649	660,979	679,155	691,933	687,430
Warren County	108,692	107,226	106,640	108,313	108,010	108,498	108,245	108,356	107,340	107,509
New Jersey	6,946,420	7,058,225	7,102,947	7,465,361	7,763,900	8,041,686	8,265,298	8,421,174	8,522,015	8,401,964
Fairfield County	916,829	939,983	949,245	990,708	1,025,401	1,058,665	1,089,784	1,113,720	1,127,694	1,111,740
Litchfield County	189,927	186,304	184,855	191,229	195,169	198,490	201,378	201,692	200,925	196,896
New Haven County	862,477	862,224	862,123	908,586	948,934	986,301	1,017,540	1,039,417	1,052,575	1,038,321
Connecticut	1,969,233	1,988,511	1,996,222	2,090,523	2,169,504	2,243,455	2,308,703	2,354,829	2,381,194	2,346,957

Source: US Census Bureau; American Community Survey (ACS); NYC DCP; NYMTC 2050 SED Forecasts

As now configured, the Population Model projects a net increase of 2.2 million residents in the Region between 2020 and 2050. This expansion stems from the birth of over 9 million new children, the deaths of nearly 6 million residents, and the net outmigration of 800,000 existing inhabitants including new children. While the volume of births do not depart much from the start of this century, though rates decline, the volume of deaths begin to decline in the current decade and net out migration losses accelerate over the next three decades. It is notable that during the years from 2010 to 2020, net migration sharply increased due to in-migration of new residents from outside of the 31-county region, largely driven by local job growth. Collectively, these trends show a continuing loss in successive five year periods to 2050, as the following chart demonstrates.

Figure 28. The Components of Change in the 31 County NYMTC Region Population, 1995-2050

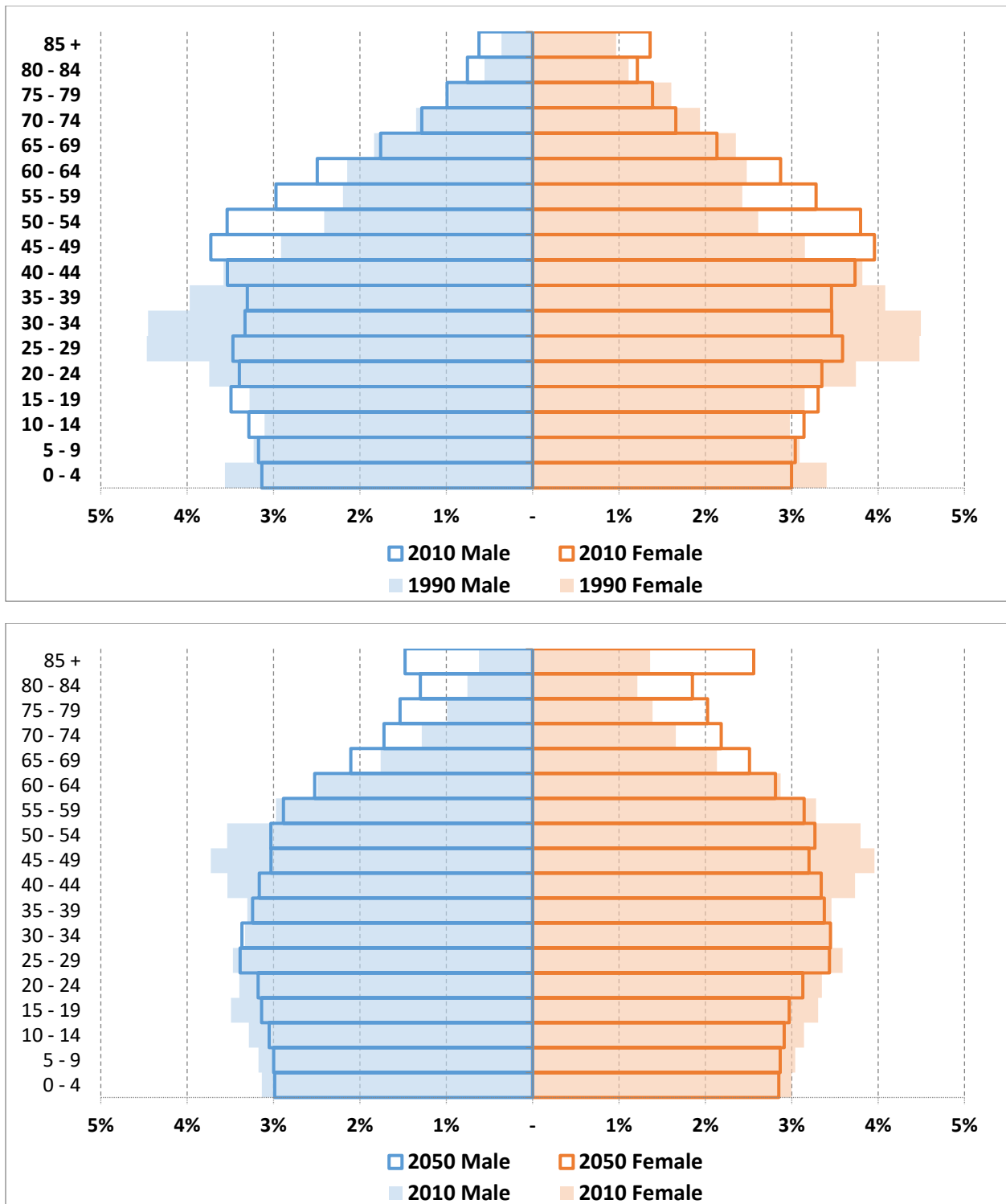


As the negative components of death and out-migration increase in importance relative to births and in-migration, the structure of an area's population undergoes a transformation, exacerbated by extended aging. From a traditional broadly based pyramid of youth to increasingly fewer elder ages, a slightly rectangular shape emerges with those in middle ages more aligned in size with those in more dependent youth and older ages. This will, of course, differ by sub-region, as does the relative importance of natural increase versus migration. In some suburban projections, such as Long Island and Connecticut, it is noted that deaths comprise a larger share of the population's natural increase, suggesting an aging of their settlement, while a more moderate share or two-thirds the volume of births occurs in the Mid-Hudson and New Jersey. In New York City, which is expected to record the lowest share of deaths relative to births or half the high volume, the population base will lose the largest number of residents in part because of excessive outmigration.

An estimated 1.2 million more inhabitants will leave the City, than move in over 30 years, in part because of land limitations.

The shifting components of population growth not only alter the relative distribution of the Region's residents, but also its youthful resources, its somewhat dependent elderly, and its productive working aged population. On an overall basis, the gain is greatest in New Jersey with an increase of more than 900,000 residents, elevating its share of the Region's population to 32% by 2050. While New York City, which still retains a larger base than the fourteen counties of New Jersey, will follow with a net plus of over 500,000 residents that nearly maintains its 36% share of the Region's total. Connecticut and the Mid-Hudson respectively acquire one-quarter to one-third of a million new residents from 2020 to 2050 which enables them to maintain their share of the Region's total, while the meager gains projected for Long Island result in a modest decline in share.

Figure 29. Population Pyramids of the 31 County NYMTC Region, 1990-2010 and 2010-2050



Although the Region as a whole is expected to gain in elderly population, as life expectancy advances and high birth generations pass through working ages, some sub-regions are less advantaged than others by this macro trend. Long Island and Connecticut are each expected to

exceed 22% of their population base in residents aged 65 years and older by 2050 with both areas advancing from a 16% share at present. New York City, by contrast, is projected to increase the elderly by only two percentage points to a less than 16% share some 30 years hence. The outlook for a growing elderly presence is also real but less significant in the Mid-Hudson and New Jersey.

When it comes to the youthful population, the shifts in share are not likely to be as extreme. New York City will essentially remain unchanged at 23% of its population base, as will the Mid-Hudson at over 25%. While Long Island and New Jersey will each contract more than one percent in share to less than 24% of total population and Connecticut will decline to 23% of all residents.

New York City has traditionally had the largest sub-region share of working age population among its residents, followed in succession by New Jersey, then Connecticut and Long Island, with the Mid-Hudson least of all. By 2050, the relative decline of working age residents among the resident population will affect all areas, with Long Island and New Jersey most of all, followed closely by the Mid-Hudson and Connecticut. New York City will retain its working age advantage and strengthen this differential vis-à-vis the rest of the Region by a much narrower loss in share.

Given the declining share of working age population in the Region's base over the 2020-2050 timeframe, from 61% to 57%, despite evident work experience among the young and elderly, the *Dependency Ratio*³ is expected to rise. As an indicator of the potential burden of the dependent population upon those working, the *ratio* is projected to climb from 64% in 2017 to 76% by 2050.

Counties that achieve double-digit growth over the 2020-2050 period include, in descending order, Orange, Rockland, Westchester, Bronx, and Dutchess in New York State; Ocean, Hudson, Passaic, Union, Mercer, Essex, and Middlesex in New Jersey; and New Haven and Fairfield in Connecticut. Counties that are projected to decline over the period are, in descending order, Sullivan, Hunterdon, Sussex, Morris, and Warren. All other counties will grow in the single digit range.

4.3.1 Population in Households and Group Quarters

In the 31-County Region, the population in households is forecast to increase by almost 1.1 million between 2015 and 2020; yet between 2015 and 2017 Census data indicate the population in households has increased by only 140,000, suggesting an increase of almost 1 million new residents in only 3 years. (See Figure 30.) The cohort-component portions of the population model should be revisited to make the model more sensitive to the slower growth of more recent years.

In New York City, because the group quarters population has unique mortality, fertility, and migration patterns from those living in households, the group quarters population was initially removed from the general population and then placed back in after the projection was completed. This method allows for those in group quarters to be included in the projection, but not to have the same fertility, mortality, and migration experiences as the household population. The population in group quarters in this forecast was left at over 185,000 from the base year to the final projection

³ Calculated as (Population aged 65 and over + Population under 20)/(Population aged 20 to 64)*100

year. If the group quarters population were added back based on the 2010 percentage of the household population, the 2050 projected population would have increased by 21,000 persons.

For the non-NYC sub-region counties, the population in households is derived by subtracting the population in Group Quarters from the Total Population in Households. Group Quarters population is forecast using the historical share of total population by sex and age cohort, adjusted to one of two controls of either a constant share or constant level. The population in households is then derived by subtracting the forecasted group quarters population from the total population.

Figure 30. County Model 2050 Forecast Update Outputs: Household Population

AREA NAME	Update Household Population									
	2010	2015	2017	2020	2025	2030	2035	2040	2045	2050
31-County Region	21,767,983	22,116,433	22,255,812	23,196,653	23,892,258	24,566,102	25,085,237	25,423,132	25,582,983	25,341,684
Bronx County	1,338,398	1,369,753	1,382,294	1,397,167	1,438,565	1,472,288	1,503,782	1,532,535	1,552,887	1,572,634
Kings County	2,517,302	2,582,814	2,609,018	2,672,070	2,670,637	2,718,400	2,763,738	2,804,916	2,834,709	2,862,471
New York County	1,518,500	1,549,082	1,561,315	1,587,926	1,594,201	1,609,347	1,618,919	1,624,244	1,628,103	1,634,225
Queens County	2,222,002	2,263,030	2,279,442	2,302,875	2,325,431	2,345,551	2,366,353	2,384,649	2,397,614	2,410,647
Richmond County	460,892	467,131	469,627	471,715	485,602	489,911	492,681	493,271	494,681	495,513
New York City	8,057,094	8,231,810	8,301,696	8,431,753	8,514,436	8,635,497	8,745,473	8,839,615	8,907,994	8,975,490
Nassau County	1,317,866	1,334,246	1,340,798	1,463,319	1,536,299	1,591,452	1,622,210	1,629,710	1,611,317	1,554,101
Suffolk County	1,463,944	1,469,077	1,471,130	1,559,943	1,610,806	1,657,413	1,677,167	1,677,617	1,660,885	1,615,297
Long Island	2,781,810	2,803,323	2,811,928	3,023,262	3,147,105	3,248,866	3,299,376	3,307,327	3,272,202	3,169,397
Dutchess County	277,523	278,453	278,825	289,375	303,300	315,659	324,439	328,532	329,019	318,997
Orange County	360,583	363,700	364,947	392,148	419,300	446,457	469,448	488,207	500,889	500,292
Putnam County	97,118	96,929	96,853	103,231	107,095	110,709	113,314	114,699	114,465	111,704
Rockland County	304,504	313,214	316,698	337,161	357,240	375,317	388,247	396,953	400,411	392,122
Sullivan County	73,722	70,229	68,832	73,665	74,173	73,773	72,119	69,818	67,234	64,928
Ulster County	170,720	171,191	171,379	176,514	181,603	185,038	186,146	184,749	182,003	177,191
Westchester County	920,409	940,426	948,433	1,019,605	1,066,918	1,109,684	1,141,966	1,158,036	1,160,179	1,143,790
Mid Hudson	2,204,579	2,234,142	2,245,967	2,391,698	2,509,629	2,616,638	2,695,680	2,740,994	2,754,199	2,709,025
Bergen County	894,694	915,216	923,425	977,331	1,029,362	1,069,046	1,097,632	1,107,708	1,109,949	1,069,853
Essex County	760,197	769,663	773,449	817,626	860,389	896,109	920,235	938,785	949,065	935,885
Hudson County	624,888	655,305	667,472	723,357	772,784	819,231	850,945	871,044	884,080	863,344
Hunterdon County	123,780	121,238	120,221	123,873	123,036	123,504	124,164	124,494	124,000	120,347
Mercer County	347,708	351,644	353,218	352,540	365,834	380,143	394,028	405,245	415,362	415,031
Middlesex County	786,023	802,471	809,050	850,481	874,823	900,728	923,131	940,544	948,447	938,308
Monmouth County	622,710	622,081	621,829	650,312	658,598	667,065	672,561	673,113	671,270	655,229
Morris County	483,410	488,902	491,099	513,823	520,600	526,876	525,196	521,069	515,724	507,099
Ocean County	569,404	576,543	579,399	609,968	649,197	686,805	737,848	769,756	797,132	799,795
Passaic County	490,207	496,460	498,961	526,138	551,358	576,854	592,259	612,845	627,862	624,127
Somerset County	319,474	321,019	321,637	337,741	343,176	347,385	351,928	355,959	359,173	355,298
Sussex County	147,523	141,829	139,551	149,320	148,036	147,867	147,152	146,994	145,792	143,646
Union County	529,695	546,660	553,446	575,380	604,003	630,421	652,289	669,991	682,269	677,576
Warren County	106,724	99,654	96,826	106,260	105,959	106,374	105,916	105,756	104,497	104,458
New Jersey	6,806,437	6,908,685	6,949,584	7,314,150	7,607,155	7,878,407	8,095,282	8,243,303	8,334,622	8,209,995
Fairfield County	897,661	921,949	931,664	969,261	1,003,556	1,036,337	1,066,520	1,089,097	1,101,354	1,084,595
Litchfield County	187,123	183,075	181,456	188,320	192,055	195,050	197,515	197,438	196,290	192,088
New Haven County	833,279	833,449	833,517	878,209	918,323	955,308	985,389	1,005,358	1,016,322	1,001,095
Connecticut	1,918,063	1,938,473	1,946,637	2,035,791	2,113,934	2,186,694	2,249,425	2,291,892	2,313,966	2,277,777

Source: US Census Bureau; American Community Survey (ACS); NYC DCP; NYMTC 2050 SED Forecasts

Because it is a selected historical share of total population, group quarters in the non-NYC sub-region counties can vary widely from year to year, particularly in the New Jersey counties as shown in Figure 31, which follows. Subsequently, a more uniform way of addressing group quarters population should be explored.

Figure 31. County Model 2050 Forecast Update Outputs: Group Quarters Population

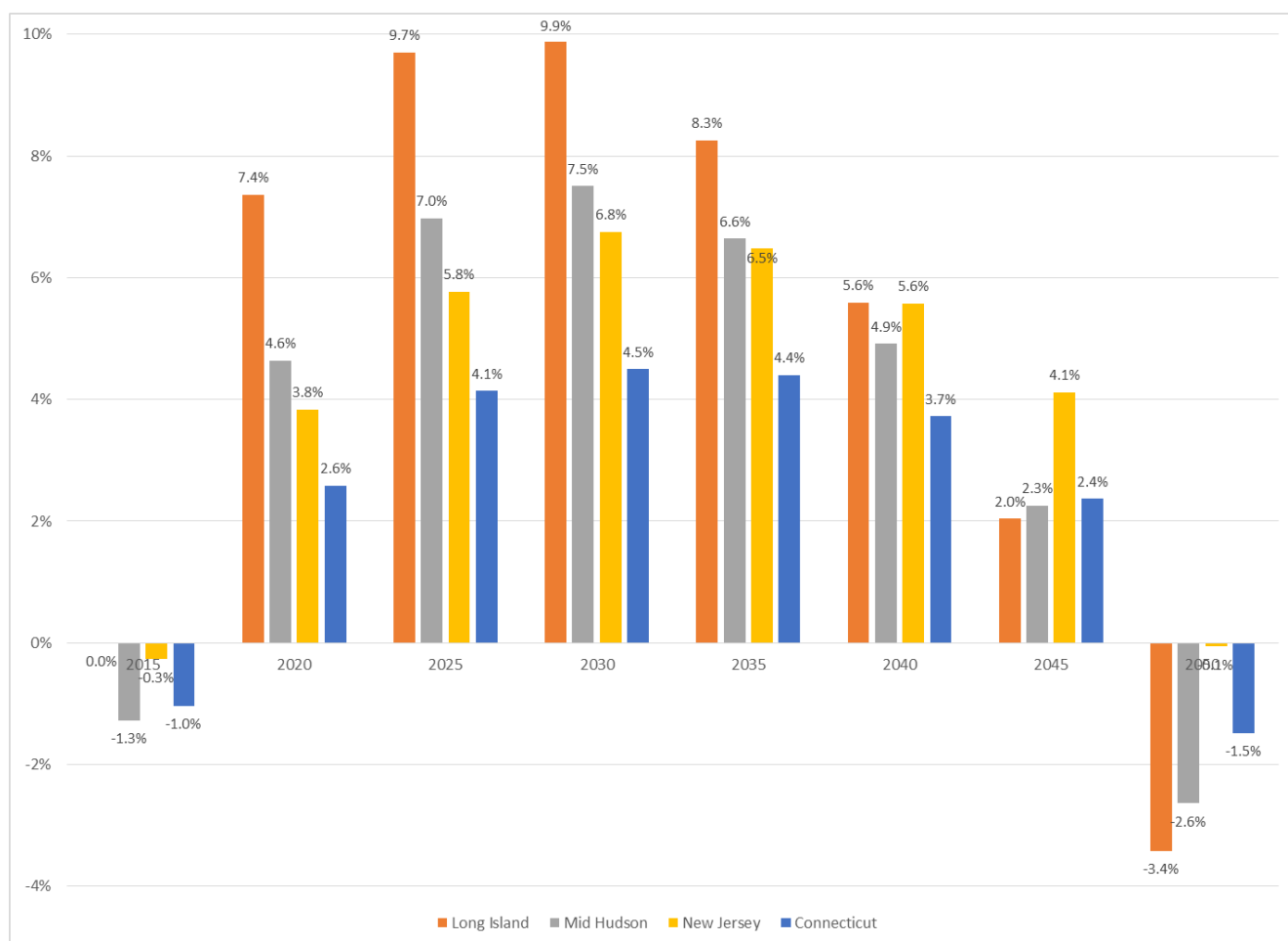
		Group Quarters Population Update								
AREA NAME	2010	2015	2017	2020	2025	2030	2035	2040	2045	2050
31-County Region	514,027	521,061	523,875	541,487	551,673	562,636	577,327	597,448	621,354	632,388
Bronx County	46,710	46,710	46,710	46,710	46,710	46,710	46,710	46,710	46,710	46,710
Kings County	35,609	35,609	35,609	35,609	35,609	35,609	35,609	35,609	35,609	35,609
New York County	67,373	67,373	67,373	67,373	67,373	67,373	67,373	67,373	67,373	67,373
Queens County	28,000	28,000	28,000	28,000	28,000	28,000	28,000	28,000	28,000	28,000
Richmond County	7,838	7,838	7,838	7,838	7,838	7,838	7,838	7,838	7,838	7,838
New York City	185,530	185,530	185,530	185,530	185,530	185,530	185,530	185,530	185,530	185,530
Nassau County	21,666	20,366	19,846	24,161	24,552	24,896	25,968	27,635	29,088	29,602
Suffolk County	29,406	32,296	33,452	32,481	33,538	34,853	36,850	39,540	42,574	44,574
Long Island	51,072	52,662	53,298	56,642	58,089	59,749	62,818	67,175	71,662	74,176
Dutchess County	19,965	18,475	17,879	20,536	20,741	20,756	21,114	21,964	23,129	23,342
Orange County	12,230	11,684	11,466	13,351	14,260	14,817	15,454	16,467	17,645	18,307
Putnam County	2,592	2,559	2,546	2,883	3,035	3,155	3,253	3,344	3,447	3,472
Rockland County	7,183	7,474	7,590	8,305	8,920	9,528	10,004	10,440	10,982	11,075
Sullivan County	3,825	6,101	7,011	3,678	3,638	3,593	3,456	3,336	3,230	3,129
Ulster County	11,773	10,109	9,443	11,940	12,001	12,096	12,201	12,374	12,465	12,417
Westchester County	28,704	26,889	26,163	32,679	33,142	33,372	34,203	36,013	38,642	39,790
Mid Hudson	86,272	83,291	82,099	93,372	95,738	97,316	99,686	103,937	109,540	111,533
Bergen County	10,422	11,114	11,391	11,680	12,077	12,400	12,825	13,448	14,642	15,173
Essex County	23,772	21,946	21,216	25,767	27,170	28,270	29,101	29,784	30,754	30,905
Hudson County	9,378	7,314	6,488	10,290	10,887	11,770	12,556	13,309	13,930	13,950
Hunterdon County	3,571	5,012	5,588	4,029	3,835	3,837	3,811	3,891	4,031	4,078
Mercer County	19,803	18,568	18,074	19,894	20,468	21,340	22,051	22,596	23,236	23,662
Middlesex County	23,835	27,829	29,427	25,651	26,338	26,959	27,623	28,719	29,729	30,044
Monmouth County	7,670	7,104	6,878	8,303	8,574	8,992	9,568	10,295	11,057	11,386
Morris County	8,866	9,290	9,460	10,314	10,537	10,734	10,966	11,451	12,244	12,819
Ocean County	7,163	6,907	6,805	7,370	7,733	8,344	9,228	9,910	10,756	11,409
Passaic County	11,019	11,114	11,152	11,789	12,249	12,637	12,933	13,500	14,398	14,879
Somerset County	3,970	9,585	11,831	4,642	4,860	5,160	5,541	6,080	6,672	7,118
Sussex County	1,742	4,101	5,045	2,061	2,224	2,483	2,793	3,124	3,437	3,641
Union County	6,804	2,084	196	7,367	7,744	8,228	8,690	9,164	9,664	9,854
Warren County	1,968	7,572	9,814	2,053	2,050	2,124	2,329	2,600	2,843	3,051
New Jersey	139,983	149,540	153,363	151,210	156,746	163,279	170,015	177,870	187,393	191,970
Fairfield County	19,168	18,034	17,580	21,447	21,845	22,328	23,264	24,623	26,340	27,145
Litchfield County	2,804	3,229	3,399	2,909	3,115	3,440	3,862	4,254	4,635	4,808
New Haven County	29,198	28,775	28,606	30,377	30,610	30,993	32,152	34,059	36,253	37,226
Connecticut	51,170	50,038	49,585	54,733	55,571	56,761	59,278	62,936	67,229	69,179

Source: US Census Bureau; American Community Survey (ACS); NYC DCP; NYMTC 2050 SED Forecasts

4.3.2 Comparison of Update to 2050 Forecast

The Update forecasts total populations range from 700,000 higher than the 2050 Forecasts in 2020 to 1.1 million higher in 2030, before tapering down to be 200,000 lower by 2050 (0.9% less than the previous forecast). As shown in Figure 32, all sub-regions outside of New York City follow the same general pattern, with Long Island seeing the most extreme changes in population in the Update, ranging from a high of 9.9% in 2030 to a low of -3.4% in 2050. The forecast differential range is least for Connecticut, ranging from a high of 4.5% to a low of -1.5%.

Figure 32. Comparison of Update Forecasts to 2050 Forecasts, Population for Non-NYC Sub-Regions



4.4 Population Model Recommendations

As mentioned in Technical Memorandum 1, *Existing Trends Analysis* (NYMTC 2019. p. 4), more detailed weighting of domestic and foreign migration should be considered as foreign migration to the NYMTC region is a greater share of migration than in other parts of the country.

It is strongly recommended that, at minimum, a regional population model be calibrated on a race/ethnicity/foreign origin basis, in which the components of change – births, deaths, native versus foreign net migration, and induced labor in-migration –reflect the rate differentials that are recognized in national level forecasting. If the results of this enhanced NYMTC 31-County model significantly differ from the sum of all individual county models – that is, at more than one million persons or over 4% by 2050 –then adjustments should be made accordingly to account for the Region’s increasing diversity.

It is also recommended that other methods of group quarters forecasting be explored, be it the DCP method of removing Group Quarters from the total population or just by tying the group quarters share of total population to the most recent historical year of data by sub-region.

As mentioned in Section 4.3.1, the cohort-component portions of the population model should be revisited to make the model more sensitive to the slower growth of more recent years.

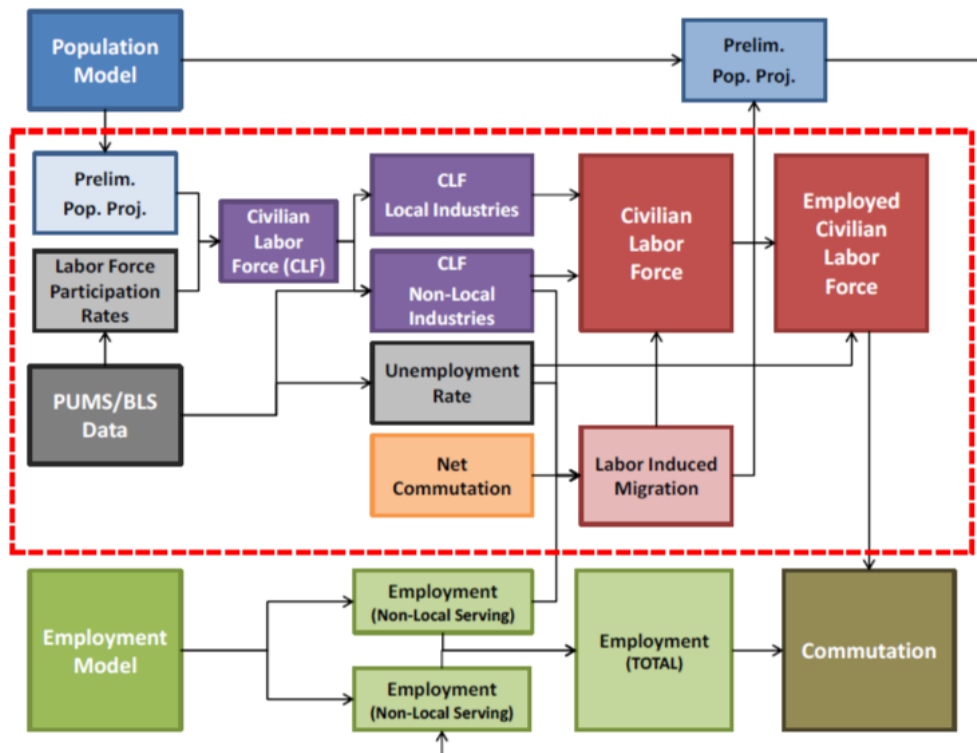
5.0 Labor Force Model

5.1 Labor Force Model Overview

Described in Section 4.0 in the NYMTC Modeling Methodology Technical Memorandum (2016. *pp. 84-97*) and shown in Figure 33, the Labor Force Model converts population projection inputs into estimates of civilian labor force by combining various other inputs through a series of calculations that perform the following key functions:

- Generates civilian labor force projections
- Generates estimates of the Labor Induced Migration Adjustment (LIMA)
- Provides an estimate of the employed labor force by county of residence to be reconciled with total employment projections by county of work through the commutation adjustments to historically observed commuter flows associated with the 31-County Region

Figure 33. Labor Force Model Structure



Source: NYMTC, 2015. *Modeling Methodology TM*, p. 84

5.2 Data Inputs

The Labor force model data inputs incorporated into the 2050 model and the Update are listed in Figure 34. The Update generally incorporated the same inputs used in the 2050 model with new vintages added for the years from 2011 to 2017. All changes to data inputs and processing of those inputs are described in further detail below in the context of the function of the data input within the employment model.

