Population and Labor Force Trends and Future Projections: A Comparative Analysis for Northern Kentucky and Selected Metropolitan Statistical Areas

Conducted by

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Executive Summary

To better understand the population and demographic factors that will shape the future size and composition of Northern Kentucky's labor force, the Center for Economic Analysis and Development, funded by BE NKY Growth Partnership, projected population and labor force growth for Northern Kentucky and 18 metropolitan statistical areas from 2020 to 2050. The report highlights the intensified national labor competition, with talent shortages impacting site selection decisions. Demographic trends, changing generational preferences, and the rise of remote work contribute to workforce challenges. CEAD analyzed four labor force scenarios to aid policy analysis.

Northern Kentucky consists of Boone, Campbell, and Kenton counties, while CEAD grouped the 18 metros into two categories, close-proximity, and high-growth aspirational. CEAD and BE NKY selected the metropolitan areas in the analysis for two primary reasons. First, Northern Kentucky often competes with the close-proximity (mostly midwestern) metro areas for economic development projects. Second, the high-growth aspirational metros include those that are typically characterized as growth "hot spots" by either the media or industry sources and are similar in size to the metropolitan areas in the close-proximity group. Except for Lexington and Charleston, with populations under 1 million, and Tampa and Detroit, with populations greater than 3 million, the population in the metropolitan areas of interest fall between 1 and 3 million. Table 1 in the report provides a complete list of the 18 metropolitan areas included in the study.

Starting with the 2020 Decennial Census data, CEAD projected population by age and race for each region of interest. CEAD provided four projection scenarios, titled:

- Optimistic
- Aspirational
- Baseline
- Pessimistic

The baseline projection is based on traditional cohort component methodology. This is the "most likely" scenario unless there are either policy interventions or unforeseen economic impacts that change the trajectory of net migration. This projection assumes that local policy will have little, if any, impact on birth and deaths rates.

The pessimistic projection asks what happens to the rate of population growth if the region adopts policies discouraging growth and investment? Or what happens if the region were to lose a major employer or have a major industry shrink substantially? A gradual exit of the auto industry in Detroit would be an example of the latter.

The aspirational projection is the converse of the pessimistic forecast. What happens to the population growth rate if the region emphasizes additional pro-growth policies? What happens if the region substantially invests in its assets, including everything from roads and highways to parks and recreation to education and childcare?

The optimistic projection assumes that in addition to the pro-growth policies and strategies noted under the aspirational projection, these policies start to have a significant impact on the attraction and retention of both employers and employees.

The primary takeaways from the historical trends, current data, and the four population projection scenarios include:

- Broader U.S. population trends are influencing regional outlook. Overall, the U.S. rate of population growth is slowing. At the same time, the population is aging and becoming more diverse. These trends are not playing out evenly across metro areas.
- The current demographics of a region greatly influence its future trajectory.
- Migration is vital to growth, but there is no singular solution to address a slowdown in population growth.
- Similarly, there is no single factor that explains why some metros have experienced growth while others are stable or declining, although there are some shared growth drivers. Notably, the fast-growing aspirational metro regions were not overnight success stories. Most have been experiencing above-average population growth rates for 50 years.
- Baseline projections call for modest population growth in Northern Kentucky and the Cincinnati MSA between 2020 and 2050.
- Baseline projections show the labor force in Northern Kentucky growing modestly while the labor force in the overall Cincinnati MSA will contract between 2020 to 2050.

Northern Kentucky is not an island unto itself. While Northern Kentucky's population growth is expected to outpace that of the Cincinnati MSA, the region is tied to the economic and demographic prospects of the larger metro area. Further, given its unique geographic positioning, Northern Kentucky's growth trajectory will be influenced by policy makers in both Frankfort and Columbus.

Rate of population growth is slowing

Historical trends highlight three key points. First, population growth rates peaked between 1990 and 2000, corresponding roughly to the Millennials' birth years. Second, the rate of population growth varies significantly across U.S. regions. Third, across most metropolitan areas, the population is aging.

Between 1970 and 2020, the U.S. population grew by 62.7 percent, adding 127.7 million people. The annual growth rate increased from 1.1 percent (1970-1980) to 1.3 percent (1990-2000) but slowed to 0.7 percent in the last decade (2010-2020).