Figure 34. Table of Data Inputs to Labor Force Model

Variable Name	Publisher	2050 Model		2050 Update Model	
		Dataset	Years	Dataset	Years
Employment Status by age/sex	US Census Bureau	ACS, Table B23001, 5 yr sample		No Change	2013-2017
Age/sex-specific civilian labor force participation rate (civilian labor force & resident population)	US Census Bureau and IPUMS	IPUMS' ACS Microdata 5-yr ACS samples	2010 & 2012	No Change	2011-2015 & 2013-2017
Sex of Workers by place of work	US Census Bureau	ACS, Table B08007, 5 yr sample		No Change	2013-2017
Civilian labor force participation rate, by age, sex, race, and ethnicity	US BLS	Employment Projections program	1992, 2002, 2012, and projected 2022	No Change	1996, 2006, 2016, and projected 2026
Military personnel workers	US Census Bureau and IPUMS	ACS	2010	IPUMS' ACS Microdata 5-yr ACS samples	2011-2015 & 2013-2017
Employment by 2 digit NAICS industry by age/sex	US Census Bureau and IPUMS	ACS	2010	IPUMS' ACS Microdata 5-yr ACS samples	2011-2015 & 2013-2017
Labor Force, unemployed and employed	USBLS	LAUS		No Change	2013-2017 Annual Avg Data
Budget & Economic Outlook	CBO	Budget & Economic Outlook	2014-2024	No Change	2018-2028

5.2.1 Civilian Labor Force Participation Rates

Estimates of age/sex specific labor force participation rates applied in the model were initially based on the calculations obtained from the 2010 PUMS, these have been updated for both 2015 and 2017 PUMS data. The calculation of future year participation rates to be applied in the model update were calculated based on changes implied by the BLS estimates for 2016-2026. The estimated change in BLS age/sex specific rates between 2016 and 2026 were used to interpolate national rates for 2020 and 2025. Given that the BLS series was only projected to 2022, the 2026 rates were held constant for 2030 and every other future forecast year, as was the precedent in the 2050 Forecasts.

5.2.2 Labor Induced Migration Estimates

The established methodology of the Labor Force model was to create greater consistency with employment projections by linking migration to employment. Labor demand implied by the employment forecasts was reconciled against labor supply estimates generated from the conversion of preliminary population forecasts into the labor force estimates. The Journey to Work flows driving this process were discussed in the Employment section of this Technical Memorandum.

The assessment of labor flows into and out of the Region was limited only to those industries likely to affect migration patterns – that is to say that the local serving industries (i.e., Retail Trade, Arts/Entertainment/Recreation, Accommodation/Food Services, and Other Services) were held out from the calculation of labor induced migration. These data were updated using PUMS cross-tabulations by county, or PUMAs aggregated to county as in the case of Westchester, NY. In one case, two counties, Sullivan and Ulster counties, are grouped within a single PUMA and any rates derived from the combined geography are applied to each county individually.

5.2.3 Labor Demand

For each five year interval in the forecasting process, the labor demand implied by the employment model is calculated by first aggregating the total volume of jobs in the 16 basic industry sectors excluding Retail Trade, Arts/Entertainment/Recreation, Accommodation/Food Services, and Other Services. This includes jobs that are categorized as both Wage & Salary, as well as Self Employed.

An adjustment is applied to account for the number of multiple job-holders. The estimated volume of workers required to meet the employment demand in these industries is calculated by taking the total number of jobs and dividing by 1.07 (7% of workers assumed to hold multiple jobs) to address multiple job holders. The value of 7% functioned as a placeholder within the model to prevent the formulas from producing an unending iterative loop. At a later point in the model, the actual multiple-job-holder rate is calculated as it projects the forecast year closed commutation matrix.

5.1.4 Labor Supply

Labor supply is determined by converting population projections by sex and age cohort (aged 16+) into corresponding labor supply through the application of labor force participation rates, military personnel estimates, non-basic and basic industries of occupation, and unemployment. These data were updated using the 2017 5-Year PUMS estimates and the 2016 CBO unemployment projection, respectively.

5.3 Labor Force Model Outputs

As shown in Figure 35 between 2015 and 2050 the total labor force by place of residence is expected to increase by 538,000 to 13.05 million, an increase of 4.3% region wide. This growth is not equally distributed as Connecticut will see the largest percent increase (9.3%) followed by the Mid-Hudson (7.0%), New York City (6.0%), and New Jersey (5.2%). Of these, only New York

City, will see increases in each of its counties. In contrast, Long Island, is expected to see a decline in labor force of -7.1%, distributed almost equally between Nassau and Suffolk counties.

Figure 35. County Model 2050 Forecast Update Outputs: Labor Force

Labor Force Update										
AREA NAME	2010	2015	2017	2020	2025	2030	2035	2040	2045	2050
31-County Region	11,568,295	12,510,618	12,887,548	12,647,342	12,903,638	13,047,719	13,138,990	13,230,884	13,308,577	13,049,017
Bronx County	617,531	646,166	657,620	660,002	672,396	680,317	693,545	710,298	721,893	720,881
Kings County	1,236,176	1,309,809	1,339,262	1,359,591	1,325,056	1,343,443	1,370,531	1,395,637	1,406,777	1,405,782
New York County	921,966	948,774	959,497	973,470	963,455	963,732	970,965	981,383	988,081	981,431
Queens County	1,185,673	1,204,289	1,211,735	1,218,675	1,221,195	1,222,203	1,230,975	1,242,170	1,247,594	1,254,848
Richmond County	217,944	221,719	223,229	220,188	227,771	226,769	227,168	228,455	230,830	228,915
New York City	4,179,290	4,330,757	4,391,344	4,431,927	4,409,872	4,436,463	4,493,184	4,557,943	4,595,175	4,591,857
Nassau County	688,439	867,449	939,053	823,756	855,221	861,916	856,292	850,331	840,852	808,635
Suffolk County	784,674	889,293	931,141	860,692	874,662	873,407	859,269	853,257	848,604	823,721
Long Island	1,473,113	1,756,742	1,870,194	1,684,448	1,729,883	1,735,323	1,715,561	1,703,588	1,689,456	1,632,356
Dutchess County	155,789	162,774	165,568	164,916	170,917	171,417	170,868	171,402	172,762	165,427
Orange County	182,275	190,340	193,566	203,882	216,326	224,351	229,682	236,283	243,405	239,537
Putnam County	54,348	58,411	60,036	59,664	60,996	60,860	59,868	59,756	59,581	58,348
Rockland County	150,999	174,227	183,519	177,618	187,617	195,030	199,097	201,884	203,961	195,850
Sullivan County	39,099	38,270	37,938	38,381	38,251	37,255	35,886	34,539	33,312	32,326
Ulster County	94,826	97,971	99,229	97,003	98,328	97,239	95,776	94,528	93,671	90,889
Westchester County	497,887	571,732	601,270	584,322	605,578	615,559	614,743	611,343	610,397	601,988
Mid Hudson	1,175,224	1,293,725	1,341,125	1,325,785	1,378,013	1,401,711	1,405,921	1,409,736	1,417,089	1,384,365
Bergen County	480,575	539,297	562,786	549,284	582,219	594,695	597,236	591,508	588,051	553,765
Essex County	400,430	426,323	436,681	452,865	478,273	492,143	498,050	499,557	501,073	482,507
Hudson County	360,289	411,361	431,790	430,817	456,136	476,773	490,112	495,022	497,431	467,200
Hunterdon County	69,840	77,729	80,884	71,244	69,070	67,016	65,425	65,506	65,887	64,639
Mercer County	195,951	206,116	210,181	191,002	200,561	206,746	213,246	218,230	224,227	220,717
Middlesex County	433,695	485,319	505,969	464,023	471,753	479,886	486,676	490,469	491,272	476,778
Monmouth County	333,624	355,637	364,443	363,364	362,279	356,637	350,932	348,001	348,677	340,629
Morris County	268,515	291,509	300,707	295,705	296,939	292,487	282,462	275,862	275,126	273,429
Ocean County	271,103	294,361	303,664	291,246	308,930	320,842	341,004	352,932	365,122	356,791
Passaic County	250,474	260,658	264,732	277,007	290,542	299,872	302,780	309,976	316,176	308,797
Somerset County	180,098	205,528	215,699	191,920	194,684	193,462	192,301	192,633	194,513	191,482
Sussex County	82,916	84,620	85,301	85,129	81,277	77,810	74,585	74,090	74,365	74,580
Union County	290,559	315,979	326,147	321,683	336,797	347,102	354,226	359,158	363,504	355,286
Warren County	58,848	61,231	62,184	60,249	58,789	57,086	55,234	54,853	54,810	56,388
New Jersey	3,676,918	4,015,668	4,151,168	4,045,536	4,188,248	4,262,557	4,304,268	4,327,795	4,360,235	4,222,990
Fairfield County	485,934	524,690	540,193	553,541	571,790	578,933	582,932	589,063	595,689	582,480
Litchfield County	106,195	112,883	115,558	109,218	108,782	106,214	104,264	103,418	104,421	103,404
New Haven County	471,620	476,153	477,965	496,887	517,050	526,519	532,861	539,341	546,513	531,565
Connecticut	1,063,750	1,113,726	1,133,716	1,159,645	1,197,622	1,211,665	1,220,056	1,231,822	1,246,622	1,217,450

Unemployment rates have decreased significantly since 2012, so the Update of employed labor force is even more robust for those counties and sub-regions experiencing increases. The Region's employed labor force is expected to increase by more than 850,000 between 2015 and 2050 (7.4%). Connecticut will see increases of 12.3%; the Mid-Hudson, 10.2%; New York City, 9.0%; and New Jersey, 8.7%. Long Island will see a smaller rate of decrease in employed labor force than total labor force at -4.6% overall.

Figure 36. County Model 2050 Forecast Update Outputs: Employed Labor Force

AREA NAME	Employed Labor Force Update									
	2010	2015	2017	2020	2025	2030	2035	2040	2045	2050
31-County Region	10,370,686	11,694,391	12,223,872	12,055,788	12,214,166	12,393,320	12,520,868	12,649,662	12,766,000	12,557,334
Bronx County	520,228	576,814	599,448	595,559	600,107	610,471	625,591	644,032	657,928	660,384
Kings County	1,101,924	1,209,665	1,252,762	1,282,843	1,241,452	1,263,059	1,292,852	1,320,939	1,335,921	1,339,412
New York County	837,475	890,568	911,805	926,520	912,622	915,027	923,984	936,010	944,524	940,279
Queens County	1,054,073	1,122,073	1,149,273	1,163,339	1,159,094	1,163,317	1,174,849	1,188,746	1,197,162	1,207,367
Richmond County	198,188	209,834	214,493	211,880	218,119	217,676	218,560	220,303	223,102	221,757
New York City	3,711,889	4,008,954	4,127,780	4,180,140	4,131,393	4,169,551	4,235,837	4,310,029	4,358,639	4,369,200
Nassau County	631,146	825,691	903,509	801,309	827,302	836,060	832,799	829,180	822,091	792,665
Suffolk County	719,152	845,160	895,562	831,859	840,882	841,870	830,332	826,598	824,154	801,990
Long Island	1,350,298	1,670,851	1,799,072	1,633,168	1,668,184	1,677,931	1,663,132	1,655,778	1,646,245	1,594,655
Dutchess County	140,167	150,476	154,599	159,277	163,983	164,999	164,987	166,022	167,862	161,236
Orange County	167,127	180,962	186,496	196,002	206,982	215,161	220,770	227,624	235,011	231,793
Putnam County	49,413	55,321	57,684	57,112	57,953	58,036	57,293	57,387	57,420	56,428
Rockland County	139,826	162,810	172,003	170,951	179,186	186,975	191,574	194,965	197,688	190,515
Sullivan County	33,369	34,944	35,573	35,051	34,374	33,745	32,754	31,765	30,867	30,178
Ulster County	85,282	92,499	95,386	92,873	93,239	92,645	91,669	90,886	90,471	88,180
Westchester County	455,021	537,170	570,029	558,221	575,345	586,415	587,172	585,450	586,067	579,496
Mid Hudson	1,070,207	1,214,180	1,271,770	1,269,487	1,311,062	1,337,976	1,346,218	1,354,100	1,365,386	1,337,826
Bergen County	439,847	514,850	544,851	531,424	560,084	573,692	577,703	573,709	571,892	539,996
Essex County	344,101	382,741	398,197	423,382	442,211	457,523	465,449	469,300	473,174	458,000
Hudson County	313,256	381,215	408,399	414,684	435,944	457,263	471,643	477,972	481,909	454,134
Hunterdon County	62,863	74,475	79,119	69,362	66,639	64,946	63,677	64,028	64,675	63,720
Mercer County	174,984	190,836	197,177	181,969	189,590	196,189	203,107	208,622	215,143	212,552
Middlesex County	390,279	458,718	486,093	445,528	449,870	459,164	467,169	472,331	474,627	462,102
Monmouth County	304,710	335,357	347,616	348,253	344,630	340,511	336,253	334,622	336,454	329,842
Morris County	245,210	277,007	289,726	286,892	286,284	282,864	273,985	268,379	268,457	267,590
Ocean County	241,314	278,318	293,119	279,233	293,320	306,091	326,830	339,817	353,164	346,679
Passaic County	222,718	248,440	258,729	267,396	277,222	287,766	292,159	300,744	308,433	302,870
Somerset County	167,223	194,675	205,655	185,665	187,342	186,652	185,999	186,789	189,085	186,604
Sussex County	73,759	79,990	82,483	81,479	77,110	74,141	71,366	71,187	71,748	72,253
Union County	254,625	292,603	307,794	306,683	317,698	329,135	337,587	344,006	349,908	343,697
Warren County	53,593	57,191	58,630	57,611	55,876	54,419	52,804	52,591	52,700	54,372
New Jersey	3,288,483	3,766,415	3,957,588	3,879,560	3,983,823	4,070,357	4,125,731	4,164,095	4,211,369	4,094,411
Fairfield County	433,778	484,328	504,548	521,275	534,856	543,329	548,827	556,363	564,404	553,633
Litchfield County	95,796	106,417	110,665	104,044	102,707	100,724	99,295	98,906	100,286	99,726
New Haven County	420,236	443,245	452,449	468,113	482,141	493,454	501,828	510,392	519,672	507,884
Connecticut	949,810	1,033,990	1,067,662	1,093,433	1,119,704	1,137,507	1,149,950	1,165,661	1,184,361	1,161,243

5.4 Labor Force Model Recommendations

Multiple job holder rates as well as labor-induced migration adjustments should be evaluated given more recent historical data to determine impacts individually and in conjunction with the employment and population model adjustments.

6.0 Household Model

6.1 Household Model Overview

Calculated from population volume, households are projected by applying occupancy rates and average household size as described in Section 5 of the Modeling Methodology Technical

Memorandum (2015. *pp.* 98-104). In this model calibration, vacancy rates are held constant from 2020-2050 at 2010 levels.

6.2 Data Inputs

The Household model data inputs incorporated into the 2050 model and the Update are listed in Figure 37. The Update generally incorporated the same inputs used in the 2050 model with new vintages added for the years from 2011 to 2017.

There were no changes to the data inputs within the household model, beyond the additional collection of the 2015 and 2017 ACS PUMS data.

Figure 37. Table of Data Inputs to Household Model

Variable Name	Publisher	2050 Model		2050 Update Model	
		Dataset	Years	Dataset	Years
Aggregate Household Income	US Census Bureau	ACS 5-yr samples	2008-2012 5-Yr Estimate & 2006-2010 5-YR Estimate	No Change	2007-2011 to 2013-2017
Total Households	US Census Bureau	ACS 5-yr samples	2008-2012 5-Yr Estimate, 1990,2000, 2010	No Change	2007-2011 to 2013-2017
Distribution of Households by Number of Persons	US Census Bureau	Decennial Census	1990, 2000, 2010	IPUMS' ACS Microdata 5-yr ACS samples	2011-2015 & 2013-2017
Average Household Size	US Census Bureau	Decennial Census	1990, 2000, 2010	IPUMS' ACS Microdata 5-yr ACS samples	2011-2015 to 2013-2017 5-Yr Sample data only
Distribution of Households by Age of Householder	US Census Bureau	Decennial Census	1990, 2000, 2010	IPUMS' ACS Microdata 5-yr ACS samples	2011-2015 & 2013-2017 5-Yr Samples

The number of occupied housing units associated with the projected household population at each time point was calculated by applying the 2010 decennial census average household size to the household population.

6.3 Issues and Trends

Recent year declines in household size are reflected in the 26-County Region model. To this end, historical age-specific headship rates are applied to the population by age cohort to determine total numbers of households. Six unique headship rates methodologies were derived from 1990-2010 decennial census and ACS PUMS data for the 26-County Region. For the update, 2015 and 2017 PUMS data were added to the historical observations and may be used to determine future year headship rates to account for changing household formation patterns, as individuals advance into older age groups. The model may be calibrated to reflect any of these rates.

For the update, 2015 and 2017 PUMS data were added to the historical observations and may be used to determine future year headship rates to account for changing household formation patterns, as individuals advance into older age groups. However, it was discovered that there is a flaw in the both the 2015 and 2017 PUMS data for several New Jersey counties. In Hunterdon, Mercer, and Ocean counties, the population in households is less than the number of households in several age cohorts.⁴ Because it is as yet uncertain if there are further issues with the PUMS data, the 2010 headship rate baseline was maintained.

For the New York City Model, the 2010 average household size was held constant throughout the projection period because the direction in which household size is headed is not clear. The DCP Population Model approach of setting the average household size at fixed rate and applying that rate to projected household population levels is further justified given the sub-region's virtually unchanged shares of household size distributions relative to the other sub-regions.

6.4 Household Model Outputs

As shown in the household model outputs on the following pages, the 31-County Region is forecasted to add 1.5 million households between 2015 and 2050. Of these, 41.7% are in the New Jersey sub-region in particular in Hudson, Ocean, Essex, and Bergen counties. New York City has the next largest share at 18.9%, with the largest share of those being located in Brooklyn. The Mid-Hudson, Long Island, and Connecticut follow with 14.5%, 12.6%, and 12.3%, respectively.

In the year 2050, the Update household total is within 1 percent of each of the 2050 Forecast of households for each of sub-regions. However, there are individual counties with significant differentials including Sullivan County (-23.8%), Warren County (-9.3%), and Mercer County (-8.8%). The adjustments to the headship controls to the household model will have to be re-examined in these instances.

As expected given lower fertility rates, average household size shows declines in every county in the 31-County Region between 2015 and 2050. By 2050, the regional average household size will be 2.59. Long Island has the highest average at 2.80 persons per household followed by the Mid-Hudson (2.59), New Jersey (2.57), New York City (2.54), and Connecticut (2.40).

⁴ This error was reported to the Census Bureau and IPUMS; as of 6/19/2019 we are awaiting a response.

Figure 38. County Model 2050 Forecast Update Outputs: Total Households

Total Households Update										
AREA NAME	2010	2015	2017	2020	2025	2030	2035	2040	2045	2050
31-County Region	8,178,733	8,330,773	8,395,804	9,161,710	9,727,869	10,166,680	10,476,230	10,670,027	10,781,504	10,721,199
Bronx County	483,449	494,775	498,736	504,677	519,631	531,812	543,188	553,574	560,926	568,058
Kings County	934,946	959,278	972,538	992,428	991,896	1,009,636	1,026,475	1,041,768	1,052,834	1,063,145
New York County	763,846	779,230	787,045	798,769	801,926	809,544	814,359	817,038	818,979	822,059
Queens County	787,335	801,873	807,520	815,991	823,983	831,113	838,483	844,966	849,560	854,178
Richmond County	165,516	167,757	168,415	169,403	174,390	175,937	176,932	177,144	177,650	177,949
New York City	3,135,092	3,202,911	3,234,254	3,281,268	3,311,826	3,358,042	3,399,438	3,434,491	3,459,949	3,485,390
Nassau County	448,528	451,292	452,398	560,512	635,670	681,384	707,296	718,418	719,022	705,108
Suffolk County	499,922	503,308	504,662	581,738	633,479	670,972	689,739	697,892	698,361	686,198
Long Island	948,450	954,600	957,060	1,142,250	1,269,149	1,352,357	1,397,035	1,416,310	1,417,382	1,391,305
Dutchess County	107,965	110,457	111,454	122,098	133,915	142,773	148,937	152,425	154,310	150,820
Orange County	125,925	128,045	128,894	151,024	169,385	184,523	195,970	205,180	211,576	212,359
Putnam County	35,041	35,581	35,798	41,692	45,511	48,129	49,340	49,684	49,493	48,374
Rockland County	99,242	102,554	103,879	121,321	134,806	144,334	150,700	154,396	155,854	153,429
Sullivan County	30,139	28,901	28,405	31,749	33,096	33,627	33,421	32,634	31,480	30,332
Ulster County	71,049	72,978	73,750	79,122	84,482	87,953	89,785	89,912	89,383	87,541
Westchester County	347,232	357,067	361,001	430,654	471,376	499,174	513,743	518,116	516,087	508,682
Mid Hudson	816,593	835,585	843,181	977,660	1,072,571	1,140,513	1,181,896	1,202,346	1,208,182	1,191,536
Bergen County	335,730	339,121	340,477	393,005	439,509	469,813	489,726	497,696	500,719	486,453
Essex County	283,712	291,401	294,476	334,340	370,269	395,894	413,005	425,633	432,236	428,421
Hudson County	246,437	262,032	268,269	322,433	363,750	394,554	416,846	431,292	442,048	435,179
Hunterdon County	47,169	47,550	47,702	50,141	51,272	52,361	52,652	53,133	53,046	51,694
Mercer County	133,155	132,694	132,510	132,159	140,647	148,499	155,780	161,738	167,024	167,976
Middlesex County	281,186	286,104	288,071	320,106	339,643	357,643	373,173	384,727	390,957	388,254
Monmouth County	233,983	235,322	235,857	265,374	280,503	291,748	298,667	302,026	303,402	298,816
Morris County	180,534	184,201	185,668	204,847	214,214	220,541	220,771	218,268	216,065	213,231
Ocean County	221,111	223,906	225,024	245,312	268,912	290,353	318,706	337,967	355,034	359,948
Passaic County	166,785	169,530	170,628	193,137	210,694	224,950	233,816	243,490	251,527	251,659
Somerset County	117,759	116,516	116,019	128,025	135,038	140,172	144,209	146,927	149,087	148,329
Sussex County	54,752	53,682	53,254	60,826	61,566	62,113	61,807	61,664	61,219	60,323
Union County	188,118	192,026	193,589	214,944	234,889	250,916	263,661	272,557	278,308	276,250
Warren County	41,480	39,125	38,183	43,412	43,892	44,543	44,563	44,409	43,769	43,668
New Jersey	2,531,911	2,573,208	2,589,727	2,908,062	3,154,797	3,344,101	3,487,379	3,581,525	3,644,440	3,610,200
Fairfield County	335,545	347,063	351,670	389,847	420,251	443,278	459,736	470,384	477,038	472,358
Litchfield County	76,640	78,232	78,868	84,967	89,900	93,156	95,477	96,183	96,275	95,032
New Haven County	334,502	339,174	341,043	377,655	409,375	435,233	455,269	468,787	478,237	475,377
Connecticut	746,687	764,469	771,582	852,470	919,526	971,667	1,010,482	1,035,355	1,051,550	1,042,767

Figure 39. County Model 2050 Forecast Update Outputs: Average Household Size

AREA NAME	Household Size Update									
	2010	2015	2017	2020	2025	2030	2035	2040	2045	2050
31-County Region	2.66	2.65	2.65	2.61	2.58	2.56	2.55	2.55	2.55	2.55
Bronx County	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77
Kings County	2.69	2.69	2.68	2.69	2.69	2.69	2.69	2.69	2.69	2.69
New York County	1.99	1.99	1.98	1.99	1.99	1.99	1.99	1.99	1.99	1.99
Queens County	2.82	2.82	2.82	2.82	2.82	2.82	2.82	2.82	2.82	2.82
Richmond County	2.78	2.78	2.79	2.78	2.78	2.78	2.78	2.78	2.78	2.78
New York City	2.57	2.57	2.57	2.57	2.57	2.57	2.57	2.57	2.57	2.58
Nassau County	2.94	2.96	2.96	2.89	2.81	2.79	2.79	2.80	2.80	2.79
Suffolk County	2.93	2.92	2.92	2.82	2.75	2.71	2.69	2.68	2.67	2.66
Long Island	2.93	2.94	2.94	2.86	2.78	2.75	2.74	2.74	2.73	2.72
Dutchess County	2.57	2.52	2.50	2.44	2.39	2.36	2.35	2.35	2.34	2.34
Orange County	2.86	2.84	2.83	2.71	2.65	2.62	2.62	2.62	2.62	2.62
Putnam County	2.77	2.72	2.71	2.61	2.54	2.52	2.53	2.55	2.56	2.56
Rockland County	3.07	3.05	3.05	2.95	2.89	2.88	2.87	2.88	2.89	2.89
Sullivan County	2.45	2.43	2.42	2.35	2.30	2.27	2.23	2.22	2.21	2.21
Ulster County	2.40	2.35	2.32	2.29	2.24	2.20	2.18	2.17	2.16	2.15
Westchester County	2.65	2.63	2.63	2.55	2.50	2.48	2.49	2.51	2.52	2.52
Mid Hudson	2.70	2.67	2.66	2.58	2.53	2.51	2.51	2.52	2.53	2.53
Bergen County	2.66	2.70	2.71	2.63	2.57	2.53	2.52	2.53	2.55	2.55
Essex County	2.68	2.64	2.63	2.57	2.51	2.47	2.46	2.45	2.45	2.46
Hudson County	2.54	2.50	2.49	2.42	2.38	2.36	2.34	2.33	2.32	2.32
Hunterdon County	2.62	2.55	2.52	2.50	2.43	2.40	2.41	2.41	2.43	2.43
Mercer County	2.61	2.65	2.67	2.63	2.60	2.57	2.56	2.56	2.56	2.57
Middlesex County	2.80	2.80	2.81	2.75	2.71	2.68	2.66	2.65	2.65	2.66
Monmouth County	2.66	2.64	2.64	2.55	2.48	2.45	2.44	2.44	2.44	2.43
Morris County	2.68	2.65	2.65	2.58	2.53	2.50	2.49	2.51	2.51	2.50
Ocean County	2.58	2.57	2.57	2.55	2.53	2.51	2.48	2.47	2.46	2.46
Passaic County	2.94	2.93	2.92	2.82	2.78	2.75	2.74	2.74	2.73	2.73
Somerset County	2.71	2.76	2.77	2.70	2.63	2.58	2.57	2.57	2.57	2.58
Sussex County	2.69	2.64	2.62	2.53	2.48	2.46	2.46	2.46	2.45	2.44
Union County	2.82	2.85	2.86	2.79	2.75	2.72	2.71	2.71	2.72	2.73
Warren County	2.57	2.55	2.54	2.46	2.41	2.38	2.36	2.36	2.35	2.34
New Jersey	2.69	2.68	2.68	2.62	2.57	2.54	2.52	2.52	2.52	2.52
Fairfield County	2.68	2.66	2.65	2.58	2.53	2.50	2.50	2.51	2.52	2.51
Litchfield County	2.44	2.34	2.30	2.26	2.20	2.17	2.16	2.16	2.15	2.14
New Haven County	2.49	2.46	2.44	2.39	2.34	2.30	2.29	2.29	2.28	2.27
Connecticut	2.57	2.54	2.52	2.46	2.41	2.38	2.37	2.38	2.38	2.37

6.5 Household Model Recommendations

As stated in the Technical Memorandum 1, *Existing Trends Analysis* (NYMTC 2019. p. 4), it may be useful to incorporate a family/non-family household component into the sub-regional household models to reflect the changing nature of housing and household choices, especially by millennials and seniors.

6.0 TAZ Allocation Model

6.1 Updating of Variables

As described in the NYMTC Zonal Allocation Methodology Technical Memorandum (2016), the SED forecasts were used as county controls to establish many of the 16 variables (Figure 40) required for input into the NYBPM. Among those variables, group quarters subcategory variables were held constant in the Update allocation model from 2010 levels derived from the 2010 Decennial Census. Enrollment variables were updated based on future population projections by age and 2017 ratios of enrollment to various age cohorts following the original TAZ allocation methodology (NYMTC, 2016. *Zonal Allocation Methodology TM, pp. 16-19, 58-62*). Earnings per worker and average household income variables were held constant at 2017 levels based on TAZ level trends derived from the ACS 2013-2017 5-year sample. All other variables were updated to county controls from the SED Forecast Update as shown in Figure 40.

6.2 Issues and Trends

Proximity to Highway Corridors

In the original TAZ allocation of the 2050 Forecast, the project team measured each TAZ's proximity to major highway corridors for used in quantifying zonal attraction. The project team's analysis used ESRI's latest U.S. Highways GIS layer sourced from TomTom, one of two leading commercial network street providers in North America. Major roadways, including limited access and major highways (class 1 and 2 roadways), were measured to determine the linear miles crossed in each TAZ within the 23-County Region that encompasses the non-New York City counties of the BPM Region.

The highway proximity allocation factor was established by averaging two unique allocation factors. One factor measured highway proximity controlled for land area in effort to avoid creating a bias towards large rural TAZs with limited access to highways. This factor was calculated based on the ratio of linear highway miles to total land area square miles within each TAZ.

The second allocation factor was described in the NYMTC TAZ Allocation Technical Memorandum as being calculated based on the "number of major highway crossings observed." It was noted that this ratio created a potential bias towards large TAZs that had a greater likelihood of containing multiple major highways due to their size (2016. *pp. 48-50*).