Between 1970 and 2020, Northern Kentucky's population grew by 58.8 percent, adding 147,559 people while Cincinnati's population increased by 32.8 percent, adding 557,281 people.

Population growth between 1970 and 2020 varied across 384 U.S. metro areas, with larger metros generally growing faster.[1] Among 18 metros of interest, Northern Kentucky, if classified, would be among smaller metros. Its 58.8 percent growth from 1970 to 2020 places it in the third quintile among smaller metros with a 2020 population of less than 500,000.

[1] Metropolitan areas are defined (geographically delineated) by the Office of Management and Budget (OMB) bulletin no. 20-01 issued March 6, 2020.

Population is aging

The population projections through the next quarter-century show that the U.S. population will continue to age. By 2050, in the Cincinnati MSA 22.4 percent of the population will be 65 years and over, up from 16 percent in 2020. In Northern Kentucky 24.4 percent of the population will be 65 years and over in 2050, up from 15.1 percent in 2020.

The aging of the population is reflected in both the Old Age Dependency Rate and the Youth Dependency Rate. Each rate reflects the number of dependents per 1,000 people of working age. In Northern Kentucky, under the baseline population projection, the old age dependency ratio will increase from 23.2 in 2020 to 41.5 in 2050, an increase of 18.3. The Cincinnati MSA old-age dependency ratio will rise from 24.7 in 2020 to 37.1 in 2050, an increase of 12.4. Under the baseline population projection, the youth dependency ratio fell between 2020 and 2050 in both Northern Kentucky and the Cincinnati MSA.

Population is becoming more diverse

Racial and ethnic diversity is emphasized for its role in economic growth, contributing to innovation, workforce utilization, entrepreneurship, and meeting diversity, equity, and inclusion goals. Population projections for the four scenarios include data for White, Black, Hispanic, and All Other groups. The White population is projected to decrease as a percentage of the total, becoming less than half of the U.S. population by 2050.

Northern Kentucky faces a challenge in its relative lack of racial and ethnic diversity. Although it is projected to become more diverse, with the White population falling from 84.8 percent in 2020 to 78.1 percent in 2050, it will still be less diverse than any of the 18 metros of interest.

The Cincinnati MSA is projected to become more diverse as well, with the White population falling from 75.9 percent in 2020 to 67.1 percent in 2050.

In the United States, the Hispanic population is among the fastest growing racial groups. Hispanic women in recent years have had among the highest birth rates relative to other racial/ethnic groups. It is notable that among the close-proximity metropolitan areas, each has a relatively small Hispanic population accounting for 10.5 percent or less of total population. In Northern Kentucky the Hispanic population is just 4.5 percent of total population. Among the high-growth aspirational metros, the Hispanic population generally accounts for a higher percentage of the total population topping out at 31.9 percent in Austin.

A region's current demographics influences its future trajectory

Three main factors determine a region's population growth: births, deaths, and net migration. All else equal, if a region is relatively young it will have a higher birth rate than a region with an older population. Likewise, in general, the White population has a lower fertility rate than the Black and Hispanic populations. And of course, an older population will typically have a higher death rate. Without significant changes in net migration rates, a region's future population is largely determined by its current demographics. The baseline projection assumes that the current demographic baseline and trends in a region will continue going forward. **Without a significant change in migration rates, it is unlikely that a region will move from its baseline forecast.**

Migration is vital to growth, but there is no singular solution to address a slowdown in population growth

In general, high-growth aspirational metros experience faster growth due to domestic net migration. In contrast, Cincinnati, Northern Kentucky, and many close-proximity metros rely more on natural change and international net migration. In-migration means new talent, which has the potential to drive innovation, household formation, elevated birth rates and new business creation, among other things.

Domestic net migration has averaged 433 people annually since 2010 in Northern Kentucky, contrasting with the Cincinnati MSA loss of 1,803 people annually.

Assuming a consistent natural change rate (births minus deaths), achieving the optimistic projection from the baseline projection in the Cincinnati MSA would require attracting 12,502 people annually. **Similarly, Northern Kentucky would need to attract 2,402 people annually to reach the optimistic forecast from the baseline while holding natural change constant.** In other words, the region would need to increase net migration from its historical average of 433 per year to 2,402 per year, an increase of 1,969, an annual increase of more than 400 percent.

The starting age profile, economic conditions, and amenities influence population growth. Younger populations tend to grow faster, and economic factors and amenities play roles in attraction and retention. No single factor explains growth patterns across metros; for example, Nashville's rapid growth contrasts with Memphis's relative stagnation despite each having a similar climate and state tax environment. Yet, some common characteristics of growing metros include the presence of state government (i.e. a state capital), major research universities or other large postsecondary institutions, strong offerings in entertainment and amenities as well as a relatively low cost of living.

Fast-growing aspirational metro regions were not overnight success stories

One of the striking differences between the close-proximity and high-growth aspirational metropolitan regions is the large differences in population growth, both historically and projected through 2050.

Only three of the close-proximity metropolitan areas exceeded the U.S. average rate of growth in population including Indianapolis (up 64.2 percent), Columbus (up 78 percent), and Lexington (up 93.3 percent). On the other hand, all of the high-growth aspirational metros have experienced population growth at more than double the U.S. average, ranging from a low of 138.5 percent in Charleston to a high of 472.1 percent in Austin. In other words, the **high-growth aspirational metros are not overnight success stories. They have been outpacing U.S. population growth for the past 50 years.**

Baseline projections show modest population growth in Northern Kentucky and the Cincinnati MSA from 2020 to 2050.

Projections suggest a slowing growth rate of population growth for Northern Kentucky and the Cincinnati MSA, with modest growth under each scenario except for the pessimistic.

- The pessimistic scenario anticipates population declines, with an average annual decrease of 0.1 percent in Northern Kentucky and an average annual decline of 0.4 percent in the Cincinnati MSA between 2020 and 2050.

- **The baseline scenario predicts modest population increases, with an average annual increase of 0.5 percent in Northern Kentucky and an average annual increase of 0.1 percent in the Cincinnati MSA during the same 30-year period.**
- The aspirational scenario predicts faster population growth with an average annual increase of 0.6 percent in Northern Kentucky and an average annual increase of 0.2 percent in the Cincinnati MSA during the same 30-year period.
- The optimistic scenario predicts the fastest population growth with an average annual increase of 1.1 percent in Northern Kentucky and an average annual increase of 0.7 percent in the Cincinnati MSA during the same 30-year period.

Baseline projections show the labor force in Northern Kentucky grows modestly and the labor force in the Cincinnati MSA will decline from 2020 to 2050.

CEAD estimated the workforce size by determining the prime working-age population (15 to 64 years) and applying region-specific, age-specific labor force participation rates (LFPR). The assumption is made that LFPR rates will remain constant from 2020 to 2050. Both Cincinnati and Northern Kentucky show normal distributions of LFPR, with the highest participation rates among individuals aged 20-59 and lower participation rates for persons under 20 years of age and those 60 years and over. Today, the region benefits from a relatively high participation rate, so efforts to drive workforce expansion through increased participation will be difficult.

For the Cincinnati MSA, the baseline projection anticipates a decline of 31,685 in the labor force by 2050, with only the optimistic scenario predicting an increase (100,261). **Northern Kentucky's baseline projection forecasts a slight increase of 8,450 in the labor force, while the pessimistic scenario predicts a decline of 17,950.**

Notably, the aspirational forecast shows a smaller increase in the labor force compared to the baseline forecast, which is attributed to differences in age distribution. The age distribution influences LFPR, and regions with a younger population tend to have higher LFPR. The correlation between population growth and labor force growth is emphasized, with high-growth aspirational metros experiencing a positive relationship due to an increase in working-age population driven by domestic net migration.

Conclusion: High, Low, and Stagnant Population Growth Tradeoffs

There are tradeoffs associated with high, low, and stagnant population growth rates. **There is no singular optimal rate of population growth that is right for every community, rather stakeholders must decide on growth policies that reflect community goals and values.**

As previously discussed, benefits of population growth include increased income, jobs, innovation, consumer demand, and an expanded tax base. However, downsides encompass resource scarcity, environmental degradation, infrastructure strain, housing shortages, and pressure on the educational system. As exemplified by Austin, rapid growth may lead to housing shortages, increased homelessness and rapid rise in the cost of living.

Population decline also poses challenges, as reduced demand may discourage new housing construction. Housing preferences may shift to suburbs, causing inner-city vacancies, as seen in Detroit, where a response to population decline has been mass demolition of vacant housing.