Both of the two allocation factors were replicated for the Update however upon close examination, the factor based on the number of highway crossings observed produced problematic results that over-counted the presence of the same highways in some TAZs. This factor was recreated using ESRI ArcMap's intersect geoprocessing tool using the TAZ geographic information system (GIS) shapefile as input feature 1 and the USA Minor Highways GIS layer as input feature 2. The intersect process was completed using line intersections as an output type, thus generating unique roadway lines for highways that crossed into each TAZ. During the review of these 2050 allocation

Figure 40. Table of Data Inputs to Zonal Allocation Model

Variable Name	Publisher	2050 Model		2050 Update Model	
		Dataset	Years	Dataset	Years
Total Population	US Census Bureau	ACS 5-yr samples	2008-2012 & 2006-2010 5-YR Estimate	No Change	2011-2015 & 2013-2017 5-Yr Sample Data
Population in Households	US Census Bureau	ACS 5-yr samples	2008-2012 & 2006-2010 5-YR Estimate	No Change	2011-2015 & 2013-2017 5-Yr Sample Data
Group Quarters Population	US Census Bureau	ACS 5-yr samples	2008-2012 & 2006-2010 5-YR Estimate	No Change	2011-2015 & 2013-2017 5-Yr Sample Data
Institutional GQ Population	US Census Bureau	ACS 5-yr samples	2008-2012 & 2006-2010 5-YR Estimate	Data no longer available at Tract level	Same proportional distribution as in 2010
Homeless GQ Population	US Census Bureau	ACS 5-yr samples	2008-2012 & 2006-2010 5-YR Estimate	Data no longer available at Tract level	Same proportional distribution as in 2010
Other GQ Population	US Census Bureau	ACS 5-yr samples	2008-2012 & 2006-2010 5-YR Estimate	Data no longer available at Tract level	Same proportional distribution as in 2010
Aggregate Household Income	US Census Bureau	ACS 5-yr samples	2008-2012 & 2006-2010 5-YR Estimate	No Change	2011-2015 & 2013-2017 5-Yr Sample Data
Total Households	US Census Bureau	ACS 5-yr samples	2008-2012 5-Yr Estimate, 1990,2000, 2010	No Change	2011-2015 & 2013-2017 5-Yr Sample Data
K-12 Enrollment by Grade	NYSED, NYC DCP, NJDOE, CTDOE	Annual Enrollment	2012	No Change	2011-2017
Graduate and Undergraduate Enrollment	.	Annual Enrollment	2012	No Change	2017
Employment by Place of Work and Industry	US Census Bureau	CTPP JTW File	2006-10 5-Yr Estimate	LEHD	2015
Earnings per Worker	US Census Bureau	CTPP JTW File	2006-10 5-Yr Estimate	ACS 2013-2017 5-Yr sample	2017
Median Housing Value	US Census Bureau	ACS 5-yr samples	2006-10 5-Yr Estimate	No Change	2013-2017 5-Yr Sample Data
Developments in the Pipeline	NYS Counties	Outreach	2012	No Change	Outreach performed spring 2019
Accessibility Skims	NYMTC BPM	2010 BPM	2014	No Change	In progress
Proximity to Highway Corridors/Highway Segments	ESRI	2014 Major Road file	2014	2019 Major Road file	improvements made to projections

factors it was determined that the highway count factor counted the number of unique line segments within each TAZ produced from the intersect geoprocessing output. In many TAZs more than one line segment was produced for the same stretch of highway within a TAZ. In other words, this method often over-counted the number of unique highways in each TAZ and thus produced an inflated representation of highway accessibility in some TAZs. In the Update, the highway count factor was revised to count only unique highways in each TAZ distinguished by highway name.

During the review and replication of the original 2050 allocation factors, the project team observed that the GIS shapefile previously used for the two allocation factors lacked accuracy at depicting highways at the neighborhood level. Generally highway locations in this file were off-location by more than 600 feet and were often located in the wrong TAZ. The project team reached out to the ESRI, the publisher of the GIS data whom confirmed the unreliability of the roadway file at the neighborhood level. The allocation factors were revised using the North America Detailed Streets GIS layer released by ESRI which was confirmed to accurately depict all major roadways at the neighborhood level.

6.3 TAZ Model Recommendations

Along with the incorporation of the new and refined data, several potential additions to the TAZ variables were recommended in the TM 1, *Existing Trends Analysis* (NYMTC 2019. p. 4). To summarize, these include:

- assumptions for loss of available land due to sea level rise;
- changing the housing price variable to either housing price/housing costs instead of the currently used Census value
- expanding capacity improvements to include infrastructure beyond sewer;
- adding a “low-growth” weight that would reflect further restrictions on development;
- including a “flag” on TAZ that show abrupt and significant changes in land use.

Appendix County Forecast Comparison Tables

This section presents and compares the forecasts of the Original 2050 Forecast and the Update 2017 Baseline Models.

Figure 41. County Employment: Comparison of 2050 Forecast and 2050 Forecast Update

AREA NAME	2050 Forecast Employment (in 000s)								
	2010	2015	2020	2025	2030	2035	2040	2045	2050
31-County Region	11,026,007	11,760,411	12,125,636	12,303,648	12,472,992	12,699,669	12,934,892	13,159,104	13,393,301
Bronx County	380,917	414,653	425,439	432,437	438,554	444,803	452,145	458,582	465,591
Kings County	823,738	924,613	945,808	959,058	969,844	983,634	998,422	1,012,438	1,027,032
New York County	2,489,495	2,646,563	2,711,763	2,742,447	2,770,045	2,801,644	2,833,150	2,866,594	2,900,950
Queens County	709,096	771,877	784,688	788,816	792,521	797,664	804,849	807,736	811,754
Richmond County	126,397	147,064	149,309	151,740	153,264	154,778	156,416	157,888	159,430
New York City	4,529,643	4,904,770	5,017,008	5,074,498	5,124,229	5,182,523	5,244,981	5,303,237	5,364,758
Nassau County	591,002	627,635	643,851	650,000	657,136	668,093	679,278	690,946	703,103
Suffolk County	636,879	677,247	699,981	715,486	729,440	745,182	761,126	777,416	794,085
Long Island	1,227,881	1,304,882	1,343,833	1,365,486	1,386,575	1,413,274	1,440,404	1,468,363	1,497,188
Dutchess County	121,400	125,815	130,131	133,705	136,884	140,488	144,389	148,467	152,822
Orange County	150,982	154,617	160,532	165,874	170,935	176,373	182,260	188,309	194,693
Putnam County	28,455	30,250	30,687	30,896	30,937	30,992	31,072	31,195	31,323
Rockland County	116,614	125,638	131,160	135,264	139,244	143,356	147,337	151,481	155,730
Sullivan County	29,592	28,118	30,994	33,234	37,073	40,917	44,680	48,469	52,330
Ulster County	70,755	71,997	73,195	73,923	74,885	76,209	77,491	78,896	80,347
Westchester County	445,188	475,839	488,751	496,200	501,944	509,758	517,434	525,505	533,878
Mid Hudson	962,986	1,012,275	1,045,449	1,069,096	1,091,902	1,118,093	1,144,663	1,172,322	1,201,123
Bergen County	455,492	491,876	508,320	520,884	527,598	538,337	548,538	557,213	566,297
Essex County	402,495	402,755	420,649	424,536	429,609	440,532	452,602	464,138	476,343
Hudson County	289,912	314,045	335,410	343,628	351,143	361,323	371,447	380,625	390,123
Hunterdon County	60,652	62,327	63,802	64,042	64,361	65,934	67,563	69,163	70,904
Mercer County	248,058	262,141	274,913	281,499	288,456	297,789	307,005	315,589	324,450
Middlesex County	400,069	423,580	439,985	445,974	453,005	465,235	476,961	486,126	495,024
Monmouth County	288,407	293,738	302,227	303,308	304,399	310,852	318,260	325,934	334,246
Morris County	307,283	330,150	341,665	344,522	346,764	351,283	354,940	357,850	360,712
Ocean County	181,413	191,085	201,457	207,364	212,336	219,483	227,087	234,678	242,401
Passaic County	191,749	206,200	213,869	218,332	222,102	227,060	231,939	236,685	241,692
Somerset County	188,892	208,123	216,287	219,889	223,258	228,593	233,601	237,202	240,415
Sussex County	48,291	50,180	51,578	52,213	52,628	53,333	54,105	54,901	55,778
Union County	250,670	265,942	276,376	278,899	282,636	289,389	296,035	302,237	308,835
Warren County	39,432	39,796	41,080	41,612	42,182	42,738	43,386	43,790	44,202
New Jersey	3,352,815	3,541,938	3,687,618	3,746,703	3,800,475	3,891,880	3,983,470	4,066,131	4,151,423
Fairfield County	480,866	513,638	531,540	540,999	553,151	566,353	581,351	596,775	613,250
Litchfield County	68,435	71,520	73,954	74,544	75,605	76,838	78,206	79,498	80,889
New Haven County	403,380	411,387	426,235	432,321	441,057	450,707	461,816	472,778	484,672
Connecticut	952,682	996,545	1,031,729	1,047,865	1,069,812	1,093,898	1,121,373	1,149,051	1,178,811

Technical Memorandum 2: Models Update to 2017 Baseline

AREA NAME	Update Employment								
	2010	2015	2020	2025	2030	2035	2040	2045	2050
31- County Region	11,020,530	11,561,224	12,339,573	12,460,437	12,587,493	12,676,078	12,762,813	12,854,530	12,953,963
Bronx County	380,497	401,055	422,548	428,566	434,834	440,443	445,795	451,013	455,955
Kings County	822,989	902,713	953,658	960,579	969,187	977,070	982,583	987,209	991,503
New York County	2,488,607	2,654,265	2,903,684	2,920,091	2,941,720	2,946,888	2,953,125	2,959,916	2,968,241
Queens County	708,868	753,622	796,887	795,800	793,548	792,410	789,909	786,797	784,031
Richmond County	126,268	138,472	142,592	144,449	145,865	146,814	148,202	149,654	151,042
New York City	4,527,230	4,850,126	5,219,368	5,249,484	5,285,154	5,303,626	5,319,614	5,334,589	5,350,772
Nassau County	590,583	613,419	650,850	662,307	672,189	679,885	686,444	692,837	699,363
Suffolk County	636,565	671,508	708,759	713,715	720,639	723,687	727,430	731,848	736,724
Long Island	1,227,148	1,284,927	1,359,608	1,376,022	1,392,829	1,403,571	1,413,874	1,424,685	1,436,086
Dutchess County	121,287	125,663	131,590	134,485	137,219	139,260	141,303	143,436	145,615
Orange County	150,881	154,794	165,141	168,685	172,100	174,573	177,465	180,352	183,480
Putnam County	28,439	29,425	30,826	31,214	31,510	31,591	31,702	31,861	32,023
Rockland County	116,538	122,345	134,965	138,450	142,203	144,946	147,332	149,793	152,449
Sullivan County	29,577	28,673	29,752	29,850	29,818	29,641	29,427	29,245	29,066
Ulster County	70,732	71,652	76,250	76,932	77,373	77,715	77,917	78,136	78,363
Westchester County	444,936	466,908	504,397	509,938	515,084	518,082	520,263	522,559	525,535
Mid Hudson	962,390	999,460	1,072,921	1,089,554	1,105,307	1,115,808	1,125,410	1,135,382	1,146,532
Bergen County	454,800	468,646	498,806	513,610	524,341	533,581	543,155	553,453	564,560
Essex County	410,788	398,558	435,356	446,497	455,412	462,441	469,708	477,242	485,282
Hudson County	289,015	302,863	344,175	356,404	368,537	379,456	389,143	398,777	408,877
Hunterdon County	56,262	60,787	61,829	61,028	60,717	60,663	60,995	61,405	61,851
Mercer County	247,294	251,046	260,112	260,820	262,620	264,199	265,757	268,095	270,992
Middlesex County	399,260	416,340	432,704	432,827	436,272	440,536	444,278	448,519	453,034
Monmouth County	287,779	290,824	305,304	303,430	302,567	302,120	302,734	303,643	304,839
Morris County	300,861	317,920	326,587	324,358	323,286	321,056	318,676	316,819	315,092
Ocean County	181,039	187,196	204,758	210,308	215,711	220,328	225,746	231,459	237,141
Passaic County	200,590	197,746	214,062	217,436	220,534	222,252	224,722	227,993	231,688
Somerset County	182,781	199,496	204,474	204,596	205,784	207,216	208,575	210,447	212,424
Sussex County	48,187	48,045	50,627	49,685	49,014	48,180	47,753	47,566	47,460
Union County	250,208	253,923	273,344	278,702	283,822	288,074	291,705	295,535	299,552
Warren County	40,045	39,397	38,772	38,131	37,737	37,457	37,103	36,682	36,176
New Jersey	3,348,908	3,432,786	3,650,909	3,697,830	3,746,353	3,787,559	3,830,050	3,877,633	3,928,966
Fairfield County	481,896	503,675	526,914	533,055	538,566	542,639	546,698	550,730	555,295
Litchfield County	68,609	73,635	75,770	76,104	76,310	76,421	76,548	76,710	76,910
New Haven County	404,350	416,614	434,081	438,388	442,974	446,453	450,619	454,800	459,402
Connecticut	954,854	993,924	1,036,766	1,047,547	1,057,851	1,065,513	1,073,865	1,082,240	1,091,607

Employment Differential 2050 Forecast and Update (000s)									
AREA NAME	2010	2015	2020	2025	2030	2035	2040	2045	2050
31-County Region	(5,477)	(199,188)	213,936	156,789	114,501	(23,591)	(172,079)	(304,574)	(439,338)
Bronx County	-419.7	-13,598.0	-2,891.4	-3,871.9	-3,720.3	-4,359.9	-6,349.5	-7,568.6	-9,635.9
Kings County	-748.8	-21,899.9	7,850.3	1,521.3	-657.5	-6,563.6	-15,838.2	-25,228.8	-35,529.4
New York County	-887.9	7,701.3	191,920.7	177,644.3	171,674.8	145,243.7	119,974.9	93,322.3	67,290.2
Queens County	-228.2	-18,255.1	12,198.8	6,984.3	1,027.0	-5,253.4	-14,940.8	-20,939.1	-27,723.4
Richmond County	-128.9	-8,592.6	-6,717.4	-7,291.8	-7,398.7	-7,963.4	-8,213.9	-8,234.2	-8,387.4
New York City	-2,413.6	-54,644.3	202,360.9	174,986.1	160,925.2	121,103.3	74,632.5	31,351.6	-13,985.9
Nassau County	-419.0	-14,216.3	6,998.3	12,307.1	15,053.7	11,792.2	7,166.3	1,890.7	-3,740.2
Suffolk County	-314.4	-5,739.3	8,777.3	-1,771.2	-8,800.3	-21,495.1	-33,696.3	-45,568.2	-57,361.0
Long Island	-733.4	-19,955.6	15,775.5	10,535.9	6,253.3	-9,702.9	-26,530.0	-43,677.4	-61,101.2
Dutchess County	-112.9	-152.7	1,459.7	779.1	334.3	-1,228.5	-3,086.0	-5,030.8	-7,206.3
Orange County	-101.0	177.1	4,610.0	2,810.9	1,165.2	-1,799.5	-4,795.0	-7,957.0	-11,213.3
Putnam County	-16.4	-825.0	139.2	318.5	572.7	599.6	630.2	666.9	700.1
Rockland County	-75.8	-3,292.8	3,805.0	3,186.6	2,959.5	1,590.3	-4.6	-1,688.4	-3,280.8
Sullivan County	-14.5	555.2	-1,242.6	-3,384.0	-7,254.4	-11,276.2	-15,252.4	-19,223.9	-23,263.9
Ulster County	-23.2	-345.0	3,054.6	3,009.5	2,488.2	1,505.4	426.2	-759.9	-1,984.0
Westchester County	-252.0	-8,931.0	15,645.9	13,737.3	13,139.6	8,323.8	2,828.9	-2,946.4	-8,342.8
Mid Hudson	-595.8	-12,814.1	27,471.8	20,458.0	13,405.3	-2,285.1	-19,252.8	-36,939.5	-54,591.0
Bergen County	-691.6	-23,229.5	-9,513.9	-7,274.2	-3,257.2	-4,756.3	-5,383.8	-3,760.0	-1,737.6
Essex County	8,292.2	-4,197.2	14,707.8	21,960.4	25,803.1	21,908.9	17,106.3	13,104.0	8,938.8
Hudson County	-897.8	-11,181.7	8,765.2	12,775.8	17,394.1	18,133.9	17,695.6	18,151.6	18,754.6
Hunterdon County	-4,390.2	-1,540.2	-1,973.8	-3,014.4	-3,643.8	-5,271.1	-6,568.8	-7,758.2	-9,053.7
Mercer County	-763.8	-11,095.3	-14,800.9	-20,679.6	-25,835.3	-33,590.1	-41,248.0	-47,493.9	-53,458.0
Middlesex County	-808.4	-7,239.6	-7,281.2	-13,146.7	-16,732.6	-24,698.5	-32,682.6	-37,607.4	-41,990.8
Monmouth County	-627.5	-2,914.4	3,077.3	121.7	-1,831.5	-8,732.6	-15,526.3	-22,291.0	-29,406.6
Morris County	-6,421.7	-12,230.4	-15,078.4	-20,163.7	-23,478.0	-30,226.6	-36,264.2	-41,031.5	-45,620.0
Ocean County	-374.2	-3,889.0	3,301.0	2,944.0	3,375.6	845.5	-1,341.2	-3,219.5	-5,260.3
Passaic County	8,841.1	-8,453.9	193.1	-896.2	-1,568.0	-4,808.7	-7,216.7	-8,691.4	-10,004.1
Somerset County	-6,111.3	-8,626.9	-11,813.3	-15,293.6	-17,474.0	-21,377.1	-25,026.1	-26,755.2	-27,991.1
Sussex County	-103.5	-2,135.5	-951.3	-2,527.5	-3,614.0	-5,153.2	-6,351.7	-7,335.5	-8,318.3
Union County	-462.5	-12,019.7	-3,032.1	-197.2	1,185.3	-1,314.9	-4,330.3	-6,701.9	-9,283.1
Warren County	612.5	-399.1	-2,308.6	-3,481.6	-4,445.2	-5,280.6	-6,282.3	-7,108.1	-8,026.2
New Jersey	-3,906.8	-109,152.4	-36,709.0	-48,872.9	-54,121.4	-104,321.3	-153,420.2	-188,498.0	-222,456.4
Fairfield County	1,029.5	-9,963.2	-4,625.4	-7,944.6	-14,584.3	-23,713.6	-34,653.2	-46,044.8	-57,954.9
Litchfield County	174.0	2,115.2	1,816.2	1,559.4	705.4	-417.0	-1,658.1	-2,787.9	-3,979.0
New Haven County	969.1	5,226.8	7,846.2	6,066.9	1,917.1	-4,254.6	-11,197.5	-17,978.3	-25,269.8
Connecticut	2,172.6	-2,621.2	5,037.0	-318.3	-11,961.9	-28,385.2	-47,508.8	-66,811.0	-87,203.7

Employment Percent Differential 2050 Forecast and Update									
AREA NAME	2010	2015	2020	2025	2030	2035	2040	2045	2050
31-County Region	0.0%	-1.7%	1.8%	1.3%	0.9%	-0.2%	-1.3%	-2.3%	-3.3%
Bronx County	-0.1%	-3.3%	-0.7%	-0.9%	-0.8%	-1.0%	-1.4%	-1.7%	-2.1%
Kings County	-0.1%	-2.4%	0.8%	0.2%	-0.1%	-0.7%	-1.6%	-2.5%	-3.5%
New York County	0.0%	0.3%	7.1%	6.5%	6.2%	5.2%	4.2%	3.3%	2.3%
Queens County	0.0%	-2.4%	1.6%	0.9%	0.1%	-0.7%	-1.9%	-2.6%	-3.4%
Richmond County	-0.1%	-5.8%	-4.5%	-4.8%	-4.8%	-5.1%	-5.3%	-5.2%	-5.3%
New York City	-0.1%	-1.1%	4.0%	3.4%	3.1%	2.3%	1.4%	0.6%	-0.3%
Nassau County	-0.1%	-2.3%	1.1%	1.9%	2.3%	1.8%	1.1%	0.3%	-0.5%
Suffolk County	0.0%	-0.8%	1.3%	-0.2%	-1.2%	-2.9%	-4.4%	-5.9%	-7.2%
Long Island	-0.1%	-1.5%	1.2%	0.8%	0.5%	-0.7%	-1.8%	-3.0%	-4.1%
Dutchess County	-0.1%	-0.1%	1.1%	0.6%	0.2%	-0.9%	-2.1%	-3.4%	-4.7%
Orange County	-0.1%	0.1%	2.9%	1.7%	0.7%	-1.0%	-2.6%	-4.2%	-5.8%
Putnam County	-0.1%	-2.7%	0.5%	1.0%	1.9%	1.9%	2.0%	2.1%	2.2%
Rockland County	-0.1%	-2.6%	2.9%	2.4%	2.1%	1.1%	0.0%	-1.1%	-2.1%
Sullivan County	0.0%	2.0%	-4.0%	-10.2%	-19.6%	-27.6%	-34.1%	-39.7%	-44.5%
Ulster County	0.0%	-0.5%	4.2%	4.1%	3.3%	2.0%	0.5%	-1.0%	-2.5%
Westchester County	-0.1%	-1.9%	3.2%	2.8%	2.6%	1.6%	0.5%	-0.6%	-1.6%
Mid Hudson	-0.1%	-1.3%	2.6%	1.9%	1.2%	-0.2%	-1.7%	-3.2%	-4.5%
Bergen County	-0.2%	-4.7%	-1.9%	-1.4%	-0.6%	-0.9%	-1.0%	-0.7%	-0.3%
Essex County	2.1%	-1.0%	3.5%	5.2%	6.0%	5.0%	3.8%	2.8%	1.9%
Hudson County	-0.3%	-3.6%	2.6%	3.7%	5.0%	5.0%	4.8%	4.8%	4.8%
Hunterdon County	-7.2%	-2.5%	-3.1%	-4.7%	-5.7%	-8.0%	-9.7%	-11.2%	-12.8%
Mercer County	-0.3%	-4.2%	-5.4%	-7.3%	-9.0%	-11.3%	-13.4%	-15.0%	-16.5%
Middlesex County	-0.2%	-1.7%	-1.7%	-2.9%	-3.7%	-5.3%	-6.9%	-7.7%	-8.5%
Monmouth County	-0.2%	-1.0%	1.0%	0.0%	-0.6%	-2.8%	-4.9%	-6.8%	-8.8%
Morris County	-2.1%	-3.7%	-4.4%	-5.9%	-6.8%	-8.6%	-10.2%	-11.5%	-12.6%
Ocean County	-0.2%	-2.0%	1.6%	1.4%	1.6%	0.4%	-0.6%	-1.4%	-2.2%
Passaic County	4.6%	-4.1%	0.1%	-0.4%	-0.7%	-2.1%	-3.1%	-3.7%	-4.1%
Somerset County	-3.2%	-4.1%	-5.5%	-7.0%	-7.8%	-9.4%	-10.7%	-11.3%	-11.6%
Sussex County	-0.2%	-4.3%	-1.8%	-4.8%	-6.9%	-9.7%	-11.7%	-13.4%	-14.9%
Union County	-0.2%	-4.5%	-1.1%	-0.1%	0.4%	-0.5%	-1.5%	-2.2%	-3.0%
Warren County	1.6%	-1.0%	-5.6%	-8.4%	-10.5%	-12.4%	-14.5%	-16.2%	-18.2%
New Jersey	-0.1%	-3.1%	-1.0%	-1.3%	-1.4%	-2.7%	-3.9%	-4.6%	-5.4%
Fairfield County	0.2%	-1.9%	-0.9%	-1.5%	-2.6%	-4.2%	-6.0%	-7.7%	-9.5%
Litchfield County	0.3%	3.0%	2.5%	2.1%	0.9%	-0.5%	-2.1%	-3.5%	-4.9%
New Haven County	0.2%	1.3%	1.8%	1.4%	0.4%	-0.9%	-2.4%	-3.8%	-5.2%
Connecticut	0.2%	-0.3%	0.5%	0.0%	-1.1%	-2.6%	-4.2%	-5.8%	-7.4%

Figure 42. County Payroll Employment: Comparison of 2050 Forecast and 2050 Forecast Update

2050 Forecast Payroll Employment									
AREA NAME	2010	2015	2020	2025	2030	2035	2040	2045	2050
31-County Region	9,989,951	10,680,652	11,007,499	11,166,788	11,321,131	11,528,511	11,743,917	11,949,949	12,165,992
Bronx County	350,533	380,753	390,847	397,373	403,383	409,460	416,736	423,051	429,987
Kings County	730,603	822,616	842,060	854,339	864,987	878,281	892,741	906,263	920,489
New York County	2,286,188	2,433,487	2,492,001	2,518,977	2,543,398	2,571,440	2,599,454	2,629,423	2,660,313
Queens County	628,064	694,554	707,181	711,630	716,563	722,411	730,496	734,170	739,126
Richmond County	115,126	134,168	136,359	138,734	140,347	141,957	143,702	145,267	146,921
New York City	4,110,515	4,465,579	4,568,449	4,621,052	4,668,677	4,723,550	4,783,129	4,838,174	4,896,836
Nassau County	529,122	559,508	573,973	579,556	585,947	595,820	605,928	616,507	627,526
Suffolk County	567,635	603,927	623,978	637,797	650,142	664,149	678,380	692,921	707,833
Long Island	1,096,757	1,163,435	1,197,951	1,217,354	1,236,089	1,259,969	1,284,307	1,309,428	1,335,359
Dutchess County	108,554	113,565	117,483	120,716	123,567	126,866	130,443	134,188	138,192
Orange County	139,218	140,606	145,963	150,807	155,381	160,350	165,761	171,299	177,158
Putnam County	24,413	26,183	26,602	26,839	26,929	27,036	27,154	27,314	27,479
Rockland County	101,744	111,309	116,163	119,792	123,314	126,974	130,510	134,205	137,990
Sullivan County	26,023	25,142	27,706	29,691	33,078	36,468	39,783	43,125	46,535
Ulster County	60,075	62,332	63,431	64,116	64,977	66,170	67,322	68,606	69,930
Westchester County	390,315	420,637	431,850	438,362	443,404	450,326	457,130	464,346	471,848
Mid Hudson	850,342	899,773	929,198	950,323	970,650	994,190	1,018,103	1,043,083	1,069,132
Bergen County	412,477	444,410	458,708	469,825	475,874	485,755	495,158	503,449	512,140
Essex County	372,692	372,712	388,706	392,071	396,620	406,606	417,641	428,333	439,654
Hudson County	268,943	292,804	312,545	320,252	327,429	337,248	347,051	356,051	365,357
Hunterdon County	54,466	55,827	57,052	57,304	57,649	59,127	60,638	62,147	63,790
Mercer County	232,877	247,051	258,864	265,037	271,623	280,429	289,099	297,255	305,687
Middlesex County	375,817	397,998	413,015	418,521	425,216	436,775	447,748	456,487	465,021
Monmouth County	261,528	265,560	272,874	273,814	274,944	280,998	287,830	295,002	302,772
Morris County	282,198	303,983	314,233	316,741	318,787	322,848	326,097	328,696	331,298
Ocean County	161,616	169,467	178,359	183,536	188,091	194,604	201,414	208,314	215,371
Passaic County	175,120	189,774	196,664	200,796	204,326	209,106	213,823	218,540	223,498
Somerset County	173,959	192,717	200,047	203,308	206,495	211,498	216,146	219,555	222,636
Sussex County	41,378	43,621	44,750	45,340	45,780	46,502	47,252	48,055	48,929
Union County	231,382	245,932	255,326	257,616	261,032	267,183	273,198	278,871	284,921
Warren County	35,411	36,043	37,163	37,630	38,154	38,678	39,270	39,659	40,061
New Jersey	3,079,863	3,257,900	3,388,307	3,441,792	3,492,021	3,577,355	3,662,365	3,740,417	3,821,136
Fairfield County	424,329	455,439	470,199	477,538	487,011	497,677	509,801	522,354	535,823
Litchfield County	56,826	60,603	62,485	62,856	63,590	64,530	65,582	66,607	67,726
New Haven County	371,318	377,924	390,910	395,874	403,092	411,241	420,631	429,887	439,980
Connecticut	852,473	893,966	923,594	936,267	953,693	973,448	996,014	1,018,848	1,043,529