Population stagnation correlates with limited economic growth and an aging population as younger residents seek opportunity elsewhere, increasing old-age dependency ratios, and straining social services. Pittsburgh, Cleveland, St. Louis, and Detroit face challenges due to the lack of robust growth.

An aging population brings economic challenges, including increased healthcare costs and pressure on social security. Slow labor force growth or shrinkage may increase dependency ratios, posing long-term fiscal challenges for governments.

The rate of population growth significantly influences a region's labor force growth and composition. A shrinking population coupled with falling labor force participation rates may limit a region's economic growth.

Potential solutions for labor shortages include increased immigration and job automation. Immigration, a key aspect of U.S. labor force policy, depends on regional factors. Automation, effective in maintaining economic efficiency with a shrinking labor force, may eliminate less skilled jobs. If both immigration and automation fail, there is a risk of declining innovation and economic productivity.

Introduction

The Center for Economic Analysis and Development (CEAD), with funding from BE NKY Growth Partnership, forecasted population growth for Northern Kentucky and 18 metropolitan statistical areas by race and age for the 30 years 2020 to 2050. CEAD then developed a forecast for each area's available workforce based on these population and age component projections during the same 30-year period.

Over the past decade, and exacerbated by the Pandemic, the competition for labor has heated up across the country. Talent and labor availability challenges have a significant impact on site selection decisions. In the most recent Site Selectors Survey, "75 percent of respondents said they were having a significant effect; 25 percent said they were having some effect; and no one said they were having zero effect."[2] Numerous factors affect the U.S. labor market. Chief among these factors are demographic trends, fueling shifts in the size and composition of the labor force. Preferences are changing, driving settlement patterns, with many Americans preferring to live in warmer climates to the south and the west and to lower-cost metropolitan regions. To stay competitive, many employers have embraced remote, hybrid, and other flexible scheduling options to attract and retain talent.

With talent in short supply and key to attracting and retaining employers, the ability to predict labor force growth and implement successful workforce strategies have become paramount concerns for regional economic development organizations. BE NKY asked CEAD to analyze the current labor force and provide projections for the population and the labor force under four scenarios. The baseline projection provides CEAD's best estimate of future population and workforce levels. The pessimistic, aspirational, and optimistic scenarios provide alternative predictions, allowing for policy analysis assuming different inputs and outcomes.

Throughout this report, CEAD defined Northern Kentucky as Boone, Campbell, and Kenton counties. Additionally, BE NKY identified 18 metropolitan statistical areas (MSA) as regions of interest.[3] CEAD divided these 18 metro areas into two groups. The first group, close-proximity Metros, includes 11 metropolitan statistical areas: Cincinnati, Cleveland, Columbus, Indianapolis, Kansas City, Lexington, Louisville, Memphis, Nashville, Pittsburgh, and St. Louis. The second group, high-growth aspirational metros, includes seven metropolitan statistical areas: Austin, Charleston, Charlotte, Denver, Nashville, Raleigh, and Tampa. CEAD and BE NKY selected the metropolitan areas in the analysis for two primary reasons. First, Northern Kentucky often competes with the close-proximity metro areas for economic development projects. Second, the high-growth aspirational metros are often highlighted by the media and in industry rankings for having above-average population growth. At the same, they are similar in size to the metropolitan areas in the close-proximity group. Except for Lexington and Charleston, with populations under 1 million, and Tampa and Detroit, with populations greater than 3 million, the other metropolitan areas in the analysis had a 2020 population between 1 and 3 million people.

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[2] Site Selectors Survey, *Site Selection* magazine, January 2023

[3] Per the U.S. Census Bureau, "the general concept of a metropolitan area is that of a core area containing a large population nucleus, together with adjacent communities that have a high degree of economic and social integration with that core." In other words, an MSA includes a large central city with a population of at least 50,000 and its surrounding suburban counties.

Table 1: Metropolitan Statistical Areas by Group

High-growth, Aspirational Metros	Close-proximity Metros
Austin-Round Rock-Georgetown, TX	Cincinnati, OH-KY-IN
Charleston-North Charleston, SC	Cleveland-Elyria, OH
Charlotte-Concord-Gastonia, NC-SC	Columbus, OH
Denver-Aurora-Lakewood, CO	Detroit-Warren-Dearborn, MI
Nashville-Davidson--Murfreesboro--Franklin, TN	Indianapolis-Carmel-Anderson, IN
Raleigh-Cary, NC	Kansas City, MO-KS
Tampa-St. Petersburg-Clearwater, FL	Lexington-Fayette, KY
	Louisville/Jefferson County, KY-IN
	Memphis, TN-MS-AR
	Pittsburgh, PA
	St. Louis, MO-IL

Section 1: Historical Population Trends 1970 to 2020

Between 1970 and 2020, the U.S. population grew by 62.7 percent, adding 127.7 million people. Across the decades, U.S. population growth rose from an average annual rate of 1.1 percent between 1970 and 1980 to a yearly average of 1.3 percent between 1990 and 2000. Since 2010, the average annual population growth rate has slowed to 0.7 percent in the last decade ending in 2020 (Fig. 1).

During this same 50-year period, the population in the Cincinnati MSA grew by 32.8 percent, adding 557,281 people. From 2010 to 2020, the population in the Cincinnati MSA grew, on average, 0.5 percent yearly, adding 116,118 people (Fig. 2).

Simultaneously, between 1970 and 2020, the population in Northern Kentucky grew by 58.8 percent, adding 147,559 people. From 2010 to 2020, the population in Northern Kentucky grew, on average, 0.8 percent per year, narrowly outpacing the rate of U.S. population growth, which averaged 0.7 percent yearly (Fig. 3).

Population growth rates varied substantially across the 18 metros included in our analysis. Over the 50 years, while the U.S. population increased by 62.7 percent, the population of Pittsburgh fell by 14.2 percent, a decline of 391,450 people. During the same period, the population of Austin increased by 472.1 percent, adding nearly 1.9 million people. Neither Northern Kentucky nor the Cincinnati MSA matched the growth of the overall U.S. If Northern Kentucky were its own MSA, its population growth of 58.8 percent would rank 11 out of 19 (Fig. 4).

Population growth varied substantially across the 384 MSAs in the United States. CEAD compared growth rates for metro areas with a 2020 population of less than 500,000, metro areas with a 2020 population between 500,000 and 1 million, and metro areas with a 2020 population of 1 million or more.

In general, larger metropolitan areas grew faster than smaller metro areas. However, each size category had an extensive range in growth rates. Among our 18 metro areas of interest, 16 had a population of 1 million or more. Two metros of interest, Lexington and Charleston, had populations between 500,000 and 1 million. Comparing the Northern Kentucky population change from 1970 through 2020 of 58.8 percent against metro areas with less than 500,000 people would place the region in the third quintile of growth among these smaller population metro areas (Fig. 5, 6, 7).

Among the close-proximity metros, cumulative growth between 1970 and 2020 ranged from a loss of more than 391,000 in Pittsburgh to a gain of 917,525 in Columbus. Only three of the close-proximity metros, Indianapolis, Columbus, and Lexington, grew as fast as the United States during the 50 years 1970-2020 (Fig. 8).

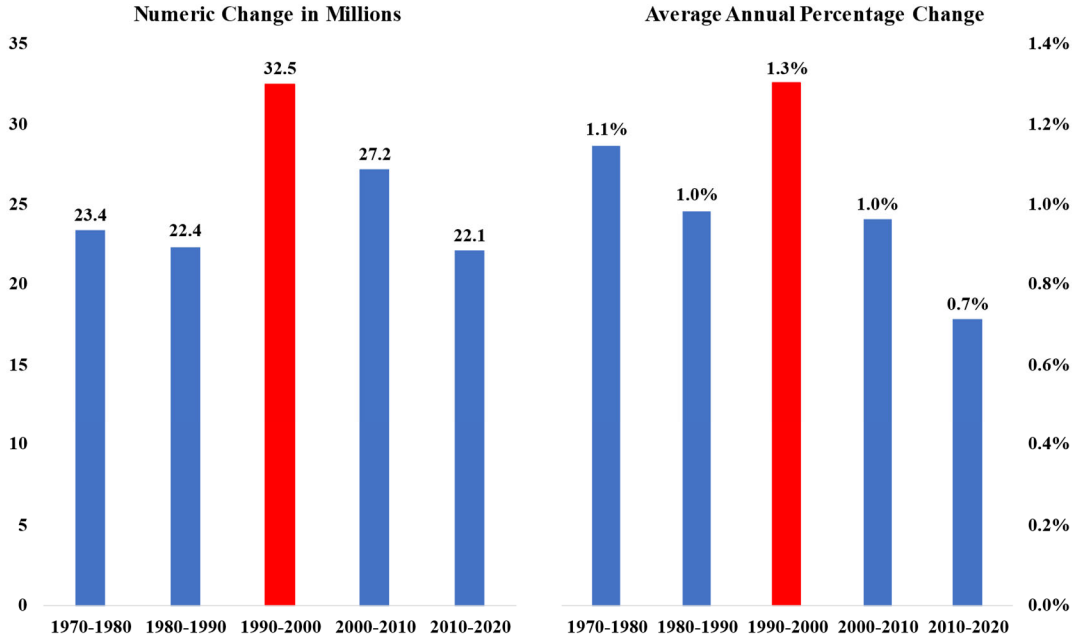
Across the high-growth aspirational metros, cumulative growth between 1970 and 2020 ranged from a gain of 466,292 in Charleston to more than 2 million in Tampa. The high-growth aspirational metros grew much faster than the United States during this period (Fig. 9).