Technical Memorandum 2: Models Update to 2017 Baseline

		Update Employment							
AREA NAME	2010	2015	2020	2025	2030	2035	2040	2045	2050
31- County Region	9,984,474	10,499,370	11,219,677	11,326,132	11,442,352	11,524,192	11,604,953	11,689,731	11,783,201
Bronx County	350,114	369,453	389,345	394,984	400,910	406,195	411,297	416,274	421,052
Kings County	729,854	803,540	849,765	856,244	864,511	872,015	877,517	882,163	886,667
New York County	2,285,300	2,444,347	2,677,520	2,691,382	2,710,647	2,714,697	2,719,864	2,725,578	2,733,080
Queens County	627,836	676,755	716,767	716,634	715,667	715,464	714,031	711,862	710,038
Richmond County	114,997	125,739	129,774	131,566	133,014	134,036	135,452	136,897	138,289
New York City	4,108,101	4,419,833	4,763,171	4,790,810	4,824,750	4,842,408	4,858,160	4,872,774	4,889,126
Nassau County	528,703	548,223	581,919	591,906	600,515	607,338	613,166	618,831	624,730
Suffolk County	567,321	602,285	634,690	638,820	644,972	647,845	651,384	655,432	660,052
Long Island	1,096,024	1,150,508	1,216,610	1,230,726	1,245,487	1,255,183	1,264,550	1,274,264	1,284,782
Dutchess County	108,441	113,436	119,022	121,554	123,967	125,790	127,630	129,545	131,540
Orange County	139,117	141,421	151,588	154,811	157,964	160,266	162,981	165,666	168,625
Putnam County	24,397	25,749	26,889	27,244	27,528	27,626	27,745	27,905	28,069
Rockland County	101,669	109,122	120,593	123,681	127,014	129,477	131,624	133,835	136,254
Sullivan County	26,008	25,509	26,611	26,689	26,664	26,517	26,341	26,194	26,057
Ulster County	60,052	62,256	66,232	66,770	67,163	67,502	67,721	67,943	68,182
Westchester County	390,063	414,758	448,884	453,739	458,308	461,067	463,135	465,309	468,209
Mid Hudson	849,747	892,251	959,819	974,488	988,607	998,245	1,007,177	1,016,398	1,026,935
Bergen County	411,785	421,284	449,873	463,103	472,781	481,194	489,983	499,455	509,732
Essex County	380,985	368,662	402,907	413,013	421,162	427,616	434,343	441,296	448,740
Hudson County	268,046	282,020	321,174	332,608	344,012	354,328	363,545	372,717	382,355
Hunterdon County	50,075	53,115	54,147	53,416	53,157	53,127	53,448	53,849	54,294
Mercer County	232,113	237,319	245,181	245,792	247,507	249,033	250,542	252,781	255,555
Middlesex County	375,008	388,309	404,360	404,299	407,600	411,620	415,122	419,048	423,265
Monmouth County	260,900	262,372	275,904	274,091	273,320	272,972	273,570	274,456	275,652
Morris County	275,776	291,622	300,683	298,379	297,368	295,295	293,111	291,373	289,798
Ocean County	161,242	166,005	181,876	186,724	191,643	195,840	200,743	205,871	211,016
Passaic County	183,961	181,477	196,199	199,298	202,156	203,807	206,181	209,303	212,865
Somerset County	167,848	185,400	190,117	190,046	191,115	192,424	193,664	195,351	197,153
Sussex County	41,274	41,935	44,409	43,571	42,997	42,291	41,951	41,828	41,784
Union County	230,920	233,011	251,335	256,167	260,867	264,802	268,186	271,758	275,532
Warren County	36,023	35,247	35,016	34,417	34,069	33,822	33,511	33,134	32,683
New Jersey	3,075,956	3,147,777	3,353,179	3,394,923	3,439,754	3,478,173	3,517,902	3,562,219	3,610,425
Fairfield County	425,358	445,415	465,846	470,516	474,998	478,391	481,718	484,971	488,748
Litchfield County	57,000	62,296	64,234	64,369	64,489	64,526	64,581	64,662	64,816
New Haven County	372,288	381,290	396,819	400,300	404,266	407,265	410,865	414,444	418,370
Connecticut	854,646	889,001	926,898	935,185	943,753	950,183	957,164	964,077	971,933

Technical Memorandum 2: Models Update to 2017 Baseline

		Payroll Employment Differential 2050 Forecast and Update (000s)							
AREA NAME	2010	2015	2020	2025	2030	2035	2040	2045	2050
31-County Region	(5,477)	(181,282)	212,178	159,344	121,221	(4,319)	(138,964)	(260,218)	(382,791)
Bronx County	(419)	(11,300)	(1,502)	(2,389)	(2,473)	(3,265)	(5,439)	(6,777)	(8,935)
Kings County	(749)	(19,076)	7,705	1,905	(476)	(6,266)	(15,224)	(24,100)	(33,822)
New York County	(888)	10,860	185,519	172,405	167,249	143,257	120,410	96,155	72,767
Queens County	(228)	(17,799)	9,586	5,004	(896)	(6,947)	(16,465)	(22,308)	(29,088)
Richmond County	(129)	(8,429)	(6,585)	(7,168)	(7,333)	(7,921)	(8,250)	(8,370)	(8,632)
New York City	(2,414)	(45,746)	194,722	169,758	156,073	118,858	75,031	34,600	(7,710)
Nassau County	(419)	(11,285)	7,946	12,350	14,568	11,518	7,238	2,324	(2,796)
Suffolk County	(314)	(1,642)	10,712	1,023	(5,170)	(16,304)	(26,996)	(37,489)	(47,781)
Long Island	(733)	(12,927)	18,659	13,372	9,398	(4,786)	(19,757)	(35,164)	(50,577)
Dutchess County	(113)	(129)	1,539	838	400	(1,076)	(2,813)	(4,643)	(6,652)
Orange County	(101)	815	5,625	4,004	2,583	(84)	(2,780)	(5,633)	(8,533)
Putnam County	(16)	(434)	287	405	599	590	591	591	590
Rockland County	(75)	(2,187)	4,430	3,889	3,700	2,503	1,114	(370)	(1,736)
Sullivan County	(15)	367	(1,095)	(3,002)	(6,414)	(9,951)	(13,442)	(16,931)	(20,478)
Ulster County	(23)	(76)	2,801	2,654	2,186	1,332	399	(663)	(1,748)
Westchester County	(252)	(5,879)	17,034	15,377	14,904	10,741	6,005	963	(3,639)
Mid Hudson	(595)	(7,522)	30,621	24,165	17,957	4,055	(10,926)	(26,685)	(42,197)
Bergen County	(692)	(23,126)	(8,835)	(6,722)	(3,093)	(4,561)	(5,175)	(3,994)	(2,408)
Essex County	8,293	(4,050)	14,201	20,942	24,542	21,010	16,702	12,963	9,086
Hudson County	(897)	(10,784)	8,629	12,356	16,583	17,080	16,494	16,666	16,998
Hunterdon County	(4,391)	(2,712)	(2,905)	(3,888)	(4,492)	(6,000)	(7,190)	(8,298)	(9,496)
Mercer County	(764)	(9,732)	(13,683)	(19,245)	(24,116)	(31,396)	(38,557)	(44,474)	(50,132)
Middlesex County	(809)	(9,689)	(8,655)	(14,222)	(17,616)	(25,155)	(32,626)	(37,439)	(41,756)
Monmouth County	(628)	(3,188)	3,030	277	(1,624)	(8,026)	(14,260)	(20,546)	(27,120)
Morris County	(6,422)	(12,361)	(13,550)	(18,362)	(21,419)	(27,553)	(32,986)	(37,323)	(41,500)
Ocean County	(374)	(3,462)	3,517	3,188	3,552	1,236	(671)	(2,443)	(4,355)
Passaic County	8,841	(8,297)	(465)	(1,498)	(2,170)	(5,299)	(7,642)	(9,237)	(10,633)
Somerset County	(6,111)	(7,317)	(9,930)	(13,262)	(15,380)	(19,074)	(22,482)	(24,204)	(25,483)
Sussex County	(104)	(1,686)	(341)	(1,769)	(2,783)	(4,211)	(5,301)	(6,227)	(7,145)
Union County	(462)	(12,921)	(3,991)	(1,449)	(165)	(2,381)	(5,012)	(7,113)	(9,389)
Warren County	612	(796)	(2,147)	(3,213)	(4,085)	(4,856)	(5,759)	(6,525)	(7,378)
New Jersey	(3,907)	(110,123)	(35,128)	(46,869)	(52,267)	(99,182)	(144,463)	(178,198)	(210,711)
Fairfield County	1,029	(10,024)	(4,353)	(7,022)	(12,013)	(19,286)	(28,083)	(37,383)	(47,075)
Litchfield County	174	1,693	1,749	1,513	899	(4)	(1,001)	(1,945)	(2,910)
New Haven County	970	3,366	5,909	4,426	1,174	(3,976)	(9,766)	(15,443)	(21,610)
Connecticut	2,173	(4,965)	3,304	(1,082)	(9,940)	(23,265)	(38,850)	(54,771)	(71,596)

Payroll Employment Percent Differential 2050 Forecast and Update									
AREA NAME	2010	2015	2020	2025	2030	2035	2040	2045	2050
31-County Region	-0.1%	-1.7%	1.9%	1.4%	1.1%	0.0%	-1.2%	-2.2%	-3.1%
Bronx County	-0.1%	-3.0%	-0.4%	-0.6%	-0.6%	-0.8%	-1.3%	-1.6%	-2.1%
Kings County	-0.1%	-2.3%	0.9%	0.2%	-0.1%	-0.7%	-1.7%	-2.7%	-3.7%
New York County	0.0%	0.4%	7.4%	6.8%	6.6%	5.6%	4.6%	3.7%	2.7%
Queens County	0.0%	-2.6%	1.4%	0.7%	-0.1%	-1.0%	-2.3%	-3.0%	-3.9%
Richmond County	-0.1%	-6.3%	-4.8%	-5.2%	-5.2%	-5.6%	-5.7%	-5.8%	-5.9%
New York City	-0.1%	-1.0%	4.3%	3.7%	3.3%	2.5%	1.6%	0.7%	-0.2%
Nassau County	-0.1%	-2.0%	1.4%	2.1%	2.5%	1.9%	1.2%	0.4%	-0.4%
Suffolk County	-0.1%	-0.3%	1.7%	0.2%	-0.8%	-2.5%	-4.0%	-5.4%	-6.8%
Long Island	-0.1%	-1.1%	1.6%	1.1%	0.8%	-0.4%	-1.5%	-2.7%	-3.8%
Dutchess County	-0.1%	-0.1%	1.3%	0.7%	0.3%	-0.8%	-2.2%	-3.5%	-4.8%
Orange County	-0.1%	0.6%	3.9%	2.7%	1.7%	-0.1%	-1.7%	-3.3%	-4.8%
Putnam County	-0.1%	-1.7%	1.1%	1.5%	2.2%	2.2%	2.2%	2.2%	2.1%
Rockland County	-0.1%	-2.0%	3.8%	3.2%	3.0%	2.0%	0.9%	-0.3%	-1.3%
Sullivan County	-0.1%	1.5%	-4.0%	-10.1%	-19.4%	-27.3%	-33.8%	-39.3%	-44.0%
Ulster County	0.0%	-0.1%	4.4%	4.1%	3.4%	2.0%	0.6%	-1.0%	-2.5%
Westchester County	-0.1%	-1.4%	3.9%	3.5%	3.4%	2.4%	1.3%	0.2%	-0.8%
Mid Hudson	-0.1%	-0.8%	3.3%	2.5%	1.9%	0.4%	-1.1%	-2.6%	-3.9%
Bergen County	-0.2%	-5.2%	-1.9%	-1.4%	-0.7%	-0.9%	-1.0%	-0.8%	-0.5%
Essex County	2.2%	-1.1%	3.7%	5.3%	6.2%	5.2%	4.0%	3.0%	2.1%
Hudson County	-0.3%	-3.7%	2.8%	3.9%	5.1%	5.1%	4.8%	4.7%	4.7%
Hunterdon County	-8.1%	-4.9%	-5.1%	-6.8%	-7.8%	-10.1%	-11.9%	-13.4%	-14.9%
Mercer County	-0.3%	-3.9%	-5.3%	-7.3%	-8.9%	-11.2%	-13.3%	-15.0%	-16.4%
Middlesex County	-0.2%	-2.4%	-2.1%	-3.4%	-4.1%	-5.8%	-7.3%	-8.2%	-9.0%
Monmouth County	-0.2%	-1.2%	1.1%	0.1%	-0.6%	-2.9%	-5.0%	-7.0%	-9.0%
Morris County	-2.3%	-4.1%	-4.3%	-5.8%	-6.7%	-8.5%	-10.1%	-11.4%	-12.5%
Ocean County	-0.2%	-2.0%	2.0%	1.7%	1.9%	0.6%	-0.3%	-1.2%	-2.0%
Passaic County	5.0%	-4.4%	-0.2%	-0.7%	-1.1%	-2.5%	-3.6%	-4.2%	-4.8%
Somerset County	-3.5%	-3.8%	-5.0%	-6.5%	-7.4%	-9.0%	-10.4%	-11.0%	-11.4%
Sussex County	-0.3%	-3.9%	-0.8%	-3.9%	-6.1%	-9.1%	-11.2%	-13.0%	-14.6%
Union County	-0.2%	-5.3%	-1.6%	-0.6%	-0.1%	-0.9%	-1.8%	-2.6%	-3.3%
Warren County	1.7%	-2.2%	-5.8%	-8.5%	-10.7%	-12.6%	-14.7%	-16.5%	-18.4%
New Jersey	-0.1%	-3.4%	-1.0%	-1.4%	-1.5%	-2.8%	-3.9%	-4.8%	-5.5%
Fairfield County	0.2%	-2.2%	-0.9%	-1.5%	-2.5%	-3.9%	-5.5%	-7.2%	-8.8%
Litchfield County	0.3%	2.8%	2.8%	2.4%	1.4%	0.0%	-1.5%	-2.9%	-4.3%
New Haven County	0.3%	0.9%	1.5%	1.1%	0.3%	-1.0%	-2.3%	-3.6%	-4.9%
Connecticut	0.3%	-0.6%	0.4%	-0.1%	-1.0%	-2.4%	-3.9%	-5.4%	-6.9%

Figure 43. County Self Employment: Comparison of 2050 Forecast and 2050 Forecast Update

AREA NAME	2050 Forecast Self Employment								
	2010	2015	2020	2025	2030	2035	2040	2045	2050
31-County Region	1,036,056	1,079,759	1,118,138	1,136,860	1,151,862	1,171,158	1,190,975	1,209,155	1,227,309
Bronx County	30,383	33,900	34,592	35,065	35,171	35,343	35,408	35,531	35,604
Kings County	93,135	101,997	103,748	104,719	104,857	105,352	105,681	106,175	106,544
New York County	203,307	213,076	219,761	223,470	226,647	230,205	233,696	237,171	240,637
Queens County	81,032	77,322	77,507	77,186	75,959	75,253	74,354	73,566	72,628
Richmond County	11,271	12,896	12,950	13,007	12,918	12,821	12,713	12,622	12,508
New York City	419,128	439,192	448,559	453,446	455,551	458,973	461,852	465,064	467,922
Nassau County	61,880	68,127	69,878	70,444	71,188	72,272	73,350	74,439	75,577
Suffolk County	69,244	73,321	76,003	77,689	79,298	81,033	82,747	84,495	86,252
Long Island	131,124	141,448	145,882	148,132	150,486	153,306	156,097	158,935	161,828
Dutchess County	12,846	12,250	12,648	12,989	13,318	13,622	13,947	14,279	14,630
Orange County	11,764	14,011	14,568	15,067	15,553	16,023	16,499	17,010	17,535
Putnam County	4,042	4,067	4,085	4,057	4,008	3,955	3,918	3,881	3,843
Rockland County	14,869	14,329	14,997	15,471	15,929	16,382	16,826	17,276	17,740
Sullivan County	3,569	2,976	3,288	3,543	3,995	4,449	4,897	5,344	5,796
Ulster County	10,681	9,665	9,764	9,807	9,908	10,040	10,169	10,290	10,416
Westchester County	54,873	55,203	56,901	57,838	58,540	59,433	60,305	61,159	62,030
Mid Hudson	112,644	112,501	116,251	118,773	121,251	123,903	126,560	129,239	131,990
Bergen County	43,015	47,465	49,613	51,059	51,724	52,582	53,380	53,765	54,157
Essex County	29,803	30,043	31,942	32,465	32,988	33,926	34,961	35,804	36,690
Hudson County	20,969	21,241	22,865	23,376	23,713	24,074	24,396	24,574	24,766
Hunterdon County	6,186	6,499	6,750	6,738	6,711	6,807	6,926	7,016	7,114
Mercer County	15,181	15,090	16,049	16,462	16,833	17,360	17,906	18,333	18,762
Middlesex County	24,252	25,582	26,970	27,453	27,789	28,460	29,213	29,639	30,003
Monmouth County	26,879	28,179	29,353	29,494	29,455	29,855	30,430	30,932	31,474
Morris County	25,085	26,167	27,433	27,781	27,977	28,435	28,843	29,154	29,414
Ocean County	19,797	21,617	23,097	23,827	24,245	24,879	25,674	26,364	27,031
Passaic County	16,629	16,426	17,204	17,536	17,776	17,955	18,116	18,145	18,194
Somerset County	14,933	15,406	16,240	16,581	16,763	17,095	17,456	17,647	17,779
Sussex County	6,913	6,559	6,828	6,873	6,848	6,831	6,852	6,846	6,849
Union County	19,288	20,010	21,050	21,283	21,604	22,206	22,837	23,365	23,914
Warren County	4,021	3,753	3,917	3,982	4,028	4,060	4,116	4,130	4,141
New Jersey	272,952	284,039	299,311	304,911	308,454	314,525	321,106	325,715	330,287
Fairfield County	56,537	58,200	61,341	63,462	66,139	68,676	71,549	74,421	77,427
Litchfield County	11,609	10,917	11,469	11,688	12,015	12,309	12,625	12,891	13,163
New Haven County	32,062	33,463	35,325	36,448	37,965	39,466	41,186	42,891	44,692
Connecticut	100,208	102,580	108,135	111,598	116,119	120,451	125,360	130,203	135,282

AREA NAME	Update Self Employment								
	2010	2015	2020	2025	2030	2035	2040	2045	2050
31-County Region	1,036,056	1,061,853	1,119,896	1,134,305	1,145,141	1,151,886	1,157,859	1,164,798	1,170,762
Bronx County	30,383	31,602	33,203	33,582	33,924	34,248	34,498	34,738	34,903
Kings County	93,135	99,173	103,893	104,336	104,676	105,056	105,067	105,046	104,836
New York County	203,307	209,918	226,164	228,708	231,072	232,191	233,261	234,338	235,161
Queens County	81,032	76,867	80,120	79,166	77,881	76,946	75,877	74,935	73,993
Richmond County	11,271	12,733	12,818	12,883	12,851	12,778	12,750	12,757	12,754
New York City	419,128	430,293	456,198	458,675	460,404	461,219	461,453	461,814	461,646
Nassau County	61,880	65,196	68,930	70,401	71,674	72,546	73,279	74,006	74,633
Suffolk County	69,244	69,223	74,068	74,895	75,668	75,842	76,046	76,416	76,672
Long Island	131,124	134,419	142,999	145,296	147,342	148,388	149,324	150,422	151,305
Dutchess County	12,846	12,227	12,569	12,931	13,252	13,469	13,673	13,891	14,075
Orange County	11,764	13,373	13,553	13,874	14,136	14,307	14,484	14,686	14,855
Putnam County	4,042	3,676	3,937	3,971	3,982	3,966	3,957	3,956	3,954
Rockland County	14,869	13,223	14,372	14,769	15,189	15,469	15,708	15,957	16,195
Sullivan County	3,569	3,164	3,141	3,161	3,154	3,123	3,086	3,051	3,010
Ulster County	10,681	9,396	10,017	10,163	10,211	10,213	10,197	10,193	10,181
Westchester County	54,873	52,150	55,513	56,198	56,776	57,015	57,128	57,250	57,326
Mid Hudson	112,644	107,209	113,102	115,066	116,699	117,562	118,233	118,984	119,596
Bergen County	43,015	47,362	48,933	50,507	51,560	52,387	53,171	53,999	54,827
Essex County	29,803	29,896	32,450	33,484	34,250	34,824	35,365	35,946	36,541
Hudson County	20,969	20,843	23,001	23,796	24,525	25,128	25,598	26,060	26,522
Hunterdon County	6,186	7,672	7,682	7,612	7,560	7,535	7,546	7,556	7,556
Mercer County	15,181	13,727	14,931	15,027	15,113	15,166	15,215	15,314	15,437
Middlesex County	24,252	28,031	28,344	28,529	28,672	28,916	29,156	29,471	29,769
Monmouth County	26,879	28,452	29,401	29,339	29,247	29,148	29,164	29,187	29,187
Morris County	25,085	26,298	25,904	25,979	25,918	25,762	25,564	25,446	25,295
Ocean County	19,797	21,191	22,882	23,584	24,068	24,488	25,004	25,588	26,125
Passaic County	16,629	16,269	17,863	18,138	18,378	18,444	18,541	18,690	18,823
Somerset County	14,933	14,096	14,357	14,550	14,669	14,791	14,911	15,096	15,270
Sussex County	6,913	6,110	6,218	6,114	6,017	5,889	5,802	5,737	5,676
Union County	19,288	20,912	22,009	22,535	22,955	23,272	23,518	23,777	24,019
Warren County	4,021	4,150	3,755	3,714	3,667	3,636	3,592	3,548	3,493
New Jersey	272,952	285,009	297,730	302,908	306,599	309,386	312,148	315,414	318,541
Fairfield County	56,537	58,260	61,068	62,539	63,568	64,248	64,979	65,759	66,548
Litchfield County	11,609	11,339	11,537	11,735	11,821	11,895	11,968	12,048	12,094
New Haven County	32,062	35,324	37,262	38,088	38,708	39,187	39,753	40,356	41,032
Connecticut	100,208	104,923	109,868	112,362	114,097	115,330	116,700	118,163	119,674

Technical Memorandum 2: Models Update to 2017 Baseline

Self Employment Differential 2050 Forecast and Update									
AREA NAME	2010	2015	2020	2025	2030	2035	2040	2045	2050
31-County Region	0	-17,906	1,758	-2,555	-6,721	-19,272	-33,115	-44,356	-56,548
Bronx County	0	-2,298	-1,389	-1,483	-1,247	-1,095	-910	-792	-701
Kings County	0	-2,824	145	-384	-181	-297	-614	-1,129	-1,708
New York County	0	-3,158	6,402	5,239	4,425	1,986	-435	-2,833	-5,476
Queens County	0	-455	2,612	1,980	1,922	1,693	1,524	1,370	1,365
Richmond County	0	-163	-132	-124	-66	-43	36	135	245
New York City	0	-8,899	7,639	5,228	4,853	2,245	-399	-3,249	-6,276
Nassau County	0	-2,931	-948	-43	486	274	-72	-434	-944
Suffolk County	0	-4,098	-1,935	-2,794	-3,630	-5,191	-6,701	-8,079	-9,580
Long Island	0	-7,029	-2,883	-2,837	-3,145	-4,917	-6,772	-8,513	-10,524
Dutchess County	0	-23	-79	-59	-66	-153	-274	-388	-554
Orange County	0	-638	-1,015	-1,193	-1,417	-1,716	-2,015	-2,324	-2,680
Putnam County	0	-391	-147	-86	-26	10	39	75	111
Rockland County	0	-1,106	-625	-702	-741	-913	-1,118	-1,319	-1,545
Sullivan County	0	188	-147	-382	-840	-1,325	-1,811	-2,292	-2,786
Ulster County	0	-269	253	356	302	173	27	-97	-236
Westchester County	0	-3,053	-1,388	-1,640	-1,764	-2,418	-3,176	-3,909	-4,704
Mid Hudson	0	-5,292	-3,149	-3,707	-4,552	-6,341	-8,327	-10,254	-12,394
Bergen County	0	-103	-679	-552	-164	-195	-209	234	670
Essex County	0	-147	507	1,018	1,261	899	404	141	-148
Hudson County	0	-398	136	420	812	1,054	1,202	1,486	1,756
Hunterdon County	0	1,173	932	874	849	729	621	541	442
Mercer County	0	-1,363	-1,118	-1,435	-1,720	-2,194	-2,691	-3,019	-3,326
Middlesex County	0	2,449	1,374	1,075	883	456	-56	-168	-235
Monmouth County	0	273	48	-155	-208	-707	-1,266	-1,745	-2,287
Morris County	0	131	-1,528	-1,802	-2,059	-2,674	-3,279	-3,708	-4,119
Ocean County	0	-426	-216	-244	-177	-391	-670	-776	-905
Passaic County	0	-157	658	602	602	490	425	545	630
Somerset County	0	-1,310	-1,883	-2,031	-2,094	-2,304	-2,545	-2,551	-2,508
Sussex County	0	-449	-610	-759	-831	-942	-1,051	-1,109	-1,173
Union County	0	902	959	1,252	1,351	1,066	681	412	105
Warren County	0	397	-162	-268	-360	-424	-523	-582	-648
New Jersey	0	970	-1,581	-2,004	-1,855	-5,139	-8,957	-10,300	-11,746
Fairfield County	0	60	-272	-923	-2,571	-4,428	-6,570	-8,662	-10,879
Litchfield County	0	422	67	46	-194	-414	-657	-843	-1,069
New Haven County	0	1,861	1,938	1,641	743	-279	-1,432	-2,535	-3,660
Connecticut	0	2,344	1,733	764	-2,022	-5,120	-8,659	-12,040	-15,608

Self Employment Percent Differential 2050 Forecast and Update									
AREA NAME	2010	2015	2020	2025	2030	2035	2040	2045	2050
31-County Region	0%	-2%	0%	0%	-1%	-2%	-3%	-4%	-5%
Bronx County	0%	-7%	-4%	-4%	-4%	-3%	-3%	-2%	-2%
Kings County	0%	-3%	0%	0%	0%	0%	-1%	-1%	-2%
New York County	0%	-1%	3%	2%	2%	1%	0%	-1%	-2%
Queens County	0%	-1%	3%	3%	3%	2%	2%	2%	2%
Richmond County	0%	-1%	-1%	-1%	-1%	0%	0%	1%	2%
New York City	0%	-2%	2%	1%	1%	0%	0%	-1%	-1%
Nassau County	0%	-4%	-1%	0%	1%	0%	0%	-1%	-1%
Suffolk County	0%	-6%	-3%	-4%	-5%	-6%	-8%	-10%	-11%
Long Island	0%	-5%	-2%	-2%	-2%	-3%	-4%	-5%	-7%
Dutchess County	0%	0%	-1%	0%	0%	-1%	-2%	-3%	-4%
Orange County	0%	-5%	-7%	-8%	-9%	-11%	-12%	-14%	-15%
Putnam County	0%	-10%	-4%	-2%	-1%	0%	1%	2%	3%
Rockland County	0%	-8%	-4%	-5%	-5%	-6%	-7%	-8%	-9%
Sullivan County	0%	6%	-4%	-11%	-21%	-30%	-37%	-43%	-48%
Ulster County	0%	-3%	3%	4%	3%	2%	0%	-1%	-2%
Westchester County	0%	-6%	-2%	-3%	-3%	-4%	-5%	-6%	-8%
Mid Hudson	0%	-5%	-3%	-3%	-4%	-5%	-7%	-8%	-9%
Bergen County	0%	0%	-1%	-1%	0%	0%	0%	0%	1%
Essex County	0%	0%	2%	3%	4%	3%	1%	0%	0%
Hudson County	0%	-2%	1%	2%	3%	4%	5%	6%	7%
Hunterdon County	0%	18%	14%	13%	13%	11%	9%	8%	6%
Mercer County	0%	-9%	-7%	-9%	-10%	-13%	-15%	-16%	-18%
Middlesex County	0%	10%	5%	4%	3%	2%	0%	-1%	-1%
Monmouth County	0%	1%	0%	-1%	-1%	-2%	-4%	-6%	-7%
Morris County	0%	1%	-6%	-6%	-7%	-9%	-11%	-13%	-14%
Ocean County	0%	-2%	-1%	-1%	-1%	-2%	-3%	-3%	-3%
Passaic County	0%	-1%	4%	3%	3%	3%	2%	3%	3%
Somerset County	0%	-9%	-12%	-12%	-12%	-13%	-15%	-14%	-14%
Sussex County	0%	-7%	-9%	-11%	-12%	-14%	-15%	-16%	-17%
Union County	0%	5%	5%	6%	6%	5%	3%	2%	0%
Warren County	0%	11%	-4%	-7%	-9%	-10%	-13%	-14%	-16%
New Jersey	0%	0%	-1%	-1%	-1%	-2%	-3%	-3%	-4%
Fairfield County	0%	0%	0%	-1%	-4%	-6%	-9%	-12%	-14%
Litchfield County	0%	4%	1%	0%	-2%	-3%	-5%	-7%	-8%
New Haven County	0%	6%	5%	5%	2%	-1%	-3%	-6%	-8%
Connecticut	0%	2%	2%	1%	-2%	-4%	-7%	-9%	-12%

Figure 44. Total Population: Comparison of 2050 Forecast and 2050 Forecast Update