The historical data show two key points to understanding future growth patterns. First, most regions' rate of population growth peaked sometime between 1990 and 2000. The ten years between 1990 and 2000 closely correspond to the end of the birth years for Millennials born

between 1981 and 1996. Second, the population growth rate varies substantially across regions in the United States.

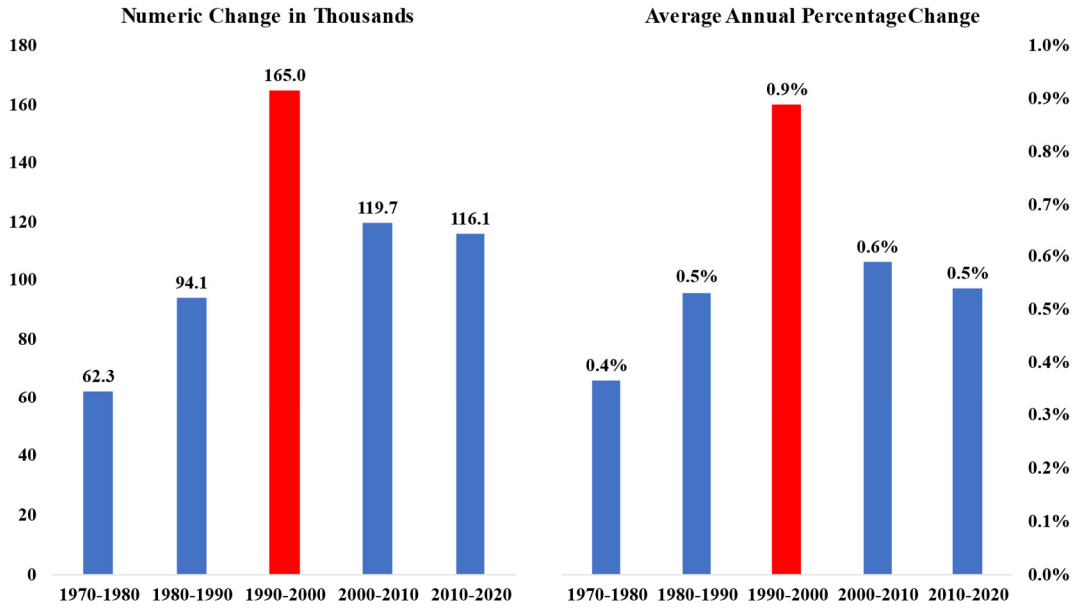
Appendix A provides historical population data and trends across the 18 metro areas of interest from 1970 through 2050.