2050 Forecast Population									
AREA NAME	2010	2015	2020	2025	2030	2035	2040	2045	2050
31-County Region	22,282,010	22,687,209	23,021,904	23,480,872	24,035,904	24,631,206	25,179,090	25,682,166	26,205,750
Bronx County	1,385,108	1,415,725	1,446,788	1,485,275	1,518,998	1,550,492	1,579,245	1,599,597	1,619,344
Kings County	2,552,911	2,602,844	2,648,452	2,706,246	2,754,009	2,799,347	2,840,525	2,870,318	2,898,080
New York County	1,585,873	1,610,697	1,638,282	1,661,574	1,676,720	1,686,292	1,691,617	1,695,476	1,701,598
Queens County	2,250,002	2,289,489	2,330,295	2,353,431	2,373,551	2,394,353	2,412,649	2,425,614	2,438,647
Richmond County	468,730	478,359	487,155	493,440	497,749	500,519	501,109	502,519	503,351
New York City	8,242,624	8,397,114	8,550,972	8,699,966	8,821,027	8,931,003	9,025,145	9,093,524	9,161,020
Nassau County	1,339,532	1,354,045	1,355,496	1,379,331	1,423,052	1,475,318	1,530,074	1,579,440	1,627,374
Suffolk County	1,493,350	1,502,193	1,513,038	1,542,300	1,587,892	1,630,332	1,665,742	1,697,546	1,731,185
Long Island	2,832,882	2,856,238	2,868,534	2,921,630	3,010,943	3,105,649	3,195,816	3,276,986	3,358,559
Dutchess County	297,488	301,608	304,729	311,567	320,840	329,766	337,270	344,278	351,790
Orange County	372,813	386,024	398,517	417,984	442,618	468,220	493,501	518,292	545,140
Putnam County	99,710	100,083	100,499	101,627	103,703	106,224	108,281	109,924	111,425
Rockland County	311,687	323,613	327,825	337,484	351,090	365,329	380,097	393,948	409,244
Sullivan County	77,547	77,833	78,031	78,746	81,811	84,491	86,639	88,890	91,596
Ulster County	182,493	185,097	187,082	189,776	192,973	195,349	196,231	196,882	197,651
Westchester County	949,113	973,036	978,138	998,319	1,031,391	1,071,863	1,109,678	1,148,288	1,190,128
Mid Hudson	2,290,851	2,347,294	2,374,821	2,435,504	2,524,425	2,621,242	2,711,696	2,800,502	2,896,974
Bergen County	905,116	928,736	936,513	951,196	970,411	994,340	1,011,159	1,030,502	1,053,154
Essex County	783,969	790,286	801,211	818,044	838,992	861,438	885,615	909,020	938,104
Hudson County	634,266	664,766	678,229	696,939	725,532	755,258	784,871	815,684	845,787
Hunterdon County	127,351	127,964	128,043	128,443	129,636	132,065	133,892	135,431	136,100
Mercer County	367,511	372,496	381,601	395,407	412,144	431,061	448,857	466,275	484,790
Middlesex County	809,858	829,266	845,251	862,805	886,904	914,559	942,881	965,760	993,675
Monmouth County	630,380	631,442	635,267	639,231	645,133	655,030	662,606	671,946	678,320
Morris County	492,276	500,519	510,334	515,015	520,708	524,756	527,355	530,198	531,824
Ocean County	576,567	585,735	603,675	629,601	656,592	699,435	727,411	755,963	785,549
Passaic County	501,226	505,892	515,359	528,416	545,994	561,209	584,980	607,568	630,541
Somerset County	323,444	331,195	334,507	339,637	344,461	352,125	359,896	367,010	376,033
Sussex County	149,265	149,798	151,005	151,373	152,028	154,194	156,225	157,703	158,637
Union County	536,499	549,162	557,963	572,196	590,331	611,245	633,168	653,837	675,650
Warren County	108,692	109,881	110,760	112,152	113,764	115,164	117,200	118,165	118,669
New Jersey	6,946,420	7,077,137	7,189,718	7,340,455	7,532,631	7,761,878	7,976,116	8,185,060	8,406,830
Fairfield County	916,829	940,639	948,901	966,693	995,809	1,028,231	1,060,727	1,091,982	1,123,422
Litchfield County	189,927	190,278	191,032	192,561	194,590	197,156	197,942	198,830	199,140
New Haven County	862,477	878,509	897,926	924,063	956,479	986,046	1,011,647	1,035,282	1,059,804
Connecticut	1,969,233	2,009,426	2,037,859	2,083,317	2,146,877	2,211,434	2,270,317	2,326,094	2,382,367

Technical Memorandum 2: Models Update to 2017 Baseline

AREA NAME	Update Population								
	2010	2015	2020	2025	2030	2035	2040	2045	2050
31- County Region	22,282,010	22,637,494	23,738,140	24,443,931	25,128,738	25,662,563	26,020,580	26,204,337	25,974,073
Bronx County	1,385,108	1,416,463	1,443,877	1,485,275	1,518,998	1,550,492	1,579,245	1,599,597	1,619,344
Kings County	2,552,911	2,618,423	2,707,679	2,706,246	2,754,009	2,799,347	2,840,525	2,870,318	2,898,080
New York County	1,585,873	1,616,455	1,655,299	1,661,574	1,676,720	1,686,292	1,691,617	1,695,476	1,701,598
Queens County	2,250,002	2,291,030	2,330,875	2,353,431	2,373,551	2,394,353	2,412,649	2,425,614	2,438,647
Richmond County	468,730	474,969	479,553	493,440	497,749	500,519	501,109	502,519	503,351
New York City	8,242,624	8,417,340	8,617,283	8,699,966	8,821,027	8,931,003	9,025,145	9,093,524	9,161,020
Nassau County	1,339,532	1,354,612	1,487,480	1,560,850	1,616,349	1,648,178	1,657,345	1,640,405	1,583,703
Suffolk County	1,493,350	1,501,373	1,592,424	1,644,344	1,692,267	1,714,017	1,717,157	1,703,459	1,659,870
Long Island	2,832,882	2,855,985	3,079,904	3,205,194	3,308,615	3,362,194	3,374,502	3,343,864	3,243,573
Dutchess County	297,488	296,928	309,912	324,041	336,416	345,553	350,495	352,147	342,340
Orange County	372,813	375,384	405,499	433,561	461,275	484,903	504,674	518,534	518,599
Putnam County	99,710	99,488	106,113	110,130	113,864	116,567	118,044	117,911	115,177
Rockland County	311,687	320,688	345,466	366,161	384,845	398,251	407,393	411,393	403,197
Sullivan County	77,547	76,330	77,343	77,811	77,366	75,575	73,154	70,464	68,057
Ulster County	182,493	181,300	188,454	193,603	197,134	198,347	197,122	194,469	189,608
Westchester County	949,113	967,315	1,052,284	1,100,060	1,143,055	1,176,169	1,194,048	1,198,821	1,183,581
Mid Hudson	2,290,851	2,317,433	2,485,070	2,605,367	2,713,954	2,795,366	2,844,931	2,863,739	2,820,558
Bergen County	905,116	926,330	989,011	1,041,439	1,081,445	1,110,457	1,121,156	1,124,591	1,085,026
Essex County	783,969	791,609	843,393	887,559	924,379	949,336	968,569	979,819	966,790
Hudson County	634,266	662,619	733,647	783,671	831,001	863,501	884,354	898,010	877,294
Hunterdon County	127,351	126,250	127,902	126,871	127,341	127,976	128,384	128,031	124,425
Mercer County	367,511	370,212	372,434	386,301	401,484	416,078	427,842	438,598	438,693
Middlesex County	809,858	830,300	876,132	901,161	927,687	950,754	969,263	978,176	968,352
Monmouth County	630,380	629,185	658,615	667,171	676,057	682,129	683,408	682,327	666,614
Morris County	492,276	498,192	524,137	531,137	537,610	536,161	532,520	527,968	519,918
Ocean County	576,567	583,450	617,337	656,930	695,149	747,076	779,666	807,888	811,204
Passaic County	501,226	507,574	537,927	563,606	589,491	605,193	626,344	642,260	639,006
Somerset County	323,444	330,604	342,383	348,036	352,545	357,469	362,039	365,845	362,416
Sussex County	149,265	145,930	151,381	150,260	150,349	149,944	150,118	149,229	147,287
Union County	536,499	548,744	582,748	611,748	638,649	660,979	679,155	691,933	687,430
Warren County	108,692	107,226	108,313	108,010	108,498	108,245	108,356	107,340	107,509
New Jersey	6,946,420	7,058,225	7,465,361	7,763,900	8,041,686	8,265,298	8,421,174	8,522,015	8,401,964
Fairfield County	916,829	939,983	990,708	1,025,401	1,058,665	1,089,784	1,113,720	1,127,694	1,111,740
Litchfield County	189,927	186,304	191,229	195,169	198,490	201,378	201,692	200,925	196,896
New Haven County	862,477	862,224	908,586	948,934	986,301	1,017,540	1,039,417	1,052,575	1,038,321
Connecticut	1,969,233	1,988,511	2,090,523	2,169,504	2,243,455	2,308,703	2,354,829	2,381,194	2,346,957

		Population Differential 2050 Forecast and Update							
AREA NAME	2010	2015	2020	2025	2030	2035	2040	2045	2050
31-County Region	0	-49,716	716,236	963,060	1,092,834	1,031,358	841,490	522,171	-231,677
Bronx County	0	738	-2,911	0	0	0	0	0	0
Kings County	0	15,579	59,227	0	0	0	0	0	0
New York County	0	5,758	17,017	0	0	0	0	0	0
Queens County	0	1,541	580	0	0	0	0	0	0
Richmond County	0	-3,390	-7,602	0	0	0	0	0	0
New York City	0	20,226	66,311	0	0	0	0	0	0
Nassau County	0	567	131,984	181,520	193,297	172,860	127,270	60,966	-43,671
Suffolk County	0	-820	79,386	102,044	104,375	83,685	51,415	5,913	-71,315
Long Island	0	-253	211,370	283,564	297,672	256,545	178,686	66,878	-114,986
Dutchess County	0	-4,680	5,182	12,473	15,576	15,787	13,225	7,869	-9,450
Orange County	0	-10,640	6,981	15,576	18,657	16,683	11,174	242	-26,541
Putnam County	0	-595	5,615	8,504	10,161	10,343	9,763	7,988	3,752
Rockland County	0	-2,925	17,641	28,677	33,755	32,922	27,297	17,445	-6,048
Sullivan County	0	-1,503	-688	-935	-4,445	-8,915	-13,485	-18,426	-23,539
Ulster County	0	-3,797	1,372	3,828	4,161	2,998	891	-2,413	-8,043
Westchester County	0	-5,721	74,146	101,741	111,665	104,307	84,370	50,533	-6,547
Mid Hudson	0	-29,861	110,249	169,863	189,529	174,124	133,235	63,237	-76,416
Bergen County	0	-2,406	52,497	90,243	111,034	116,117	109,997	94,090	31,873
Essex County	0	1,323	42,182	69,515	85,387	87,898	82,954	70,799	28,687
Hudson County	0	-2,147	55,418	86,732	105,469	108,243	99,483	82,326	31,507
Hunterdon County	0	-1,714	-141	-1,572	-2,295	-4,090	-5,508	-7,400	-11,675
Mercer County	0	-2,284	-9,167	-9,106	-10,660	-14,982	-21,016	-27,677	-46,097
Middlesex County	0	1,034	30,882	38,356	40,783	36,195	26,382	12,416	-25,323
Monmouth County	0	-2,257	23,348	27,941	30,924	27,099	20,801	10,381	-11,706
Morris County	0	-2,327	13,803	16,122	16,902	11,406	5,164	-2,230	-11,905
Ocean County	0	-2,285	13,663	27,329	38,557	47,641	52,255	51,925	25,655
Passaic County	0	1,682	22,568	35,190	43,498	43,984	41,364	34,692	8,465
Somerset County	0	-591	7,876	8,399	8,084	5,344	2,143	-1,165	-13,617
Sussex County	0	-3,868	376	-1,112	-1,679	-4,250	-6,107	-8,474	-11,350
Union County	0	-418	24,785	39,552	48,318	49,733	45,988	38,096	11,781
Warren County	0	-2,655	-2,447	-4,142	-5,267	-6,919	-8,844	-10,825	-11,160
New Jersey	0	-18,912	275,642	423,445	509,055	503,420	445,057	336,955	-4,866
Fairfield County	0	-656	41,807	58,708	62,856	61,553	52,993	35,712	-11,682
Litchfield County	0	-3,974	197	2,608	3,900	4,221	3,750	2,095	-2,244
New Haven County	0	-16,285	10,661	24,871	29,822	31,494	27,770	17,293	-21,484
Connecticut	0	-20,915	52,664	86,188	96,578	97,269	84,512	55,101	-35,410

Population Percent Differential 2050 Forecast and Update									
AREA NAME	2010	2015	2020	2025	2030	2035	2040	2045	2050
31-County Region	0.0%	-0.2%	3.1%	4.1%	4.5%	4.2%	3.3%	2.0%	-0.9%
Bronx County	0.0%	0.1%	-0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Kings County	0.0%	0.6%	2.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
New York County	0.0%	0.4%	1.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Queens County	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Richmond County	0.0%	-0.7%	-1.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
New York City	0.0%	0.2%	0.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Nassau County	0.0%	0.0%	9.7%	13.2%	13.6%	11.7%	8.3%	3.9%	-2.7%
Suffolk County	0.0%	-0.1%	5.2%	6.6%	6.6%	5.1%	3.1%	0.3%	-4.1%
Long Island	0.0%	0.0%	7.4%	9.7%	9.9%	8.3%	5.6%	2.0%	-3.4%
Dutchess County	0.0%	-1.6%	1.7%	4.0%	4.9%	4.8%	3.9%	2.3%	-2.7%
Orange County	0.0%	-2.8%	1.8%	3.7%	4.2%	3.6%	2.3%	0.0%	-4.9%
Putnam County	0.0%	-0.6%	5.6%	8.4%	9.8%	9.7%	9.0%	7.3%	3.4%
Rockland County	0.0%	-0.9%	5.4%	8.5%	9.6%	9.0%	7.2%	4.4%	-1.5%
Sullivan County	0.0%	-1.9%	-0.9%	-1.2%	-5.4%	-10.6%	-15.6%	-20.7%	-25.7%
Ulster County	0.0%	-2.1%	0.7%	2.0%	2.2%	1.5%	0.5%	-1.2%	-4.1%
Westchester County	0.0%	-0.6%	7.6%	10.2%	10.8%	9.7%	7.6%	4.4%	-0.6%
Mid Hudson	0.0%	-1.3%	4.6%	7.0%	7.5%	6.6%	4.9%	2.3%	-2.6%
Bergen County	0.0%	-0.3%	5.6%	9.5%	11.4%	11.7%	10.9%	9.1%	3.0%
Essex County	0.0%	0.2%	5.3%	8.5%	10.2%	10.2%	9.4%	7.8%	3.1%
Hudson County	0.0%	-0.3%	8.2%	12.4%	14.5%	14.3%	12.7%	10.1%	3.7%
Hunterdon County	0.0%	-1.3%	-0.1%	-1.2%	-1.8%	-3.1%	-4.1%	-5.5%	-8.6%
Mercer County	0.0%	-0.6%	-2.4%	-2.3%	-2.6%	-3.5%	-4.7%	-5.9%	-9.5%
Middlesex County	0.0%	0.1%	3.7%	4.4%	4.6%	4.0%	2.8%	1.3%	-2.5%
Monmouth County	0.0%	-0.4%	3.7%	4.4%	4.8%	4.1%	3.1%	1.5%	-1.7%
Morris County	0.0%	-0.5%	2.7%	3.1%	3.2%	2.2%	1.0%	-0.4%	-2.2%
Ocean County	0.0%	-0.4%	2.3%	4.3%	5.9%	6.8%	7.2%	6.9%	3.3%
Passaic County	0.0%	0.3%	4.4%	6.7%	8.0%	7.8%	7.1%	5.7%	1.3%
Somerset County	0.0%	-0.2%	2.4%	2.5%	2.3%	1.5%	0.6%	-0.3%	-3.6%
Sussex County	0.0%	-2.6%	0.2%	-0.7%	-1.1%	-2.8%	-3.9%	-5.4%	-7.2%
Union County	0.0%	-0.1%	4.4%	6.9%	8.2%	8.1%	7.3%	5.8%	1.7%
Warren County	0.0%	-2.4%	-2.2%	-3.7%	-4.6%	-6.0%	-7.5%	-9.2%	-9.4%
New Jersey	0.0%	-0.3%	3.8%	5.8%	6.8%	6.5%	5.6%	4.1%	-0.1%
Fairfield County	0.0%	-0.1%	4.4%	6.1%	6.3%	6.0%	5.0%	3.3%	-1.0%
Litchfield County	0.0%	-2.1%	0.1%	1.4%	2.0%	2.1%	1.9%	1.1%	-1.1%
New Haven County	0.0%	-1.9%	1.2%	2.7%	3.1%	3.2%	2.7%	1.7%	-2.0%
Connecticut	0.0%	-1.0%	2.6%	4.1%	4.5%	4.4%	3.7%	2.4%	-1.5%

Figure 45. Household Population: Comparison of 2050 Forecast and 2050 Forecast Update

AREA NAME	2050 Forecast Household Population								
	2010	2015	2020	2025	2030	2035	2040	2045	2050
31-County Region	21,767,983	22,161,361	22,492,059	22,942,742	23,483,964	24,058,845	24,584,808	25,065,418	25,572,506
Bronx County	1,338,398	1,369,015	1,400,078	1,438,565	1,472,288	1,503,782	1,532,535	1,552,887	1,572,634
Kings County	2,517,302	2,567,235	2,612,843	2,670,637	2,718,400	2,763,738	2,804,916	2,834,709	2,862,471
New York County	1,518,500	1,543,324	1,570,909	1,594,201	1,609,347	1,618,919	1,624,244	1,628,103	1,634,225
Queens County	2,222,002	2,261,489	2,302,295	2,325,431	2,345,551	2,366,353	2,384,649	2,397,614	2,410,647
Richmond County	460,892	470,521	479,317	485,602	489,911	492,681	493,271	494,681	495,513
New York City	8,057,094	8,211,584	8,365,442	8,514,436	8,635,497	8,745,473	8,839,615	8,907,994	8,975,490
Nassau County	1,317,866	1,331,347	1,332,787	1,356,324	1,399,298	1,450,218	1,503,552	1,551,627	1,598,787
Suffolk County	1,463,944	1,471,416	1,481,622	1,509,850	1,553,566	1,593,302	1,626,172	1,655,238	1,686,985
Long Island	2,781,810	2,802,762	2,814,409	2,866,175	2,952,864	3,043,520	3,129,724	3,206,865	3,285,773
Dutchess County	277,523	281,429	284,853	291,722	300,680	308,693	314,972	320,790	327,545
Orange County	360,583	373,354	385,509	404,323	428,044	452,615	476,679	500,286	526,092
Putnam County	97,118	97,433	97,784	98,824	100,791	103,172	105,091	106,617	108,039
Rockland County	304,504	315,891	319,787	328,988	342,085	355,812	370,168	383,609	398,553
Sullivan County	73,722	74,109	74,390	75,106	78,041	80,591	82,629	84,780	87,374
Ulster County	170,720	173,338	175,461	178,088	181,050	183,067	183,632	183,996	184,615
Westchester County	920,409	942,763	947,621	967,334	999,470	1,038,244	1,074,532	1,111,163	1,151,401
Mid Hudson	2,204,579	2,258,317	2,285,406	2,344,385	2,430,160	2,522,194	2,607,703	2,691,242	2,783,618
Bergen County	894,694	917,533	925,133	939,594	958,518	981,897	998,221	1,016,847	1,038,996
Essex County	760,197	766,242	776,858	792,965	813,054	834,623	857,795	880,162	908,163
Hudson County	624,888	655,152	668,629	686,855	714,720	743,767	772,771	803,057	832,708
Hunterdon County	123,780	124,103	124,159	124,560	125,724	128,088	129,784	131,126	131,663
Mercer County	347,708	352,389	361,217	374,543	390,555	408,317	424,780	440,829	458,102
Middlesex County	786,023	804,536	820,026	837,209	860,762	887,251	914,093	935,741	962,610
Monmouth County	622,710	623,512	627,129	630,806	636,222	645,398	652,326	661,039	667,169
Morris County	483,410	490,850	500,117	504,544	509,999	513,635	515,736	517,918	519,081
Ocean County	569,404	578,587	596,441	621,989	648,356	690,418	717,806	745,706	774,726
Passaic County	490,207	494,647	504,068	516,895	534,107	548,784	571,757	593,567	615,892
Somerset County	319,474	326,798	329,881	334,769	339,306	346,500	353,760	360,307	368,907
Sussex County	147,523	147,883	148,898	149,048	149,409	151,239	152,954	154,149	154,934
Union County	529,695	542,073	550,784	564,737	582,520	603,001	624,521	644,776	666,305
Warren County	106,724	107,825	108,669	109,989	111,471	112,660	114,420	115,094	115,436
New Jersey	6,806,437	6,932,130	7,042,009	7,188,503	7,374,723	7,595,580	7,800,723	8,000,320	8,214,693
Fairfield County	897,661	920,327	928,354	945,661	974,019	1,005,344	1,036,412	1,066,198	1,096,625
Litchfield County	187,123	187,416	188,053	189,359	191,031	193,171	193,611	194,200	194,407
New Haven County	833,279	848,825	868,387	894,224	925,670	953,564	977,019	998,598	1,021,900
Connecticut	1,918,063	1,956,568	1,984,794	2,029,244	2,090,719	2,152,079	2,207,042	2,258,996	2,312,932

Technical Memorandum 2: Models Update to 2017 Baseline

		Update Household Population							
AREA NAME	2010	2015	2020	2025	2030	2035	2040	2045	2050
31-County Region	21,767,983	22,116,433	23,196,653	23,892,258	24,566,102	25,085,237	25,423,132	25,582,983	25,341,684
Bronx County	1,338,398	1,369,753	1,397,167	1,438,565	1,472,288	1,503,782	1,532,535	1,552,887	1,572,634
Kings County	2,517,302	2,582,814	2,672,070	2,670,637	2,718,400	2,763,738	2,804,916	2,834,709	2,862,471
New York County	1,518,500	1,549,082	1,587,926	1,594,201	1,609,347	1,618,919	1,624,244	1,628,103	1,634,225
Queens County	2,222,002	2,263,030	2,302,875	2,325,431	2,345,551	2,366,353	2,384,649	2,397,614	2,410,647
Richmond County	460,892	467,131	471,715	485,602	489,911	492,681	493,271	494,681	495,513
New York City	8,057,094	8,231,810	8,431,753	8,514,436	8,635,497	8,745,473	8,839,615	8,907,994	8,975,490
Nassau County	1,317,866	1,334,246	1,463,319	1,536,299	1,591,452	1,622,210	1,629,710	1,611,317	1,554,101
Suffolk County	1,463,944	1,469,077	1,559,943	1,610,806	1,657,413	1,677,167	1,677,617	1,660,885	1,615,297
Long Island	2,781,810	2,803,323	3,023,262	3,147,105	3,248,866	3,299,376	3,307,327	3,272,202	3,169,397
Dutchess County	277,523	278,453	289,375	303,300	315,659	324,439	328,532	329,019	318,997
Orange County	360,583	363,700	392,148	419,300	446,457	469,448	488,207	500,889	500,292
Putnam County	97,118	96,929	103,231	107,095	110,709	113,314	114,699	114,465	111,704
Rockland County	304,504	313,214	337,161	357,240	375,317	388,247	396,953	400,411	392,122
Sullivan County	73,722	70,229	73,665	74,173	73,773	72,119	69,818	67,234	64,928
Ulster County	170,720	171,191	176,514	181,603	185,038	186,146	184,749	182,003	177,191
Westchester County	920,409	940,426	1,019,605	1,066,918	1,109,684	1,141,966	1,158,036	1,160,179	1,143,790
Mid Hudson	2,204,579	2,234,142	2,391,698	2,509,629	2,616,638	2,695,680	2,740,994	2,754,199	2,709,025
Bergen County	894,694	915,216	977,331	1,029,362	1,069,046	1,097,632	1,107,708	1,109,949	1,069,853
Essex County	760,197	769,663	817,626	860,389	896,109	920,235	938,785	949,065	935,885
Hudson County	624,888	655,305	723,357	772,784	819,231	850,945	871,044	884,080	863,344
Hunterdon County	123,780	121,238	123,873	123,036	123,504	124,164	124,494	124,000	120,347
Mercer County	347,708	351,644	352,540	365,834	380,143	394,028	405,245	415,362	415,031
Middlesex County	786,023	802,471	850,481	874,823	900,728	923,131	940,544	948,447	938,308
Monmouth County	622,710	622,081	650,312	658,598	667,065	672,561	673,113	671,270	655,229
Morris County	483,410	488,902	513,823	520,600	526,876	525,196	521,069	515,724	507,099
Ocean County	569,404	576,543	609,968	649,197	686,805	737,848	769,756	797,132	799,795
Passaic County	490,207	496,460	526,138	551,358	576,854	592,259	612,845	627,862	624,127
Somerset County	319,474	321,019	337,741	343,176	347,385	351,928	355,959	359,173	355,298
Sussex County	147,523	141,829	149,320	148,036	147,867	147,152	146,994	145,792	143,646
Union County	529,695	546,660	575,380	604,003	630,421	652,289	669,991	682,269	677,576
Warren County	106,724	99,654	106,260	105,959	106,374	105,916	105,756	104,497	104,458
New Jersey	6,806,437	6,908,685	7,314,150	7,607,155	7,878,407	8,095,282	8,243,303	8,334,622	8,209,995
Fairfield County	897,661	921,949	969,261	1,003,556	1,036,337	1,066,520	1,089,097	1,101,354	1,084,595
Litchfield County	187,123	183,075	188,320	192,055	195,050	197,515	197,438	196,290	192,088
New Haven County	833,279	833,449	878,209	918,323	955,308	985,389	1,005,358	1,016,322	1,001,095
Connecticut	1,918,063	1,938,473	2,035,791	2,113,934	2,186,694	2,249,425	2,291,892	2,313,966	2,277,777

Technical Memorandum 2: Models Update to 2017 Baseline

		Household Population Differential 2050 Forecast and Update							
AREA NAME	2010	2015	2020	2025	2030	2035	2040	2045	2050
31- County Region	0	-44,929	704,594	949,516	1,082,138	1,026,391	838,324	517,565	-230,821
Bronx County	0	738	-2,911	0	0	0	0	0	0
Kings County	0	15,579	59,227	0	0	0	0	0	0
New York County	0	5,758	17,017	0	0	0	0	0	0
Queens County	0	1,541	580	0	0	0	0	0	0
Richmond County	0	-3,390	-7,602	0	0	0	0	0	0
New York City	0	20,226	66,311	0	0	0	0	0	0
Nassau County	0	2,899	130,532	179,974	192,154	171,992	126,158	59,690	-44,687
Suffolk County	0	-2,339	78,321	100,956	103,847	83,864	51,445	5,647	-71,689
Long Island	0	561	208,853	280,930	296,002	255,856	177,603	65,337	-116,375
Dutchess County	0	-2,976	4,522	11,578	14,979	15,747	13,560	8,228	-8,548
Orange County	0	-9,654	6,639	14,977	18,413	16,834	11,528	602	-25,800
Putnam County	0	-504	5,446	8,271	9,918	10,142	9,608	7,847	3,666
Rockland County	0	-2,677	17,373	28,252	33,233	32,435	26,786	16,801	-6,431
Sullivan County	0	-3,880	-725	-934	-4,267	-8,472	-12,811	-17,545	-22,446
Ulster County	0	-2,147	1,053	3,515	3,988	3,079	1,117	-1,993	-7,424
Westchester County	0	-2,337	71,983	99,585	110,214	103,723	83,504	49,015	-7,611
Mid Hudson	0	-24,175	106,292	165,244	186,478	173,486	133,291	62,956	-74,593
Bergen County	0	-2,317	52,197	89,768	110,527	115,734	109,487	93,102	30,857
Essex County	0	3,421	40,768	67,424	83,055	85,612	80,990	68,903	27,722
Hudson County	0	153	54,728	85,929	104,510	107,177	98,273	81,022	30,636
Hunterdon County	0	-2,865	-286	-1,524	-2,220	-3,923	-5,290	-7,126	-11,316
Mercer County	0	-745	-8,677	-8,709	-10,412	-14,289	-19,535	-25,467	-43,071
Middlesex County	0	-2,065	30,455	37,615	39,966	35,880	26,451	12,706	-24,302
Monmouth County	0	-1,431	23,183	27,791	30,843	27,162	20,788	10,231	-11,940
Morris County	0	-1,948	13,706	16,057	16,877	11,560	5,333	-2,194	-11,982
Ocean County	0	-2,044	13,527	27,208	38,449	47,430	51,950	51,426	25,069
Passaic County	0	1,813	22,070	34,463	42,747	43,476	41,087	34,294	8,235
Somerset County	0	-5,779	7,860	8,407	8,079	5,428	2,199	-1,134	-13,609
Sussex County	0	-6,054	422	-1,012	-1,543	-4,088	-5,960	-8,357	-11,288
Union County	0	4,587	24,597	39,266	47,901	49,288	45,470	37,493	11,271
Warren County	0	-8,171	-2,409	-4,030	-5,097	-6,744	-8,664	-10,597	-10,979
New Jersey	0	-23,445	272,141	418,652	503,683	499,703	442,580	334,302	-4,698
Fairfield County	0	1,622	40,907	57,895	62,318	61,176	52,685	35,155	-12,030
Litchfield County	0	-4,341	267	2,696	4,019	4,345	3,826	2,090	-2,320
New Haven County	0	-15,376	9,822	24,099	29,638	31,825	28,338	17,724	-20,805
Connecticut	0	-18,095	50,997	84,690	95,975	97,346	84,850	54,970	-35,154

Household Population Percent Differential 2050 Forecast and Update									
AREA NAME	2010	2015	2020	2025	2030	2035	2040	2045	2050
31-County Region	0.0%	-0.2%	3.1%	4.1%	4.6%	4.3%	3.4%	2.1%	-0.9%
Bronx County	0.0%	0.1%	-0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Kings County	0.0%	0.6%	2.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
New York County	0.0%	0.4%	1.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Queens County	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Richmond County	0.0%	-0.7%	-1.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
New York City	0.0%	0.2%	0.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Nassau County	0.0%	0.2%	9.8%	13.3%	13.7%	11.9%	8.4%	3.8%	-2.8%
Suffolk County	0.0%	-0.2%	5.3%	6.7%	6.7%	5.3%	3.2%	0.3%	-4.2%
Long Island	0.0%	0.0%	7.4%	9.8%	10.0%	8.4%	5.7%	2.0%	-3.5%
Dutchess County	0.0%	-1.1%	1.6%	4.0%	5.0%	5.1%	4.3%	2.6%	-2.6%
Orange County	0.0%	-2.6%	1.7%	3.7%	4.3%	3.7%	2.4%	0.1%	-4.9%
Putnam County	0.0%	-0.5%	5.6%	8.4%	9.8%	9.8%	9.1%	7.4%	3.4%
Rockland County	0.0%	-0.8%	5.4%	8.6%	9.7%	9.1%	7.2%	4.4%	-1.6%
Sullivan County	0.0%	-5.2%	-1.0%	-1.2%	-5.5%	-10.5%	-15.5%	-20.7%	-25.7%
Ulster County	0.0%	-1.2%	0.6%	2.0%	2.2%	1.7%	0.6%	-1.1%	-4.0%
Westchester County	0.0%	-0.2%	7.6%	10.3%	11.0%	10.0%	7.8%	4.4%	-0.7%
Mid Hudson	0.0%	-1.1%	4.7%	7.0%	7.7%	6.9%	5.1%	2.3%	-2.7%
Bergen County	0.0%	-0.3%	5.6%	9.6%	11.5%	11.8%	11.0%	9.2%	3.0%
Essex County	0.0%	0.4%	5.2%	8.5%	10.2%	10.3%	9.4%	7.8%	3.1%
Hudson County	0.0%	0.0%	8.2%	12.5%	14.6%	14.4%	12.7%	10.1%	3.7%
Hunterdon County	0.0%	-2.3%	-0.2%	-1.2%	-1.8%	-3.1%	-4.1%	-5.4%	-8.6%
Mercer County	0.0%	-0.2%	-2.4%	-2.3%	-2.7%	-3.5%	-4.6%	-5.8%	-9.4%
Middlesex County	0.0%	-0.3%	3.7%	4.5%	4.6%	4.0%	2.9%	1.4%	-2.5%
Monmouth County	0.0%	-0.2%	3.7%	4.4%	4.8%	4.2%	3.2%	1.5%	-1.8%
Morris County	0.0%	-0.4%	2.7%	3.2%	3.3%	2.3%	1.0%	-0.4%	-2.3%
Ocean County	0.0%	-0.4%	2.3%	4.4%	5.9%	6.9%	7.2%	6.9%	3.2%
Passaic County	0.0%	0.4%	4.4%	6.7%	8.0%	7.9%	7.2%	5.8%	1.3%
Somerset County	0.0%	-1.8%	2.4%	2.5%	2.4%	1.6%	0.6%	-0.3%	-3.7%
Sussex County	0.0%	-4.1%	0.3%	-0.7%	-1.0%	-2.7%	-3.9%	-5.4%	-7.3%
Union County	0.0%	0.8%	4.5%	7.0%	8.2%	8.2%	7.3%	5.8%	1.7%
Warren County	0.0%	-7.6%	-2.2%	-3.7%	-4.6%	-6.0%	-7.6%	-9.2%	-9.5%
New Jersey	0.0%	-0.3%	3.9%	5.8%	6.8%	6.6%	5.7%	4.2%	-0.1%
Fairfield County	0.0%	0.2%	4.4%	6.1%	6.4%	6.1%	5.1%	3.3%	-1.1%
Litchfield County	0.0%	-2.3%	0.1%	1.4%	2.1%	2.2%	2.0%	1.1%	-1.2%
New Haven County	0.0%	-1.8%	1.1%	2.7%	3.2%	3.3%	2.9%	1.8%	-2.0%
Connecticut	0.0%	-0.9%	2.6%	4.2%	4.6%	4.5%	3.8%	2.4%	-1.5%

Figure 46. Group Quarters Population: Comparison of 2050 Forecast and 2050 Forecast Update

2050 Forecast: Group Quarters Population									
AREA NAME	2010	2015	2020	2025	2030	2035	2040	2045	2050
31-County Region	514,027	525,848	529,845	538,130	551,940	572,360	594,283	616,748	633,244
Bronx County	46,710	46,710	46,710	46,710	46,710	46,710	46,710	46,710	46,710
Kings County	35,609	35,609	35,609	35,609	35,609	35,609	35,609	35,609	35,609
New York County	67,373	67,373	67,373	67,373	67,373	67,373	67,373	67,373	67,373
Queens County	28,000	28,000	28,000	28,000	28,000	28,000	28,000	28,000	28,000
Richmond County	7,838	7,838	7,838	7,838	7,838	7,838	7,838	7,838	7,838
New York City	185,530	185,530	185,530	185,530	185,530	185,530	185,530	185,530	185,530
Nassau County	21,666	22,699	22,709	23,006	23,754	25,100	26,522	27,813	28,586
Suffolk County	29,406	30,778	31,415	32,449	34,325	37,029	39,570	42,308	44,200
Long Island	51,072	53,476	54,124	55,455	58,079	62,129	66,092	70,121	72,786
Dutchess County	19,965	20,179	19,877	19,846	20,160	21,074	22,298	23,488	24,245
Orange County	12,230	12,670	13,008	13,661	14,574	15,605	16,822	18,006	19,048
Putnam County	2,592	2,650	2,714	2,803	2,912	3,052	3,189	3,306	3,386
Rockland County	7,183	7,723	8,037	8,496	9,006	9,517	9,929	10,339	10,692
Sullivan County	3,825	3,723	3,641	3,640	3,770	3,899	4,010	4,110	4,222
Ulster County	11,773	11,760	11,622	11,688	11,923	12,282	12,600	12,886	13,036
Westchester County	28,704	30,273	30,516	30,986	31,921	33,619	35,146	37,124	38,727
Mid Hudson	86,272	88,977	89,415	91,119	94,265	99,048	103,994	109,260	113,356
Bergen County	10,422	11,203	11,380	11,602	11,893	12,443	12,938	13,655	14,157
Essex County	23,772	24,044	24,354	25,079	25,938	26,815	27,820	28,857	29,941
Hudson County	9,378	9,613	9,600	10,084	10,812	11,490	12,100	12,626	13,079
Hunterdon County	3,571	3,861	3,884	3,883	3,912	3,978	4,109	4,305	4,436
Mercer County	19,803	20,107	20,384	20,865	21,589	22,744	24,077	25,446	26,688
Middlesex County	23,835	24,730	25,225	25,596	26,142	27,308	28,788	30,019	31,066
Monmouth County	7,670	7,930	8,138	8,424	8,912	9,632	10,281	10,907	11,151
Morris County	8,866	9,668	10,217	10,471	10,710	11,120	11,619	12,280	12,743
Ocean County	7,163	7,148	7,234	7,611	8,236	9,017	9,605	10,257	10,823
Passaic County	11,019	11,244	11,291	11,522	11,886	12,425	13,223	14,000	14,649
Somerset County	3,970	4,397	4,626	4,868	5,154	5,624	6,136	6,702	7,126
Sussex County	1,742	1,915	2,107	2,324	2,619	2,955	3,271	3,554	3,703
Union County	6,804	7,089	7,179	7,459	7,812	8,245	8,646	9,061	9,345
Warren County	1,968	2,056	2,091	2,163	2,294	2,504	2,780	3,071	3,233
New Jersey	139,983	145,006	147,710	151,952	157,908	166,298	175,393	184,740	192,138
Fairfield County	19,168	20,312	20,547	21,032	21,790	22,887	24,315	25,783	26,797
Litchfield County	2,804	2,862	2,979	3,202	3,559	3,986	4,331	4,631	4,733
New Haven County	29,198	29,684	29,539	29,839	30,809	32,482	34,628	36,684	37,905
Connecticut	51,170	52,858	53,065	54,073	56,158	59,355	63,274	67,098	69,435

Update: Group Quarters Population									
AREA NAME	2010	2015	2020	2025	2030	2035	2040	2045	2050
31-County Region	514,027	521,061	541,487	551,673	562,636	577,327	597,448	621,354	632,388
Bronx County	46,710	46,710	46,710	46,710	46,710	46,710	46,710	46,710	46,710
Kings County	35,609	35,609	35,609	35,609	35,609	35,609	35,609	35,609	35,609
New York County	67,373	67,373	67,373	67,373	67,373	67,373	67,373	67,373	67,373
Queens County	28,000	28,000	28,000	28,000	28,000	28,000	28,000	28,000	28,000
Richmond County	7,838	7,838	7,838	7,838	7,838	7,838	7,838	7,838	7,838
New York City	185,530	185,530	185,530	185,530	185,530	185,530	185,530	185,530	185,530
Nassau County	21,666	20,366	24,161	24,552	24,896	25,968	27,635	29,088	29,602
Suffolk County	29,406	32,296	32,481	33,538	34,853	36,850	39,540	42,574	44,574
Long Island	51,072	52,662	56,642	58,089	59,749	62,818	67,175	71,662	74,176
Dutchess County	19,965	18,475	20,536	20,741	20,756	21,114	21,964	23,129	23,342
Orange County	12,230	11,684	13,351	14,260	14,817	15,454	16,467	17,645	18,307
Putnam County	2,592	2,559	2,883	3,035	3,155	3,253	3,344	3,447	3,472
Rockland County	7,183	7,474	8,305	8,920	9,528	10,004	10,440	10,982	11,075
Sullivan County	3,825	6,101	3,678	3,638	3,593	3,456	3,336	3,230	3,129
Ulster County	11,773	10,109	11,940	12,001	12,096	12,201	12,374	12,465	12,417
Westchester County	28,704	26,889	32,679	33,142	33,372	34,203	36,013	38,642	39,790
Mid Hudson	86,272	83,291	93,372	95,738	97,316	99,686	103,937	109,540	111,533
Bergen County	10,422	11,114	11,680	12,077	12,400	12,825	13,448	14,642	15,173
Essex County	23,772	21,946	25,767	27,170	28,270	29,101	29,784	30,754	30,905
Hudson County	9,378	7,314	10,290	10,887	11,770	12,556	13,309	13,930	13,950
Hunterdon County	3,571	5,012	4,029	3,835	3,837	3,811	3,891	4,031	4,078
Mercer County	19,803	18,568	19,894	20,468	21,340	22,051	22,596	23,236	23,662
Middlesex County	23,835	27,829	25,651	26,338	26,959	27,623	28,719	29,729	30,044
Monmouth County	7,670	7,104	8,303	8,574	8,992	9,568	10,295	11,057	11,386
Morris County	8,866	9,290	10,314	10,537	10,734	10,966	11,451	12,244	12,819
Ocean County	7,163	6,907	7,370	7,733	8,344	9,228	9,910	10,756	11,409
Passaic County	11,019	11,114	11,789	12,249	12,637	12,933	13,500	14,398	14,879
Somerset County	3,970	9,585	4,642	4,860	5,160	5,541	6,080	6,672	7,118
Sussex County	1,742	4,101	2,061	2,224	2,483	2,793	3,124	3,437	3,641
Union County	6,804	2,084	7,367	7,744	8,228	8,690	9,164	9,664	9,854
Warren County	1,968	7,572	2,053	2,050	2,124	2,329	2,600	2,843	3,051
New Jersey	139,983	149,540	151,210	156,746	163,279	170,015	177,870	187,393	191,970
Fairfield County	19,168	18,034	21,447	21,845	22,328	23,264	24,623	26,340	27,145
Litchfield County	2,804	3,229	2,909	3,115	3,440	3,862	4,254	4,635	4,808
New Haven County	29,198	28,775	30,377	30,610	30,993	32,152	34,059	36,253	37,226
Connecticut	51,170	50,038	54,733	55,571	56,761	59,278	62,936	67,229	69,179

Group Quarters Differential 2050 Forecast and Update (000s)									
AREA NAME	2010	2015	2020	2025	2030	2035	2040	2045	2050
31-County Region	0	-4,787	11,642	13,544	10,696	4,966	3,166	4,606	-856
Bronx County	0	0	0	0	0	0	0	0	0
Kings County	0	0	0	0	0	0	0	0	0
New York County	0	0	0	0	0	0	0	0	0
Queens County	0	0	0	0	0	0	0	0	0
Richmond County	0	0	0	0	0	0	0	0	0
New York City	0	0	0	0	0	0	0	0	0
Nassau County	0	-2,333	1,452	1,545	1,143	868	1,113	1,275	1,016
Suffolk County	0	1,518	1,065	1,089	528	-179	-30	266	374
Long Island	0	-814	2,517	2,634	1,670	689	1,083	1,541	1,390
Dutchess County	0	-1,704	660	896	597	41	-335	-359	-902
Orange County	0	-986	342	599	243	-151	-354	-361	-741
Putnam County	0	-91	169	233	243	201	155	140	86
Rockland County	0	-249	268	424	522	487	511	643	383
Sullivan County	0	2,378	37	-2	-177	-443	-674	-880	-1,093
Ulster County	0	-1,651	319	313	173	-81	-226	-421	-619
Westchester County	0	-3,384	2,163	2,156	1,451	584	867	1,518	1,063
Mid Hudson	0	-5,686	3,957	4,619	3,051	638	-56	281	-1,823
Bergen County	0	-89	300	475	507	383	510	987	1,015
Essex County	0	-2,098	1,413	2,091	2,332	2,286	1,964	1,897	964
Hudson County	0	-2,299	691	803	958	1,066	1,210	1,304	872
Hunterdon County	0	1,151	145	-48	-75	-166	-218	-273	-358
Mercer County	0	-1,539	-490	-397	-249	-693	-1,481	-2,210	-3,026
Middlesex County	0	3,099	426	741	817	315	-69	-290	-1,022
Monmouth County	0	-826	165	149	81	-64	14	150	235
Morris County	0	-378	97	65	25	-155	-168	-36	77
Ocean County	0	-241	135	121	109	211	305	499	586
Passaic County	0	-130	499	727	751	508	277	398	230
Somerset County	0	5,188	16	-8	6	-83	-56	-30	-7
Sussex County	0	2,186	-47	-100	-136	-162	-147	-117	-62
Union County	0	-5,005	188	286	417	445	518	603	510
Warren County	0	5,516	-38	-113	-170	-175	-180	-228	-182
New Jersey	0	4,534	3,501	4,793	5,371	3,717	2,477	2,653	-168
Fairfield County	0	-2,278	900	814	538	377	308	557	348
Litchfield County	0	367	-71	-87	-118	-123	-77	4	75
New Haven County	0	-909	838	771	184	-331	-569	-431	-679
Connecticut	0	-2,820	1,667	1,498	603	-77	-338	131	-255

Technical Memorandum 2: Models Update to 2017 Baseline

Group Quarters Population Percent Differential 2050 Forecast and Update									
AREA NAME	2010	2015	2020	2025	2030	2035	2040	2045	2050
31-County Region	0.0%	-0.9%	2.2%	2.5%	1.9%	0.9%	0.5%	0.7%	-0.1%
Bronx County	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Kings County	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
New York County	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Queens County	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Richmond County	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
New York City	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Nassau County	0.0%	-10.3%	6.4%	6.7%	4.8%	3.5%	4.2%	4.6%	3.6%
Suffolk County	0.0%	4.9%	3.4%	3.4%	1.5%	-0.5%	-0.1%	0.6%	0.8%
Long Island	0.0%	-1.5%	4.7%	4.7%	2.9%	1.1%	1.6%	2.2%	1.9%
Dutchess County	0.0%	-8.4%	3.3%	4.5%	3.0%	0.2%	-1.5%	-1.5%	-3.7%
Orange County	0.0%	-7.8%	2.6%	4.4%	1.7%	-1.0%	-2.1%	-2.0%	-3.9%
Putnam County	0.0%	-3.4%	6.2%	8.3%	8.3%	6.6%	4.9%	4.2%	2.6%
Rockland County	0.0%	-3.2%	3.3%	5.0%	5.8%	5.1%	5.1%	6.2%	3.6%
Sullivan County	0.0%	63.9%	1.0%	0.0%	-4.7%	-11.4%	-16.8%	-21.4%	-25.9%
Ulster County	0.0%	-14.0%	2.7%	2.7%	1.5%	-0.7%	-1.8%	-3.3%	-4.7%
Westchester County	0.0%	-11.2%	7.1%	7.0%	4.5%	1.7%	2.5%	4.1%	2.7%
Mid Hudson	0.0%	-6.4%	4.4%	5.1%	3.2%	0.6%	-0.1%	0.3%	-1.6%
Bergen County	0.0%	-0.8%	2.6%	4.1%	4.3%	3.1%	3.9%	7.2%	7.2%
Essex County	0.0%	-8.7%	5.8%	8.3%	9.0%	8.5%	7.1%	6.6%	3.2%
Hudson County	0.0%	-23.9%	7.2%	8.0%	8.9%	9.3%	10.0%	10.3%	6.7%
Hunterdon County	0.0%	29.8%	3.7%	-1.2%	-1.9%	-4.2%	-5.3%	-6.4%	-8.1%
Mercer County	0.0%	-7.7%	-2.4%	-1.9%	-1.2%	-3.0%	-6.2%	-8.7%	-11.3%
Middlesex County	0.0%	12.5%	1.7%	2.9%	3.1%	1.2%	-0.2%	-1.0%	-3.3%
Monmouth County	0.0%	-10.4%	2.0%	1.8%	0.9%	-0.7%	0.1%	1.4%	2.1%
Morris County	0.0%	-3.9%	1.0%	0.6%	0.2%	-1.4%	-1.4%	-0.3%	0.6%
Ocean County	0.0%	-3.4%	1.9%	1.6%	1.3%	2.3%	3.2%	4.9%	5.4%
Passaic County	0.0%	-1.2%	4.4%	6.3%	6.3%	4.1%	2.1%	2.8%	1.6%
Somerset County	0.0%	118.0%	0.3%	-0.2%	0.1%	-1.5%	-0.9%	-0.4%	-0.1%
Sussex County	0.0%	114.2%	-2.2%	-4.3%	-5.2%	-5.5%	-4.5%	-3.3%	-1.7%
Union County	0.0%	-70.6%	2.6%	3.8%	5.3%	5.4%	6.0%	6.7%	5.5%
Warren County	0.0%	268.2%	-1.8%	-5.2%	-7.4%	-7.0%	-6.5%	-7.4%	-5.6%
New Jersey	0.0%	3.1%	2.4%	3.2%	3.4%	2.2%	1.4%	1.4%	-0.1%
Fairfield County	0.0%	-11.2%	4.4%	3.9%	2.5%	1.6%	1.3%	2.2%	1.3%
Litchfield County	0.0%	12.8%	-2.4%	-2.7%	-3.3%	-3.1%	-1.8%	0.1%	1.6%
New Haven County	0.0%	-3.1%	2.8%	2.6%	0.6%	-1.0%	-1.6%	-1.2%	-1.8%
Connecticut	0.0%	-5.3%	3.1%	2.8%	1.1%	-0.1%	-0.5%	0.2%	-0.4%

Figure 47. Labor Force: Comparison of 2050 Forecast and 2050 Forecast Update

AREA NAME	2050 Forecast Labor Force								
	2010	2015	2020	2025	2030	2035	2040	2045	2050
31-County Region	11,568,295	11,758,530	11,945,120	12,055,456	12,202,507	12,461,969	12,780,802	13,097,600	13,413,002
Bronx County	617,531	639,568	658,901	667,862	675,426	688,016	703,985	715,512	724,966
Kings County	1,236,176	1,268,601	1,298,927	1,313,280	1,331,047	1,357,935	1,383,097	1,394,596	1,399,489
New York County	921,966	939,387	963,700	967,339	968,735	976,121	985,267	990,676	991,260
Queens County	1,185,673	1,192,232	1,223,386	1,222,280	1,223,477	1,232,218	1,243,348	1,250,296	1,255,855
Richmond County	217,944	223,729	229,045	228,153	227,229	227,822	229,374	231,736	232,854
New York City	4,179,290	4,263,518	4,373,960	4,398,914	4,425,914	4,482,112	4,545,072	4,582,817	4,604,423
Nassau County	688,439	695,232	695,078	702,762	718,706	744,763	778,805	812,319	845,318
Suffolk County	784,674	777,227	780,721	784,788	792,891	808,366	830,276	853,771	877,474
Long Island	1,473,113	1,472,459	1,475,799	1,487,550	1,511,596	1,553,129	1,609,080	1,666,091	1,722,792
Dutchess County	155,789	162,101	162,202	162,102	163,052	166,082	171,058	177,149	182,767
Orange County	182,275	191,630	194,927	201,114	209,539	220,336	233,791	248,275	263,005
Putnam County	54,348	53,857	53,957	53,493	52,946	53,463	54,746	56,302	57,711
Rockland County	150,999	159,769	160,785	164,822	170,920	178,303	187,159	195,353	203,814
Sullivan County	39,099	38,618	38,403	38,589	40,268	41,642	42,892	44,158	45,530
Ulster County	94,826	94,852	94,947	94,476	94,418	95,299	96,177	97,455	98,608
Westchester County	497,887	501,871	506,684	516,215	528,333	547,161	567,671	591,054	618,046
Mid Hudson	1,175,224	1,202,698	1,211,906	1,230,810	1,259,477	1,302,285	1,353,492	1,409,745	1,469,481
Bergen County	480,575	487,509	494,679	501,337	505,381	514,247	522,213	535,012	551,797
Essex County	400,430	410,232	414,817	421,755	430,353	440,565	452,600	465,424	481,733
Hudson County	360,289	366,115	371,580	380,344	395,707	413,267	430,422	445,884	460,872
Hunterdon County	69,840	75,029	75,563	74,387	72,630	72,654	73,626	75,507	77,217
Mercer County	195,951	194,390	197,576	202,630	209,043	218,086	227,716	237,992	248,754
Middlesex County	433,695	430,921	436,886	441,450	449,317	461,448	475,571	488,707	505,619
Monmouth County	333,624	337,687	338,259	334,837	330,274	332,534	337,918	345,868	351,740
Morris County	268,515	276,782	283,411	283,260	280,503	278,582	279,715	283,044	286,628
Ocean County	271,103	268,668	273,330	281,325	289,713	308,648	322,590	337,665	352,621
Passaic County	250,474	255,961	260,226	264,565	270,304	276,959	289,759	302,729	316,292
Somerset County	180,098	182,114	184,964	185,827	184,249	185,733	189,650	195,079	202,386
Sussex County	82,916	84,600	83,631	81,062	78,616	78,668	80,099	81,904	83,213
Union County	290,559	297,556	302,143	307,806	315,242	325,583	337,510	350,009	363,239
Warren County	58,848	59,523	60,089	59,956	59,422	59,117	60,198	61,300	62,202
New Jersey	3,676,918	3,727,085	3,777,155	3,820,540	3,870,753	3,966,089	4,079,586	4,206,122	4,344,313
Fairfield County	485,934	509,824	515,991	522,245	531,583	544,383	563,152	583,585	605,329
Litchfield County	106,195	110,609	110,090	108,323	106,406	106,066	106,976	109,140	110,958
New Haven County	471,620	472,336	480,219	487,073	496,778	507,905	523,444	540,100	555,705
Connecticut	1,063,750	1,092,770	1,106,300	1,117,641	1,134,767	1,158,354	1,193,572	1,232,825	1,271,993

Technical Memorandum 2: Models Update to 2017 Baseline

Update Labor Force									
AREA NAME	2010	2015	2020	2025	2030	2035	2040	2045	2050
31- County Region	11,568,295	12,510,618	12,647,342	12,903,638	13,047,719	13,138,990	13,230,884	13,308,577	13,049,017
Bronx County	617,531	646,166	660,002	672,396	680,317	693,545	710,298	721,893	720,881
Kings County	1,236,176	1,309,809	1,359,591	1,325,056	1,343,443	1,370,531	1,395,637	1,406,777	1,405,782
New York County	921,966	948,774	973,470	963,455	963,732	970,965	981,383	988,081	981,431
Queens County	1,185,673	1,204,289	1,218,675	1,221,195	1,222,203	1,230,975	1,242,170	1,247,594	1,254,848
Richmond County	217,944	221,719	220,188	227,771	226,769	227,168	228,455	230,830	228,915
New York City	4,179,290	4,330,757	4,431,927	4,409,872	4,436,463	4,493,184	4,557,943	4,595,175	4,591,857
Nassau County	688,439	867,449	823,756	855,221	861,916	856,292	850,331	840,852	808,635
Suffolk County	784,674	889,293	860,692	874,662	873,407	859,269	853,257	848,604	823,721
Long Island	1,473,113	1,756,742	1,684,448	1,729,883	1,735,323	1,715,561	1,703,588	1,689,456	1,632,356
Dutchess County	155,789	162,774	164,916	170,917	171,417	170,868	171,402	172,762	165,427
Orange County	182,275	190,340	203,882	216,326	224,351	229,682	236,283	243,405	239,537
Putnam County	54,348	58,411	59,664	60,996	60,860	59,868	59,756	59,581	58,348
Rockland County	150,999	174,227	177,618	187,617	195,030	199,097	201,884	203,961	195,850
Sullivan County	39,099	38,270	38,381	38,251	37,255	35,886	34,539	33,312	32,326
Ulster County	94,826	97,971	97,003	98,328	97,239	95,776	94,528	93,671	90,889
Westchester County	497,887	571,732	584,322	605,578	615,559	614,743	611,343	610,397	601,988
Mid Hudson	1,175,224	1,293,725	1,325,785	1,378,013	1,401,711	1,405,921	1,409,736	1,417,089	1,384,365
Bergen County	480,575	539,297	549,284	582,219	594,695	597,236	591,508	588,051	553,765
Essex County	400,430	426,323	452,865	478,273	492,143	498,050	499,557	501,073	482,507
Hudson County	360,289	411,361	430,817	456,136	476,773	490,112	495,022	497,431	467,200
Hunterdon County	69,840	77,729	71,244	69,070	67,016	65,425	65,506	65,887	64,639
Mercer County	195,951	206,116	191,002	200,561	206,746	213,246	218,230	224,227	220,717
Middlesex County	433,695	485,319	464,023	471,753	479,886	486,676	490,469	491,272	476,778
Monmouth County	333,624	355,637	363,364	362,279	356,637	350,932	348,001	348,677	340,629
Morris County	268,515	291,509	295,705	296,939	292,487	282,462	275,862	275,126	273,429
Ocean County	271,103	294,361	291,246	308,930	320,842	341,004	352,932	365,122	356,791
Passaic County	250,474	260,658	277,007	290,542	299,872	302,780	309,976	316,176	308,797
Somerset County	180,098	205,528	191,920	194,684	193,462	192,301	192,633	194,513	191,482
Sussex County	82,916	84,620	85,129	81,277	77,810	74,585	74,090	74,365	74,580
Union County	290,559	315,979	321,683	336,797	347,102	354,226	359,158	363,504	355,286
Warren County	58,848	61,231	60,249	58,789	57,086	55,234	54,853	54,810	56,388
New Jersey	3,676,918	4,015,668	4,045,536	4,188,248	4,262,557	4,304,268	4,327,795	4,360,235	4,222,990
Fairfield County	485,934	524,690	553,541	571,790	578,933	582,932	589,063	595,689	582,480
Litchfield County	106,195	112,883	109,218	108,782	106,214	104,264	103,418	104,421	103,404
New Haven County	471,620	476,153	496,887	517,050	526,519	532,861	539,341	546,513	531,565
Connecticut	1,063,750	1,113,726	1,159,645	1,197,622	1,211,665	1,220,056	1,231,822	1,246,622	1,217,450