Figure 1: United States, Numeric and Percentage Change in Population by Decade



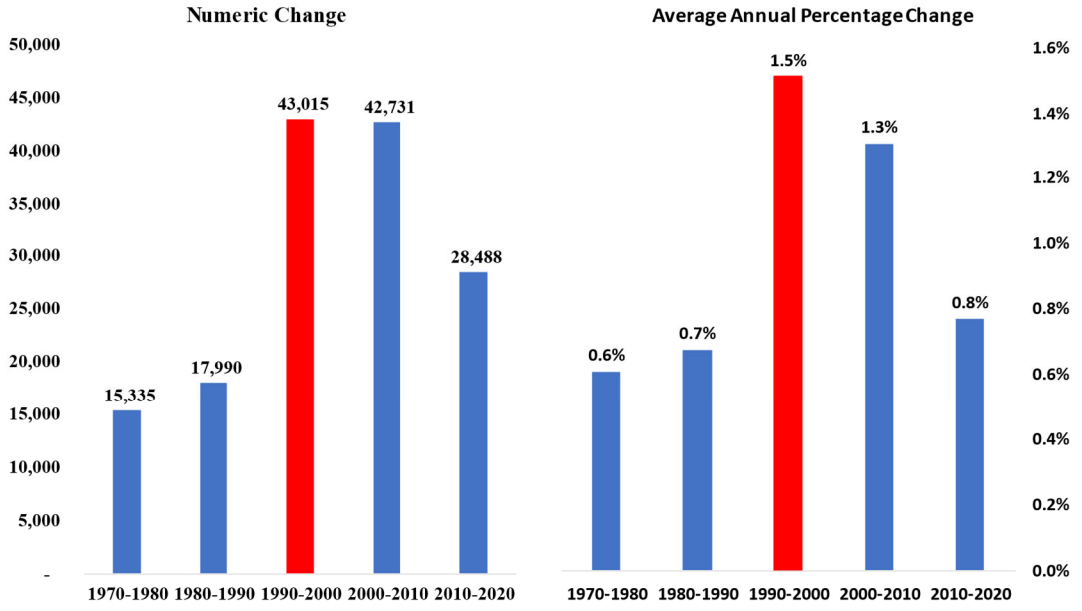
Data source: U.S. Bureau of Economic Analysis

Figure 2: Cincinnati MSA, Numeric, Percentage Change in Population by Decade



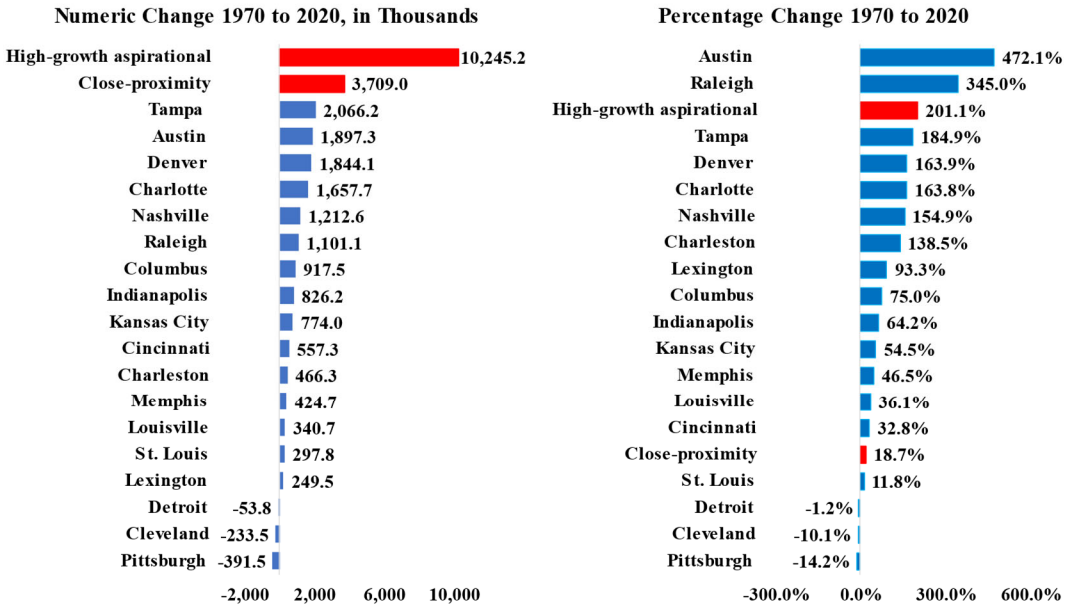
Data source: U.S. Bureau of Economic Analysis, Table CAINC4