Technical Memorandum 2: Models Update to 2017 Baseline

Labor Force Differential 2050 Forecast and Update									
AREA NAME	2010	2015	2020	2025	2030	2035	2040	2045	2050
31-County Region	0	752,088	702,222	848,183	845,211	677,021	450,082	210,976	-363,985
Bronx County	0	6,598	1,101	4,534	4,891	5,529	6,313	6,381	-4,085
Kings County	0	41,207	60,664	11,776	12,396	12,596	12,540	12,181	6,293
New York County	0	9,387	9,770	-3,884	-5,003	-5,156	-3,884	-2,595	-9,829
Queens County	0	12,057	-4,711	-1,086	-1,275	-1,243	-1,178	-2,702	-1,007
Richmond County	0	-2,010	-8,857	-382	-460	-654	-919	-907	-3,939
New York City	0	67,239	57,967	10,959	10,548	11,072	12,871	12,358	-12,567
Nassau County	0	172,217	128,678	152,459	143,210	111,529	71,526	28,533	-36,682
Suffolk County	0	112,066	79,971	89,873	80,516	50,903	22,982	-5,167	-53,754
Long Island	0	284,283	208,649	242,332	223,726	162,433	94,508	23,365	-90,436
Dutchess County	0	673	2,714	8,815	8,365	4,786	345	-4,387	-17,340
Orange County	0	-1,291	8,955	15,212	14,812	9,346	2,492	-4,870	-23,468
Putnam County	0	4,554	5,707	7,503	7,913	6,405	5,010	3,279	636
Rockland County	0	14,458	16,832	22,795	24,111	20,794	14,725	8,608	-7,964
Sullivan County	0	-348	-22	-338	-3,013	-5,756	-8,352	-10,846	-13,204
Ulster County	0	3,119	2,056	3,853	2,821	478	-1,649	-3,783	-7,719
Westchester County	0	69,861	77,638	89,363	87,226	67,582	43,673	19,342	-16,058
Mid Hudson	0	91,027	113,880	147,203	142,234	103,635	56,244	7,343	-85,116
Bergen County	0	51,788	54,606	80,883	89,314	82,989	69,295	53,039	1,969
Essex County	0	16,091	38,048	56,517	61,790	57,485	46,958	35,649	773
Hudson County	0	45,246	59,237	75,792	81,066	76,845	64,600	51,548	6,327
Hunterdon County	0	2,700	-4,320	-5,317	-5,614	-7,229	-8,120	-9,620	-12,578
Mercer County	0	11,725	-6,574	-2,070	-2,297	-4,840	-9,486	-13,765	-28,037
Middlesex County	0	54,398	27,136	30,303	30,569	25,228	14,898	2,566	-28,840
Monmouth County	0	17,951	25,105	27,443	26,364	18,399	10,083	2,810	-11,111
Morris County	0	14,728	12,294	13,679	11,984	3,880	-3,853	-7,919	-13,199
Ocean County	0	25,694	17,916	27,606	31,129	32,356	30,342	27,457	4,171
Passaic County	0	4,697	16,781	25,977	29,568	25,821	20,217	13,447	-7,495
Somerset County	0	23,414	6,955	8,856	9,213	6,567	2,982	-566	-10,904
Sussex County	0	19	1,498	215	-806	-4,083	-6,009	-7,539	-8,632
Union County	0	18,424	19,540	28,990	31,860	28,643	21,648	13,495	-7,954
Warren County	0	1,708	159	-1,166	-2,336	-3,883	-5,345	-6,489	-5,814
New Jersey	0	288,583	268,381	367,708	391,804	338,179	248,209	154,113	-121,324
Fairfield County	0	14,866	37,549	49,544	47,350	38,549	25,911	12,103	-22,849
Litchfield County	0	2,274	-873	459	-192	-1,803	-3,558	-4,719	-7,553
New Haven County	0	3,816	16,668	29,977	29,741	24,956	15,897	6,413	-24,140
Connecticut	0	20,956	53,345	79,981	76,898	61,702	38,250	13,797	-54,542

Labor Force Percent Differential 2050 Forecast and Update									
AREA NAME	2010	2015	2020	2025	2030	2035	2040	2045	2050
31-County Region	0.0%	6.4%	5.9%	7.0%	6.9%	5.4%	3.5%	1.6%	-2.7%
Bronx County	0.0%	1.0%	0.2%	0.7%	0.7%	0.8%	0.9%	0.9%	-0.6%
Kings County	0.0%	3.2%	4.7%	0.9%	0.9%	0.9%	0.9%	0.9%	0.4%
New York County	0.0%	1.0%	1.0%	-0.4%	-0.5%	-0.5%	-0.4%	-0.3%	-1.0%
Queens County	0.0%	1.0%	-0.4%	-0.1%	-0.1%	-0.1%	-0.1%	-0.2%	-0.1%
Richmond County	0.0%	-0.9%	-3.9%	-0.2%	-0.2%	-0.3%	-0.4%	-0.4%	-1.7%
New York City	0.0%	1.6%	1.3%	0.2%	0.2%	0.2%	0.3%	0.3%	-0.3%
Nassau County	0.0%	24.8%	18.5%	21.7%	19.9%	15.0%	9.2%	3.5%	-4.3%
Suffolk County	0.0%	14.4%	10.2%	11.5%	10.2%	6.3%	2.8%	-0.6%	-6.1%
Long Island	0.0%	19.3%	14.1%	16.3%	14.8%	10.5%	5.9%	1.4%	-5.2%
Dutchess County	0.0%	0.4%	1.7%	5.4%	5.1%	2.9%	0.2%	-2.5%	-9.5%
Orange County	0.0%	-0.7%	4.6%	7.6%	7.1%	4.2%	1.1%	-2.0%	-8.9%
Putnam County	0.0%	8.5%	10.6%	14.0%	14.9%	12.0%	9.2%	5.8%	1.1%
Rockland County	0.0%	9.0%	10.5%	13.8%	14.1%	11.7%	7.9%	4.4%	-3.9%
Sullivan County	0.0%	-0.9%	-0.1%	-0.9%	-7.5%	-13.8%	-19.5%	-24.6%	-29.0%
Ulster County	0.0%	3.3%	2.2%	4.1%	3.0%	0.5%	-1.7%	-3.9%	-7.8%
Westchester County	0.0%	13.9%	15.3%	17.3%	16.5%	12.4%	7.7%	3.3%	-2.6%
Mid Hudson	0.0%	7.6%	9.4%	12.0%	11.3%	8.0%	4.2%	0.5%	-5.8%
Bergen County	0.0%	10.6%	11.0%	16.1%	17.7%	16.1%	13.3%	9.9%	0.4%
Essex County	0.0%	3.9%	9.2%	13.4%	14.4%	13.0%	10.4%	7.7%	0.2%
Hudson County	0.0%	12.4%	15.9%	19.9%	20.5%	18.6%	15.0%	11.6%	1.4%
Hunterdon County	0.0%	3.6%	-5.7%	-7.1%	-7.7%	-9.9%	-11.0%	-12.7%	-16.3%
Mercer County	0.0%	6.0%	-3.3%	-1.0%	-1.1%	-2.2%	-4.2%	-5.8%	-11.3%
Middlesex County	0.0%	12.6%	6.2%	6.9%	6.8%	5.5%	3.1%	0.5%	-5.7%
Monmouth County	0.0%	5.3%	7.4%	8.2%	8.0%	5.5%	3.0%	0.8%	-3.2%
Morris County	0.0%	5.3%	4.3%	4.8%	4.3%	1.4%	-1.4%	-2.8%	-4.6%
Ocean County	0.0%	9.6%	6.6%	9.8%	10.7%	10.5%	9.4%	8.1%	1.2%
Passaic County	0.0%	1.8%	6.4%	9.8%	10.9%	9.3%	7.0%	4.4%	-2.4%
Somerset County	0.0%	12.9%	3.8%	4.8%	5.0%	3.5%	1.6%	-0.3%	-5.4%
Sussex County	0.0%	0.0%	1.8%	0.3%	-1.0%	-5.2%	-7.5%	-9.2%	-10.4%
Union County	0.0%	6.2%	6.5%	9.4%	10.1%	8.8%	6.4%	3.9%	-2.2%
Warren County	0.0%	2.9%	0.3%	-1.9%	-3.9%	-6.6%	-8.9%	-10.6%	-9.3%
New Jersey	0.0%	7.7%	7.1%	9.6%	10.1%	8.5%	6.1%	3.7%	-2.8%
Fairfield County	0.0%	2.9%	7.3%	9.5%	8.9%	7.1%	4.6%	2.1%	-3.8%
Litchfield County	0.0%	2.1%	-0.8%	0.4%	-0.2%	-1.7%	-3.3%	-4.3%	-6.8%
New Haven County	0.0%	0.8%	3.5%	6.2%	6.0%	4.9%	3.0%	1.2%	-4.3%
Connecticut	0.0%	1.9%	4.8%	7.2%	6.8%	5.3%	3.2%	1.1%	-4.3%

Figure 48. Employed Labor Force: Comparison of 2050 Forecast and 2050 Forecast Update

AREA NAME	2050 Forecast Employed Labor Force								
	2010	2015	2020	2025	2030	2035	2040	2045	2050
31-County Region	10,370,686	10,829,311	11,131,027	11,302,727	11,484,168	11,729,446	12,030,019	12,329,308	12,627,509
Bronx County	520,228	559,065	585,805	599,003	609,091	620,517	634,919	645,315	653,842
Kings County	1,101,924	1,152,228	1,193,810	1,214,446	1,235,586	1,260,650	1,284,009	1,294,684	1,299,227
New York County	837,475	867,651	896,415	903,122	906,501	913,458	922,017	927,079	927,625
Queens County	1,054,073	1,095,184	1,134,148	1,138,546	1,143,049	1,151,289	1,161,688	1,168,180	1,173,373
Richmond County	198,188	209,992	216,609	216,616	216,267	216,843	218,320	220,569	221,632
New York City	3,711,889	3,884,121	4,026,789	4,071,732	4,110,495	4,162,756	4,220,954	4,255,827	4,275,699
Nassau County	631,146	654,173	660,674	671,502	688,986	714,016	746,653	778,783	810,419
Suffolk County	719,152	730,791	741,118	748,692	758,764	773,624	794,592	817,079	839,763
Long Island	1,350,298	1,384,964	1,401,792	1,420,194	1,447,750	1,487,640	1,541,245	1,595,862	1,650,182
Dutchess County	140,167	149,906	152,065	153,054	154,632	157,520	162,239	168,016	173,344
Orange County	167,127	177,243	181,662	188,169	196,534	206,672	219,293	232,879	246,695
Putnam County	49,413	50,026	50,852	50,796	50,512	51,010	52,234	53,718	55,063
Rockland County	139,826	149,706	152,790	157,771	164,350	171,466	179,982	187,862	195,999
Sullivan County	33,369	34,896	35,440	36,001	37,821	39,117	40,291	41,480	42,769
Ulster County	85,282	86,545	88,367	88,834	89,345	90,191	91,022	92,231	93,323
Westchester County	455,021	466,811	475,858	487,252	500,251	518,112	537,534	559,676	585,235
Mid Hudson	1,070,207	1,115,133	1,137,034	1,161,877	1,193,445	1,234,088	1,282,594	1,335,863	1,392,428
Bergen County	439,847	458,298	469,355	477,966	483,266	491,775	499,393	511,633	527,685
Essex County	344,101	361,096	372,938	383,338	393,804	403,207	414,222	425,958	440,885
Hudson County	313,256	336,181	345,519	355,988	371,874	388,410	404,534	419,065	433,152
Hunterdon County	62,863	70,448	71,926	71,309	69,932	69,962	70,898	72,710	74,357
Mercer County	174,984	176,692	182,340	188,484	195,401	203,876	212,879	222,485	232,546
Middlesex County	390,279	401,893	412,230	419,066	428,143	439,738	453,196	465,714	481,830
Monmouth County	304,710	313,377	317,498	316,150	312,989	315,156	320,259	327,793	333,359
Morris County	245,210	262,407	271,443	272,740	270,977	269,140	270,235	273,451	276,913
Ocean County	241,314	247,546	255,628	265,147	274,367	292,329	305,534	319,812	333,977
Passaic County	222,718	235,315	243,408	249,691	256,527	262,874	275,023	287,334	300,207
Somerset County	167,223	172,129	176,337	177,957	176,939	178,375	182,137	187,351	194,369
Sussex County	73,759	78,702	78,844	76,953	74,953	75,009	76,373	78,095	79,342
Union County	254,625	271,367	280,510	288,418	297,079	306,862	318,103	329,883	342,353
Warren County	53,593	55,051	56,228	56,445	56,153	55,869	56,891	57,932	58,785
New Jersey	3,288,483	3,440,502	3,534,201	3,599,652	3,662,405	3,752,583	3,859,677	3,979,216	4,109,759
Fairfield County	433,778	469,841	480,672	489,231	499,715	511,786	529,431	548,641	569,083
Litchfield County	95,796	103,520	104,335	103,331	101,914	101,597	102,469	104,541	106,282
New Haven County	420,236	431,229	446,203	456,709	468,444	478,995	493,650	509,358	524,075
Connecticut	949,810	1,004,590	1,031,210	1,049,271	1,070,073	1,092,378	1,125,549	1,162,540	1,199,440

Update Employed Labor Force									
AREA NAME	2010	2015	2020	2025	2030	2035	2040	2045	2050
31-County Region	10,370,686	11,694,391	12,055,788	12,214,166	12,393,320	12,520,868	12,649,662	12,766,000	12,557,334
Bronx County	520,228	576,814	595,559	600,107	610,471	625,591	644,032	657,928	660,384
Kings County	1,101,924	1,209,665	1,282,843	1,241,452	1,263,059	1,292,852	1,320,939	1,335,921	1,339,412
New York County	837,475	890,568	926,520	912,622	915,027	923,984	936,010	944,524	940,279
Queens County	1,054,073	1,122,073	1,163,339	1,159,094	1,163,317	1,174,849	1,188,746	1,197,162	1,207,367
Richmond County	198,188	209,834	211,880	218,119	217,676	218,560	220,303	223,102	221,757
New York City	3,711,889	4,008,954	4,180,140	4,131,393	4,169,551	4,235,837	4,310,029	4,358,639	4,369,200
Nassau County	631,146	825,691	801,309	827,302	836,060	832,799	829,180	822,091	792,665
Suffolk County	719,152	845,160	831,859	840,882	841,870	830,332	826,598	824,154	801,990
Long Island	1,350,298	1,670,851	1,633,168	1,668,184	1,677,931	1,663,132	1,655,778	1,646,245	1,594,655
Dutchess County	140,167	150,476	159,277	163,983	164,999	164,987	166,022	167,862	161,236
Orange County	167,127	180,962	196,002	206,982	215,161	220,770	227,624	235,011	231,793
Putnam County	49,413	55,321	57,112	57,953	58,036	57,293	57,387	57,420	56,428
Rockland County	139,826	162,810	170,951	179,186	186,975	191,574	194,965	197,688	190,515
Sullivan County	33,369	34,944	35,051	34,374	33,745	32,754	31,765	30,867	30,178
Ulster County	85,282	92,499	92,873	93,239	92,645	91,669	90,886	90,471	88,180
Westchester County	455,021	537,170	558,221	575,345	586,415	587,172	585,450	586,067	579,496
Mid Hudson	1,070,207	1,214,180	1,269,487	1,311,062	1,337,976	1,346,218	1,354,100	1,365,386	1,337,826
Bergen County	439,847	514,850	531,424	560,084	573,692	577,703	573,709	571,892	539,996
Essex County	344,101	382,741	423,382	442,211	457,523	465,449	469,300	473,174	458,000
Hudson County	313,256	381,215	414,684	435,944	457,263	471,643	477,972	481,909	454,134
Hunterdon County	62,863	74,475	69,362	66,639	64,946	63,677	64,028	64,675	63,720
Mercer County	174,984	190,836	181,969	189,590	196,189	203,107	208,622	215,143	212,552
Middlesex County	390,279	458,718	445,528	449,870	459,164	467,169	472,331	474,627	462,102
Monmouth County	304,710	335,357	348,253	344,630	340,511	336,253	334,622	336,454	329,842
Morris County	245,210	277,007	286,892	286,284	282,864	273,985	268,379	268,457	267,590
Ocean County	241,314	278,318	279,233	293,320	306,091	326,830	339,817	353,164	346,679
Passaic County	222,718	248,440	267,396	277,222	287,766	292,159	300,744	308,433	302,870
Somerset County	167,223	194,675	185,665	187,342	186,652	185,999	186,789	189,085	186,604
Sussex County	73,759	79,990	81,479	77,110	74,141	71,366	71,187	71,748	72,253
Union County	254,625	292,603	306,683	317,698	329,135	337,587	344,006	349,908	343,697
Warren County	53,593	57,191	57,611	55,876	54,419	52,804	52,591	52,700	54,372
New Jersey	3,288,483	3,766,415	3,879,560	3,983,823	4,070,357	4,125,731	4,164,095	4,211,369	4,094,411
Fairfield County	433,778	484,328	521,275	534,856	543,329	548,827	556,363	564,404	553,633
Litchfield County	95,796	106,417	104,044	102,707	100,724	99,295	98,906	100,286	99,726
New Haven County	420,236	443,245	468,113	482,141	493,454	501,828	510,392	519,672	507,884
Connecticut	949,810	1,033,990	1,093,433	1,119,704	1,137,507	1,149,950	1,165,661	1,184,361	1,161,243

Employed Labor Force Differential 2050 Forecast and Update									
AREA NAME	2010	2015	2020	2025	2030	2035	2040	2045	2050
31-County Region	0	865,080	924,762	911,440	909,153	791,421	619,643	436,692	-70,175
Bronx County	0	17,749	9,754	1,104	1,381	5,075	9,113	12,613	6,542
Kings County	0	57,437	89,032	27,006	27,473	32,202	36,929	41,237	40,186
New York County	0	22,917	30,104	9,500	8,526	10,526	13,993	17,446	12,655
Queens County	0	26,889	29,190	20,548	20,268	23,560	27,058	28,983	33,994
Richmond County	0	-158	-4,729	1,503	1,408	1,717	1,982	2,533	124
New York City	0	124,834	153,351	59,661	59,055	73,081	89,075	102,812	93,501
Nassau County	0	171,518	140,635	155,801	147,074	118,783	82,527	43,307	-17,755
Suffolk County	0	114,369	90,741	92,190	83,106	56,708	32,006	7,075	-37,772
Long Island	0	285,886	231,376	247,990	230,181	175,491	114,533	50,383	-55,527
Dutchess County	0	570	7,212	10,929	10,367	7,468	3,783	-154	-12,108
Orange County	0	3,719	14,340	18,813	18,627	14,097	8,332	2,132	-14,902
Putnam County	0	5,295	6,260	7,158	7,524	6,282	5,154	3,702	1,365
Rockland County	0	13,104	18,161	21,415	22,625	20,108	14,982	9,826	-5,484
Sullivan County	0	48	-390	-1,627	-4,076	-6,362	-8,526	-10,613	-12,591
Ulster County	0	5,955	4,506	4,405	3,299	1,478	-136	-1,760	-5,143
Westchester County	0	70,358	82,363	88,093	86,164	69,059	47,917	26,391	-5,739
Mid Hudson	0	99,047	132,452	149,185	144,531	112,130	71,506	29,523	-54,603
Bergen County	0	56,552	62,070	82,118	90,426	85,928	74,315	60,259	12,311
Essex County	0	21,645	50,444	58,873	63,718	62,242	55,078	47,215	17,115
Hudson County	0	45,034	69,164	79,955	85,389	83,233	73,438	62,844	20,981
Hunterdon County	0	4,027	-2,564	-4,670	-4,986	-6,285	-6,870	-8,034	-10,637
Mercer County	0	14,144	-370	1,107	788	-769	-4,257	-7,342	-19,994
Middlesex County	0	56,825	33,298	30,804	31,021	27,431	19,134	8,913	-19,728
Monmouth County	0	21,981	30,755	28,480	27,522	21,097	14,364	8,661	-3,517
Morris County	0	14,600	15,449	13,544	11,888	4,845	-1,856	-4,995	-9,323
Ocean County	0	30,771	23,605	28,173	31,725	34,501	34,283	33,352	12,702
Passaic County	0	13,125	23,988	27,531	31,239	29,285	25,721	21,100	2,663
Somerset County	0	22,546	9,328	9,385	9,713	7,624	4,651	1,734	-7,764
Sussex County	0	1,288	2,634	157	-811	-3,644	-5,186	-6,347	-7,089
Union County	0	21,235	26,174	29,280	32,057	30,724	25,902	20,025	1,344
Warren County	0	2,140	1,383	-568	-1,735	-3,065	-4,300	-5,232	-4,414
New Jersey	0	325,913	345,359	384,170	407,952	373,147	304,418	232,153	-15,349
Fairfield County	0	14,487	40,603	45,625	43,614	37,041	26,932	15,763	-15,450
Litchfield County	0	2,896	-291	-624	-1,190	-2,302	-3,563	-4,255	-6,556
New Haven County	0	12,017	21,911	25,432	25,009	22,833	16,742	10,314	-16,191
Connecticut	0	29,400	62,223	70,433	67,433	57,572	40,111	21,821	-38,197

Employed Labor Force Percent Differential 2050 Forecast and Update									
AREA NAME	2010	2015	2020	2025	2030	2035	2040	2045	2050
31-County Region	0.0%	8.0%	8.3%	8.1%	7.9%	6.7%	5.2%	3.5%	-0.6%
Bronx County	0.0%	3.2%	1.7%	0.2%	0.2%	0.8%	1.4%	2.0%	1.0%
Kings County	0.0%	5.0%	7.5%	2.2%	2.2%	2.6%	2.9%	3.2%	3.1%
New York County	0.0%	2.6%	3.4%	1.1%	0.9%	1.2%	1.5%	1.9%	1.4%
Queens County	0.0%	2.5%	2.6%	1.8%	1.8%	2.0%	2.3%	2.5%	2.9%
Richmond County	0.0%	-0.1%	-2.2%	0.7%	0.7%	0.8%	0.9%	1.1%	0.1%
New York City	0.0%	3.2%	3.8%	1.5%	1.4%	1.8%	2.1%	2.4%	2.2%
Nassau County	0.0%	26.2%	21.3%	23.2%	21.3%	16.6%	11.1%	5.6%	-2.2%
Suffolk County	0.0%	15.6%	12.2%	12.3%	11.0%	7.3%	4.0%	0.9%	-4.5%
Long Island	0.0%	20.6%	16.5%	17.5%	15.9%	11.8%	7.4%	3.2%	-3.4%
Dutchess County	0.0%	0.4%	4.7%	7.1%	6.7%	4.7%	2.3%	-0.1%	-7.0%
Orange County	0.0%	2.1%	7.9%	10.0%	9.5%	6.8%	3.8%	0.9%	-6.0%
Putnam County	0.0%	10.6%	12.3%	14.1%	14.9%	12.3%	9.9%	6.9%	2.5%
Rockland County	0.0%	8.8%	11.9%	13.6%	13.8%	11.7%	8.3%	5.2%	-2.8%
Sullivan County	0.0%	0.1%	-1.1%	-4.5%	-10.8%	-16.3%	-21.2%	-25.6%	-29.4%
Ulster County	0.0%	6.9%	5.1%	5.0%	3.7%	1.6%	-0.1%	-1.9%	-5.5%
Westchester County	0.0%	15.1%	17.3%	18.1%	17.2%	13.3%	8.9%	4.7%	-1.0%
Mid Hudson	0.0%	8.9%	11.6%	12.8%	12.1%	9.1%	5.6%	2.2%	-3.9%
Bergen County	0.0%	12.3%	13.2%	17.2%	18.7%	17.5%	14.9%	11.8%	2.3%
Essex County	0.0%	6.0%	13.5%	15.4%	16.2%	15.4%	13.3%	11.1%	3.9%
Hudson County	0.0%	13.4%	20.0%	22.5%	23.0%	21.4%	18.2%	15.0%	4.8%
Hunterdon County	0.0%	5.7%	-3.6%	-6.5%	-7.1%	-9.0%	-9.7%	-11.1%	-14.3%
Mercer County	0.0%	8.0%	-0.2%	0.6%	0.4%	-0.4%	-2.0%	-3.3%	-8.6%
Middlesex County	0.0%	14.1%	8.1%	7.4%	7.2%	6.2%	4.2%	1.9%	-4.1%
Monmouth County	0.0%	7.0%	9.7%	9.0%	8.8%	6.7%	4.5%	2.6%	-1.1%
Morris County	0.0%	5.6%	5.7%	5.0%	4.4%	1.8%	-0.7%	-1.8%	-3.4%
Ocean County	0.0%	12.4%	9.2%	10.6%	11.6%	11.8%	11.2%	10.4%	3.8%
Passaic County	0.0%	5.6%	9.9%	11.0%	12.2%	11.1%	9.4%	7.3%	0.9%
Somerset County	0.0%	13.1%	5.3%	5.3%	5.5%	4.3%	2.6%	0.9%	-4.0%
Sussex County	0.0%	1.6%	3.3%	0.2%	-1.1%	-4.9%	-6.8%	-8.1%	-8.9%
Union County	0.0%	7.8%	9.3%	10.2%	10.8%	10.0%	8.1%	6.1%	0.4%
Warren County	0.0%	3.9%	2.5%	-1.0%	-3.1%	-5.5%	-7.6%	-9.0%	-7.5%
New Jersey	0.0%	9.5%	9.8%	10.7%	11.1%	9.9%	7.9%	5.8%	-0.4%
Fairfield County	0.0%	3.1%	8.4%	9.3%	8.7%	7.2%	5.1%	2.9%	-2.7%
Litchfield County	0.0%	2.8%	-0.3%	-0.6%	-1.2%	-2.3%	-3.5%	-4.1%	-6.2%
New Haven County	0.0%	2.8%	4.9%	5.6%	5.3%	4.8%	3.4%	2.0%	-3.1%
Connecticut	0.0%	2.9%	6.0%	6.7%	6.3%	5.3%	3.6%	1.9%	-3.2%

Figure 49. Households: Comparison of 2050 Forecast and 2050 Forecast Update

AREA NAME	2050 Forecast Households								
	2010	2015	2020	2025	2030	2035	2040	2045	2050
31-County Region	8,178,733	8,362,118	8,564,466	8,792,351	9,024,973	9,243,731	9,430,557	9,606,729	9,800,202
Bronx County	483,449	494,508	505,729	519,631	531,812	543,188	553,574	560,926	568,058
Kings County	934,946	953,492	970,431	991,896	1,009,636	1,026,475	1,041,768	1,052,834	1,063,145
New York County	763,846	776,333	790,209	801,926	809,544	814,359	817,038	818,979	822,059
Queens County	787,335	801,326	815,785	823,983	831,113	838,483	844,966	849,560	854,178
Richmond County	165,516	168,974	172,133	174,390	175,937	176,932	177,144	177,650	177,949
New York City	3,135,092	3,194,634	3,254,287	3,311,826	3,358,042	3,399,438	3,434,491	3,459,949	3,485,390
Nassau County	448,528	450,931	456,377	468,167	482,441	497,008	511,886	526,159	541,829
Suffolk County	499,922	508,487	523,081	541,585	560,510	575,637	588,168	599,739	612,077
Long Island	948,450	959,418	979,458	1,009,752	1,042,951	1,072,645	1,100,054	1,125,899	1,153,906
Dutchess County	107,965	112,123	115,718	119,803	124,013	127,310	129,717	131,899	134,452
Orange County	125,925	132,783	139,421	147,611	156,776	165,946	174,450	182,701	191,614
Putnam County	35,041	36,186	37,257	38,230	39,111	39,812	40,289	40,683	41,080
Rockland County	99,242	103,959	105,776	108,892	113,270	117,718	121,925	126,023	130,892
Sullivan County	30,139	31,069	31,763	32,515	34,045	35,298	36,231	37,192	38,313
Ulster County	71,049	74,098	76,691	79,081	81,184	82,522	83,096	83,455	83,804
Westchester County	347,232	356,766	362,624	372,891	386,163	399,395	411,423	423,896	438,277
Mid Hudson	816,593	846,984	869,250	899,022	934,562	968,001	997,131	1,025,849	1,058,434
Bergen County	335,730	339,860	346,982	356,064	364,940	372,493	375,917	380,925	389,078
Essex County	283,712	289,757	297,143	306,636	317,134	326,688	335,761	344,629	355,508
Hudson County	246,437	259,460	267,536	277,029	289,731	303,485	317,032	331,067	344,953
Hunterdon County	47,169	48,489	49,824	51,016	51,821	52,362	52,722	52,989	53,142
Mercer County	133,155	133,401	138,260	144,254	150,619	157,188	163,141	169,241	176,177
Middlesex County	281,186	284,658	293,238	302,001	312,684	323,181	333,200	340,819	350,407
Monmouth County	233,983	238,584	245,710	251,386	256,009	260,096	262,238	265,293	267,928
Morris County	180,534	186,604	193,466	197,862	201,578	202,821	203,040	204,076	205,043
Ocean County	221,111	225,056	232,550	243,084	254,431	272,266	282,784	293,124	303,300
Passaic County	166,785	170,877	175,941	181,445	187,674	193,112	201,022	209,472	218,186
Somerset County	117,759	118,200	122,203	126,293	129,499	132,228	134,632	136,926	140,474
Sussex County	54,752	56,688	58,583	59,351	59,830	60,722	61,624	62,252	62,648
Union County	188,118	189,424	193,719	199,433	206,126	213,256	220,062	226,636	233,939
Warren County	41,480	42,989	44,423	45,655	46,875	47,641	48,541	49,020	49,300
New Jersey	2,531,911	2,584,045	2,659,576	2,741,507	2,828,953	2,917,542	2,991,717	3,066,468	3,150,082
Fairfield County	335,545	348,204	355,711	366,097	378,542	389,979	400,214	411,265	423,423
Litchfield County	76,640	80,885	83,337	85,520	87,181	88,458	88,741	89,088	89,367
New Haven County	334,502	347,947	362,848	378,627	394,742	407,668	418,210	428,211	439,601
Connecticut	746,687	777,037	801,895	830,244	860,465	886,105	907,165	928,564	952,391

AREA NAME	Update Households								
	2010	2015	2020	2025	2030	2035	2040	2045	2050
31-County Region	8,178,733	8,330,773	9,161,710	9,727,869	10,166,680	10,476,230	10,670,027	10,781,504	10,721,199
Bronx County	483,449	494,775	504,677	519,631	531,812	543,188	553,574	560,926	568,058
Kings County	934,946	959,278	992,428	991,896	1,009,636	1,026,475	1,041,768	1,052,834	1,063,145
New York County	763,846	779,230	798,769	801,926	809,544	814,359	817,038	818,979	822,059
Queens County	787,335	801,873	815,991	823,983	831,113	838,483	844,966	849,560	854,178
Richmond County	165,516	167,757	169,403	174,390	175,937	176,932	177,144	177,650	177,949
New York City	3,135,092	3,202,911	3,281,268	3,311,826	3,358,042	3,399,438	3,434,491	3,459,949	3,485,390
Nassau County	448,528	451,292	560,512	635,670	681,384	707,296	718,418	719,022	705,108
Suffolk County	499,922	503,308	581,738	633,479	670,972	689,739	697,892	698,361	686,198
Long Island	948,450	954,600	1,142,250	1,269,149	1,352,357	1,397,035	1,416,310	1,417,382	1,391,305
Dutchess County	107,965	110,457	122,098	133,915	142,773	148,937	152,425	154,310	150,820
Orange County	125,925	128,045	151,024	169,385	184,523	195,970	205,180	211,576	212,359
Putnam County	35,041	35,581	41,692	45,511	48,129	49,340	49,684	49,493	48,374
Rockland County	99,242	102,554	121,321	134,806	144,334	150,700	154,396	155,854	153,429
Sullivan County	30,139	28,901	31,749	33,096	33,627	33,421	32,634	31,480	30,332
Ulster County	71,049	72,978	79,122	84,482	87,953	89,785	89,912	89,383	87,541
Westchester County	347,232	357,067	430,654	471,376	499,174	513,743	518,116	516,087	508,682
Mid Hudson	816,593	835,585	977,660	1,072,571	1,140,513	1,181,896	1,202,346	1,208,182	1,191,536
Bergen County	335,730	339,121	393,005	439,509	469,813	489,726	497,696	500,719	486,453
Essex County	283,712	291,401	334,340	370,269	395,894	413,005	425,633	432,236	428,421
Hudson County	246,437	262,032	322,433	363,750	394,554	416,846	431,292	442,048	435,179
Hunterdon County	47,169	47,550	50,141	51,272	52,361	52,652	53,133	53,046	51,694
Mercer County	133,155	132,694	132,159	140,647	148,499	155,780	161,738	167,024	167,976
Middlesex County	281,186	286,104	320,106	339,643	357,643	373,173	384,727	390,957	388,254
Monmouth County	233,983	235,322	265,374	280,503	291,748	298,667	302,026	303,402	298,816
Morris County	180,534	184,201	204,847	214,214	220,541	220,771	218,268	216,065	213,231
Ocean County	221,111	223,906	245,312	268,912	290,353	318,706	337,967	355,034	359,948
Passaic County	166,785	169,530	193,137	210,694	224,950	233,816	243,490	251,527	251,659
Somerset County	117,759	116,516	128,025	135,038	140,172	144,209	146,927	149,087	148,329
Sussex County	54,752	53,682	60,826	61,566	62,113	61,807	61,664	61,219	60,323
Union County	188,118	192,026	214,944	234,889	250,916	263,661	272,557	278,308	276,250
Warren County	41,480	39,125	43,412	43,892	44,543	44,563	44,409	43,769	43,668
New Jersey	2,531,911	2,573,208	2,908,062	3,154,797	3,344,101	3,487,379	3,581,525	3,644,440	3,610,200
Fairfield County	335,545	347,063	389,847	420,251	443,278	459,736	470,384	477,038	472,358
Litchfield County	76,640	78,232	84,967	89,900	93,156	95,477	96,183	96,275	95,032
New Haven County	334,502	339,174	377,655	409,375	435,233	455,269	468,787	478,237	475,377
Connecticut	746,687	764,469	852,470	919,526	971,667	1,010,482	1,035,355	1,051,550	1,042,767

		Household Differential 2050 Forecast and Update (000s)							
AREA NAME	2010	2015	2020	2025	2030	2035	2040	2045	2050
31-County Region	0	-31,345	597,244	935,518	1,141,707	1,232,499	1,239,471	1,174,774	920,997
Bronx County	0.0	266.4	-1,051.6	0.0	0.0	0.0	0.0	0.0	0.0
Kings County	0.0	5,786.0	21,997.4	0.0	0.0	0.0	0.0	0.0	0.0
New York County	0.0	2,896.4	8,559.9	0.0	0.0	0.0	0.0	0.0	0.0
Queens County	0.0	546.2	205.5	0.0	0.0	0.0	0.0	0.0	0.0
Richmond County	0.0	-1,217.5	-2,730.1	0.0	0.0	0.0	0.0	0.0	0.0
New York City	0.0	8,277.6	26,981.2	0.0	0.0	0.0	0.0	0.0	0.0
Nassau County	0.0	361.1	104,134.7	167,503.6	198,943.2	210,287.8	206,532.8	192,862.4	163,278.7
Suffolk County	0.0	-5,179.1	58,657.3	91,894.2	110,462.5	114,102.0	109,723.8	98,621.3	74,120.3
Long Island	0.0	-4,818.0	162,792.0	259,397.8	309,405.7	324,389.8	316,256.5	291,483.7	237,399.0
Dutchess County	0.0	-1,665.6	6,379.8	14,112.7	18,759.7	21,627.0	22,707.3	22,410.8	16,367.5
Orange County	0.0	-4,737.7	11,602.9	21,774.1	27,747.8	30,023.9	30,729.9	28,874.6	20,745.1
Putnam County	0.0	-604.7	4,434.5	7,281.1	9,017.6	9,528.2	9,395.5	8,810.3	7,293.6
Rockland County	0.0	-1,404.9	15,545.2	25,914.0	31,063.9	32,982.5	32,470.8	29,831.1	22,536.2
Sullivan County	0.0	-2,168.4	-13.8	581.0	-417.8	-1,877.1	-3,597.0	-5,712.6	-7,981.3
Ulster County	0.0	-1,119.7	2,430.8	5,400.8	6,768.4	7,262.0	6,816.2	5,927.5	3,737.2
Westchester County	0.0	301.4	68,030.4	98,484.8	113,011.4	114,348.4	106,693.0	92,190.9	70,404.5
Mid Hudson	0.0	-11,399.5	108,409.8	173,548.5	205,951.1	213,894.9	205,215.6	182,332.7	133,102.8
Bergen County	0.0	-739.1	46,023.1	83,445.1	104,872.8	117,232.9	121,778.7	119,793.9	97,375.3
Essex County	0.0	1,643.2	37,197.2	63,633.1	78,759.7	86,316.6	89,871.9	87,607.2	72,913.5
Hudson County	0.0	2,571.6	54,897.4	86,721.0	104,822.6	113,360.4	114,260.2	110,980.8	90,225.9
Hunterdon County	0.0	-939.0	317.7	256.3	540.8	289.4	410.5	57.4	-1,447.9
Mercer County	0.0	-706.8	-6,100.8	-3,607.3	-2,119.8	-1,408.8	-1,403.5	-2,217.5	-8,200.9
Middlesex County	0.0	1,445.8	26,868.5	37,642.6	44,958.2	49,992.1	51,526.7	50,137.3	37,846.7
Monmouth County	0.0	-3,261.7	19,663.7	29,116.6	35,739.5	38,570.4	39,787.5	38,109.7	30,887.4
Morris County	0.0	-2,402.4	11,380.8	16,351.9	18,962.9	17,949.8	15,228.4	11,989.8	8,188.4
Ocean County	0.0	-1,150.7	12,762.3	25,828.2	35,922.3	46,440.1	55,183.0	61,910.2	56,647.6
Passaic County	0.0	-1,346.8	17,196.2	29,248.7	37,275.7	40,703.6	42,467.3	42,055.2	33,472.9
Somerset County	0.0	-1,683.4	5,822.8	8,745.0	10,672.3	11,980.9	12,295.6	12,161.1	7,854.8
Sussex County	0.0	-3,005.7	2,243.1	2,214.9	2,283.0	1,084.5	39.9	-1,033.1	-2,325.0
Union County	0.0	2,602.5	21,225.4	35,456.5	44,790.2	50,404.1	52,494.7	51,671.4	42,311.3
Warren County	0.0	-3,864.1	-1,010.8	-1,762.5	-2,332.1	-3,078.5	-4,132.5	-5,251.2	-5,631.1
New Jersey	0.0	-10,836.6	248,486.5	413,290.0	515,148.3	569,837.6	589,808.3	577,972.2	460,118.9
Fairfield County	0.0	-1,141.2	34,136.5	54,154.7	64,735.7	69,757.1	70,170.4	65,772.9	48,934.9
Litchfield County	0.0	-2,653.7	1,630.7	4,379.5	5,974.7	7,018.6	7,441.8	7,186.8	5,664.9
New Haven County	0.0	-8,773.2	14,807.4	30,747.4	40,491.7	47,601.3	50,577.9	50,026.0	35,776.7
Connecticut	0.0	-12,568.1	50,574.7	89,281.6	111,202.1	124,377.0	128,190.0	122,985.7	90,376.5

Household Percent Differential 2050 Forecast and Update									
AREA NAME	2010	2015	2020	2025	2030	2035	2040	2045	2050
31-County Region	0.0%	-0.4%	7.0%	10.6%	12.7%	13.3%	13.1%	12.2%	9.4%
Bronx County	0.0%	0.1%	-0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Kings County	0.0%	0.6%	2.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
New York County	0.0%	0.4%	1.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Queens County	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Richmond County	0.0%	-0.7%	-1.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
New York City	0.0%	0.3%	0.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Nassau County	0.0%	0.1%	22.8%	35.8%	41.2%	42.3%	40.3%	36.7%	30.1%
Suffolk County	0.0%	-1.0%	11.2%	17.0%	19.7%	19.8%	18.7%	16.4%	12.1%
Long Island	0.0%	-0.5%	16.6%	25.7%	29.7%	30.2%	28.7%	25.9%	20.6%
Dutchess County	0.0%	-1.5%	5.5%	11.8%	15.1%	17.0%	17.5%	17.0%	12.2%
Orange County	0.0%	-3.6%	8.3%	14.8%	17.7%	18.1%	17.6%	15.8%	10.8%
Putnam County	0.0%	-1.7%	11.9%	19.0%	23.1%	23.9%	23.3%	21.7%	17.8%
Rockland County	0.0%	-1.4%	14.7%	23.8%	27.4%	28.0%	26.6%	23.7%	17.2%
Sullivan County	0.0%	-7.0%	0.0%	1.8%	-1.2%	-5.3%	-9.9%	-15.4%	-20.8%
Ulster County	0.0%	-1.5%	3.2%	6.8%	8.3%	8.8%	8.2%	7.1%	4.5%
Westchester County	0.0%	0.1%	18.8%	26.4%	29.3%	28.6%	25.9%	21.7%	16.1%
Mid Hudson	0.0%	-1.3%	12.5%	19.3%	22.0%	22.1%	20.6%	17.8%	12.6%
Bergen County	0.0%	-0.2%	13.3%	23.4%	28.7%	31.5%	32.4%	31.4%	25.0%
Essex County	0.0%	0.6%	12.5%	20.8%	24.8%	26.4%	26.8%	25.4%	20.5%
Hudson County	0.0%	1.0%	20.5%	31.3%	36.2%	37.4%	36.0%	33.5%	26.2%
Hunterdon County	0.0%	-1.9%	0.6%	0.5%	1.0%	0.6%	0.8%	0.1%	-2.7%
Mercer County	0.0%	-0.5%	-4.4%	-2.5%	-1.4%	-0.9%	-0.9%	-1.3%	-4.7%
Middlesex County	0.0%	0.5%	9.2%	12.5%	14.4%	15.5%	15.5%	14.7%	10.8%
Monmouth County	0.0%	-1.4%	8.0%	11.6%	14.0%	14.8%	15.2%	14.4%	11.5%
Morris County	0.0%	-1.3%	5.9%	8.3%	9.4%	8.9%	7.5%	5.9%	4.0%
Ocean County	0.0%	-0.5%	5.5%	10.6%	14.1%	17.1%	19.5%	21.1%	18.7%
Passaic County	0.0%	-0.8%	9.8%	16.1%	19.9%	21.1%	21.1%	20.1%	15.3%
Somerset County	0.0%	-1.4%	4.8%	6.9%	8.2%	9.1%	9.1%	8.9%	5.6%
Sussex County	0.0%	-5.3%	3.8%	3.7%	3.8%	1.8%	0.1%	-1.7%	-3.7%
Union County	0.0%	1.4%	11.0%	17.8%	21.7%	23.6%	23.9%	22.8%	18.1%
Warren County	0.0%	-9.0%	-2.3%	-3.9%	-5.0%	-6.5%	-8.5%	-10.7%	-11.4%
New Jersey	0.0%	-0.4%	9.3%	15.1%	18.2%	19.5%	19.7%	18.8%	14.6%
Fairfield County	0.0%	-0.3%	9.6%	14.8%	17.1%	17.9%	17.5%	16.0%	11.6%
Litchfield County	0.0%	-3.3%	2.0%	5.1%	6.9%	7.9%	8.4%	8.1%	6.3%
New Haven County	0.0%	-2.5%	4.1%	8.1%	10.3%	11.7%	12.1%	11.7%	8.1%
Connecticut	0.0%	-1.6%	6.3%	10.8%	12.9%	14.0%	14.1%	13.2%	9.5%

Figure 50. Household Size: Comparison of 2050 Forecast and 2050 Forecast Update

2050 Forecast Household Size									
AREA NAME	2010	2015	2020	2025	2030	2035	2040	2045	2050
31-County Region	2.66	2.65	2.63	2.61	2.60	2.60	2.61	2.61	2.61
Bronx County	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77
Kings County	2.69	2.69	2.69	2.69	2.69	2.69	2.69	2.69	2.69
New York County	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99
Queens County	2.82	2.82	2.82	2.82	2.82	2.82	2.82	2.82	2.82
Richmond County	2.78	2.78	2.78	2.78	2.78	2.78	2.78	2.78	2.78
New York City	2.57	2.57	2.57	2.57	2.57	2.57	2.57	2.57	2.58
Nassau County	2.94	2.95	2.92	2.90	2.90	2.92	2.94	2.95	2.95
Suffolk County	2.93	2.89	2.83	2.79	2.77	2.77	2.76	2.76	2.76
Long Island	2.93	2.92	2.87	2.84	2.83	2.84	2.85	2.85	2.85
Dutchess County	2.57	2.51	2.46	2.44	2.42	2.42	2.43	2.43	2.44
Orange County	2.86	2.81	2.77	2.74	2.73	2.73	2.73	2.74	2.75
Putnam County	2.77	2.69	2.62	2.59	2.58	2.59	2.61	2.62	2.63
Rockland County	3.07	3.04	3.02	3.02	3.02	3.02	3.04	3.04	3.04
Sullivan County	2.45	2.39	2.34	2.31	2.29	2.28	2.28	2.28	2.28
Ulster County	2.40	2.34	2.29	2.25	2.23	2.22	2.21	2.20	2.20
Westchester County	2.65	2.64	2.61	2.59	2.59	2.60	2.61	2.62	2.63
Mid Hudson	2.70	2.67	2.63	2.61	2.60	2.61	2.62	2.62	2.63
Bergen County	2.66	2.70	2.67	2.64	2.63	2.64	2.66	2.67	2.67
Essex County	2.68	2.64	2.61	2.59	2.56	2.55	2.55	2.55	2.55
Hudson County	2.54	2.53	2.50	2.48	2.47	2.45	2.44	2.43	2.41
Hunterdon County	2.62	2.56	2.49	2.44	2.43	2.45	2.46	2.47	2.48
Mercer County	2.61	2.64	2.61	2.60	2.59	2.60	2.60	2.60	2.60
Middlesex County	2.80	2.83	2.80	2.77	2.75	2.75	2.74	2.75	2.75
Monmouth County	2.66	2.61	2.55	2.51	2.49	2.48	2.49	2.49	2.49
Morris County	2.68	2.63	2.59	2.55	2.53	2.53	2.54	2.54	2.53
Ocean County	2.58	2.57	2.56	2.56	2.55	2.54	2.54	2.54	2.55
Passaic County	2.94	2.89	2.86	2.85	2.85	2.84	2.84	2.83	2.82
Somerset County	2.71	2.76	2.70	2.65	2.62	2.62	2.63	2.63	2.63
Sussex County	2.69	2.61	2.54	2.51	2.50	2.49	2.48	2.48	2.47
Union County	2.82	2.86	2.84	2.83	2.83	2.83	2.84	2.84	2.85
Warren County	2.57	2.51	2.45	2.41	2.38	2.36	2.36	2.35	2.34
New Jersey	2.69	2.68	2.65	2.62	2.61	2.60	2.61	2.61	2.61
Fairfield County	2.68	2.64	2.61	2.58	2.57	2.58	2.59	2.59	2.59
Litchfield County	2.44	2.32	2.26	2.21	2.19	2.18	2.18	2.18	2.18
New Haven County	2.49	2.44	2.39	2.36	2.35	2.34	2.34	2.33	2.32
Connecticut	2.57	2.52	2.48	2.44	2.43	2.43	2.43	2.43	2.43

	Update Household Size								
AREA NAME	2010	2015	2020	2025	2030	2035	2040	2045	2050
31-County Region	2.66	2.65	2.61	2.58	2.56	2.55	2.55	2.55	2.55
Bronx County	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77
Kings County	2.69	2.69	2.69	2.69	2.69	2.69	2.69	2.69	2.69
New York County	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99
Queens County	2.82	2.82	2.82	2.82	2.82	2.82	2.82	2.82	2.82
Richmond County	2.78	2.78	2.78	2.78	2.78	2.78	2.78	2.78	2.78
New York City	2.57	2.57	2.57	2.57	2.57	2.57	2.57	2.57	2.58
Nassau County	2.94	2.96	2.89	2.81	2.79	2.79	2.80	2.80	2.79
Suffolk County	2.93	2.92	2.82	2.75	2.71	2.69	2.68	2.67	2.66
Long Island	2.93	2.94	2.86	2.78	2.75	2.74	2.74	2.73	2.72
Dutchess County	2.57	2.52	2.44	2.39	2.36	2.35	2.35	2.34	2.34
Orange County	2.86	2.84	2.71	2.65	2.62	2.62	2.62	2.62	2.62
Putnam County	2.77	2.72	2.61	2.54	2.52	2.53	2.55	2.56	2.56
Rockland County	3.07	3.05	2.95	2.89	2.88	2.87	2.88	2.89	2.89
Sullivan County	2.45	2.43	2.35	2.30	2.27	2.23	2.22	2.21	2.21
Ulster County	2.40	2.35	2.29	2.24	2.20	2.18	2.17	2.16	2.15
Westchester County	2.65	2.63	2.55	2.50	2.48	2.49	2.51	2.52	2.52
Mid Hudson	2.70	2.67	2.58	2.53	2.51	2.51	2.52	2.53	2.53
Bergen County	2.66	2.70	2.63	2.57	2.53	2.52	2.53	2.55	2.55
Essex County	2.68	2.64	2.57	2.51	2.47	2.46	2.45	2.45	2.46
Hudson County	2.54	2.50	2.42	2.38	2.36	2.34	2.33	2.32	2.32
Hunterdon County	2.62	2.55	2.50	2.43	2.40	2.41	2.41	2.43	2.43
Mercer County	2.61	2.65	2.63	2.60	2.57	2.56	2.56	2.56	2.57
Middlesex County	2.80	2.80	2.75	2.71	2.68	2.66	2.65	2.65	2.66
Monmouth County	2.66	2.64	2.55	2.48	2.45	2.44	2.44	2.44	2.43
Morris County	2.68	2.65	2.58	2.53	2.50	2.49	2.51	2.51	2.50
Ocean County	2.58	2.57	2.55	2.53	2.51	2.48	2.47	2.46	2.46
Passaic County	2.94	2.93	2.82	2.78	2.75	2.74	2.74	2.73	2.73
Somerset County	2.71	2.76	2.70	2.63	2.58	2.57	2.57	2.57	2.58
Sussex County	2.69	2.64	2.53	2.48	2.46	2.46	2.46	2.45	2.44
Union County	2.82	2.85	2.79	2.75	2.72	2.71	2.71	2.72	2.73
Warren County	2.57	2.55	2.46	2.41	2.38	2.36	2.36	2.35	2.34
New Jersey	2.69	2.68	2.62	2.57	2.54	2.52	2.52	2.52	2.52
Fairfield County	2.68	2.66	2.58	2.53	2.50	2.50	2.51	2.52	2.51
Litchfield County	2.44	2.34	2.26	2.20	2.17	2.16	2.16	2.15	2.14
New Haven County	2.49	2.46	2.39	2.34	2.30	2.29	2.29	2.28	2.27
Connecticut	2.57	2.54	2.46	2.41	2.38	2.37	2.38	2.38	2.37

Household Size Differential 2050 Forecast and Update									
AREA NAME	2010	2015	2020	2025	2030	2035	2040	2045	2050
31-County Region	0.00	0.00	-0.01	-0.03	-0.04	-0.05	-0.05	-0.06	-0.06
Bronx County	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Kings County	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
New York County	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Queens County	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Richmond County	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
New York City	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Nassau County	0.00	0.00	-0.03	-0.08	-0.11	-0.13	-0.14	-0.15	-0.16
Suffolk County	0.00	0.03	-0.01	-0.04	-0.07	-0.08	-0.09	-0.09	-0.10
Long Island	0.00	0.02	-0.02	-0.06	-0.09	-0.10	-0.11	-0.11	-0.13
Dutchess County	0.00	0.01	-0.02	-0.05	-0.06	-0.07	-0.08	-0.09	-0.09
Orange County	0.00	0.03	-0.05	-0.09	-0.11	-0.11	-0.11	-0.12	-0.13
Putnam County	0.00	0.03	-0.01	-0.04	-0.06	-0.06	-0.05	-0.06	-0.07
Rockland County	0.00	0.02	-0.08	-0.13	-0.14	-0.15	-0.15	-0.15	-0.15
Sullivan County	0.00	0.04	0.01	-0.01	-0.03	-0.05	-0.06	-0.07	-0.07
Ulster County	0.00	0.01	0.00	-0.02	-0.03	-0.04	-0.04	-0.05	-0.05
Westchester County	0.00	-0.01	-0.07	-0.09	-0.11	-0.11	-0.11	-0.10	-0.11
Mid Hudson	0.00	0.01	-0.05	-0.07	-0.09	-0.09	-0.09	-0.10	-0.10
Bergen County	0.00	0.00	-0.04	-0.07	-0.09	-0.11	-0.12	-0.12	-0.12
Essex County	0.00	0.00	-0.05	-0.08	-0.09	-0.10	-0.10	-0.10	-0.10
Hudson County	0.00	-0.02	-0.08	-0.10	-0.11	-0.11	-0.10	-0.10	-0.09
Hunterdon County	0.00	-0.01	0.01	-0.01	-0.03	-0.04	-0.05	-0.05	-0.04
Mercer County	0.00	0.01	0.02	0.00	-0.02	-0.03	-0.04	-0.04	-0.03
Middlesex County	0.00	-0.02	-0.05	-0.06	-0.07	-0.08	-0.09	-0.10	-0.09
Monmouth County	0.00	0.03	0.00	-0.03	-0.04	-0.05	-0.05	-0.05	-0.06
Morris County	0.00	0.02	-0.01	-0.02	-0.03	-0.04	-0.03	-0.03	-0.03
Ocean County	0.00	0.00	-0.01	-0.03	-0.04	-0.05	-0.07	-0.09	-0.10
Passaic County	0.00	0.03	-0.04	-0.07	-0.09	-0.10	-0.10	-0.10	-0.09
Somerset County	0.00	-0.01	0.00	-0.02	-0.04	-0.05	-0.06	-0.06	-0.05
Sussex County	0.00	0.03	-0.02	-0.03	-0.04	-0.03	-0.02	-0.02	-0.03
Union County	0.00	-0.01	-0.05	-0.08	-0.11	-0.12	-0.13	-0.13	-0.11
Warren County	0.00	0.04	0.01	0.00	0.00	0.00	0.00	0.00	0.00
New Jersey	0.00	0.00	-0.03	-0.06	-0.07	-0.08	-0.09	-0.09	-0.08
Fairfield County	0.00	0.01	-0.03	-0.06	-0.07	-0.08	-0.08	-0.08	-0.08
Litchfield County	0.00	0.02	0.00	-0.01	-0.02	-0.02	-0.03	-0.03	-0.04
New Haven County	0.00	0.02	-0.01	-0.03	-0.04	-0.05	-0.05	-0.05	-0.05
Connecticut	0.00	0.02	-0.01	-0.03	-0.05	-0.06	-0.06	-0.06	-0.06

Household Size Percent Differential 2050 Forecast and Update									
AREA NAME	2010	2015	2020	2025	2030	2035	2040	2045	2050
31-County Region	0.0%	0.2%	-0.6%	-1.2%	-1.7%	-1.9%	-2.1%	-2.2%	-2.2%
Bronx County	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Kings County	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
New York County	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Queens County	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Richmond County	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
New York City	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Nassau County	0.0%	0.1%	-1.1%	-2.9%	-3.9%	-4.5%	-4.8%	-5.1%	-5.5%
Suffolk County	0.0%	0.9%	-0.3%	-1.5%	-2.4%	-2.9%	-3.1%	-3.4%	-3.6%
Long Island	0.0%	0.5%	-0.6%	-2.0%	-3.0%	-3.5%	-3.7%	-4.0%	-4.4%
Dutchess County	0.0%	0.4%	-0.8%	-1.9%	-2.6%	-3.0%	-3.3%	-3.7%	-3.7%
Orange County	0.0%	1.0%	-1.8%	-3.2%	-3.9%	-4.1%	-4.2%	-4.5%	-4.7%
Putnam County	0.0%	1.2%	-0.4%	-1.5%	-2.4%	-2.5%	-2.1%	-2.2%	-2.6%
Rockland County	0.0%	0.5%	-2.6%	-4.2%	-4.8%	-5.0%	-5.0%	-5.0%	-5.1%
Sullivan County	0.0%	1.9%	0.3%	-0.4%	-1.2%	-2.1%	-2.8%	-3.0%	-3.0%
Ulster County	0.0%	0.3%	-0.1%	-0.7%	-1.2%	-1.7%	-1.8%	-2.2%	-2.4%
Westchester County	0.0%	-0.3%	-2.6%	-3.6%	-4.1%	-4.2%	-4.0%	-4.0%	-4.2%
Mid Hudson	0.0%	0.3%	-1.7%	-2.8%	-3.4%	-3.5%	-3.5%	-3.6%	-3.9%
Bergen County	0.0%	0.0%	-1.4%	-2.7%	-3.6%	-4.2%	-4.6%	-4.6%	-4.5%
Essex County	0.0%	-0.1%	-1.8%	-2.9%	-3.5%	-3.8%	-4.1%	-4.0%	-3.9%
Hudson County	0.0%	-1.0%	-3.3%	-4.1%	-4.3%	-4.4%	-4.2%	-4.2%	-3.8%
Hunterdon County	0.0%	-0.4%	0.2%	-0.6%	-1.2%	-1.5%	-1.9%	-1.9%	-1.8%
Mercer County	0.0%	0.3%	0.8%	0.0%	-0.7%	-1.3%	-1.6%	-1.5%	-1.2%
Middlesex County	0.0%	-0.8%	-1.6%	-2.1%	-2.6%	-3.1%	-3.4%	-3.5%	-3.3%
Monmouth County	0.0%	1.2%	-0.1%	-1.0%	-1.6%	-1.9%	-2.1%	-2.2%	-2.5%
Morris County	0.0%	0.9%	-0.2%	-1.0%	-1.3%	-1.5%	-1.2%	-1.1%	-1.4%
Ocean County	0.0%	0.2%	-0.5%	-1.2%	-1.7%	-2.2%	-2.7%	-3.3%	-3.8%
Passaic County	0.0%	1.2%	-1.4%	-2.6%	-3.3%	-3.6%	-3.7%	-3.6%	-3.2%
Somerset County	0.0%	-0.3%	-0.1%	-0.9%	-1.4%	-2.1%	-2.3%	-2.2%	-1.9%
Sussex County	0.0%	1.3%	-0.6%	-1.3%	-1.5%	-1.3%	-0.9%	-0.9%	-1.2%
Union County	0.0%	-0.5%	-1.8%	-3.0%	-3.8%	-4.3%	-4.5%	-4.4%	-4.0%
Warren County	0.0%	1.6%	0.4%	0.1%	0.1%	-0.1%	0.1%	0.1%	0.0%
New Jersey	0.0%	0.1%	-1.2%	-2.1%	-2.7%	-3.1%	-3.3%	-3.3%	-3.2%
Fairfield County	0.0%	0.5%	-1.0%	-2.1%	-2.9%	-3.0%	-3.0%	-3.0%	-3.0%
Litchfield County	0.0%	1.0%	0.2%	-0.5%	-0.8%	-1.1%	-1.2%	-1.4%	-1.8%
New Haven County	0.0%	0.7%	-0.3%	-1.1%	-1.7%	-2.1%	-2.1%	-2.2%	-2.1%
Connecticut	0.0%	0.7%	-0.4%	-1.4%	-2.0%	-2.3%	-2.3%	-2.4%	-2.4%

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