Figure 3: Northern Kentucky, Numeric, Percentage Change in Population by Decade



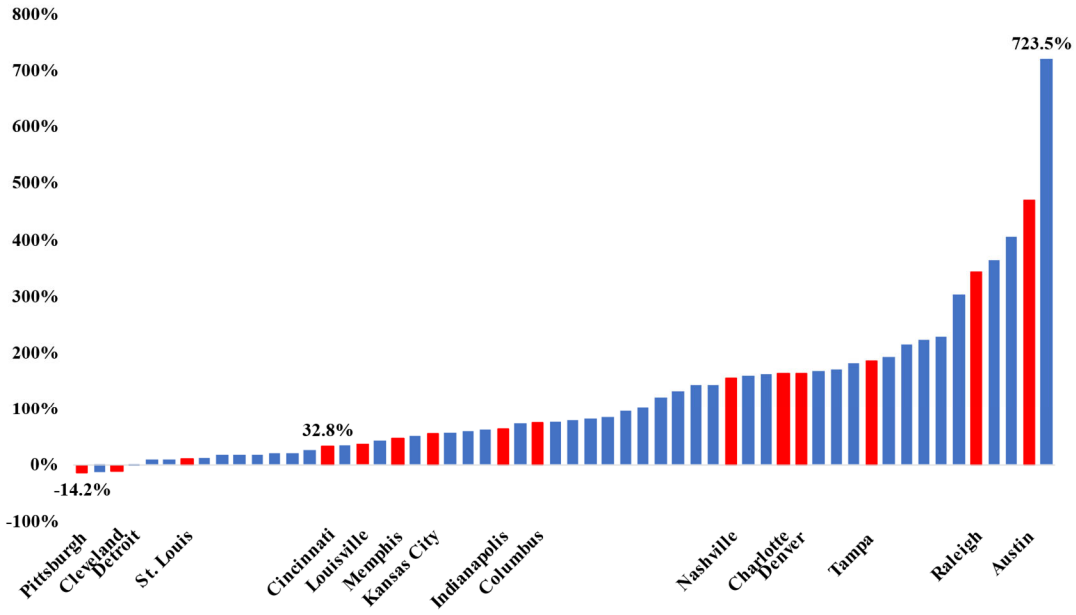
Data source: U.S. Bureau of Economic Analysis, Table CAINC4

Figure 4: Numeric, Percentage Change in Population by Decade, Selected MSAs



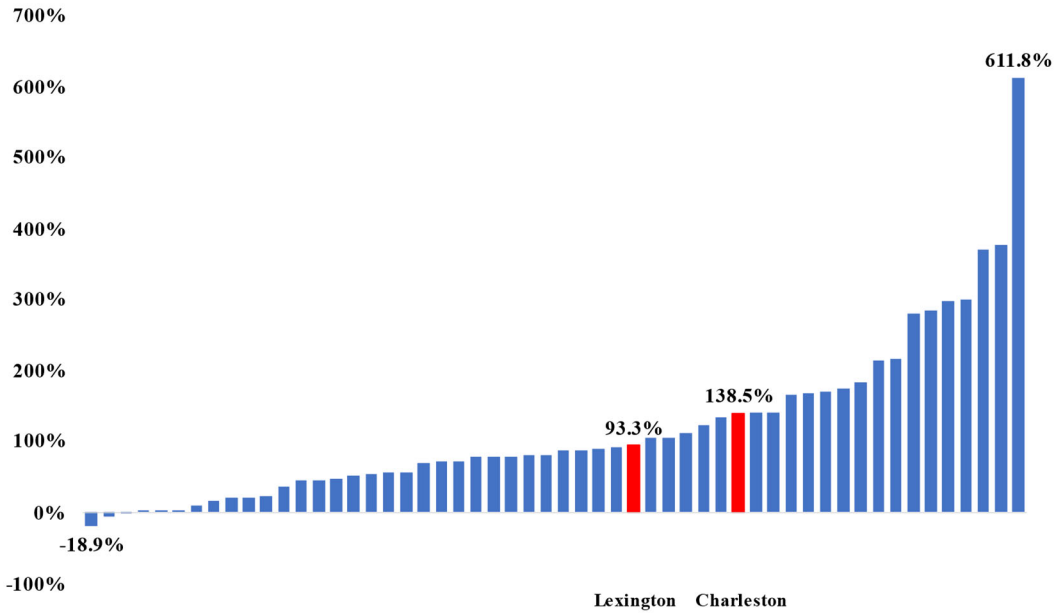
Data source: U.S. Bureau of Economic Analysis

Figure 5: Percent Change 1970-2020 MSAs: 2020 Population of 1M or More



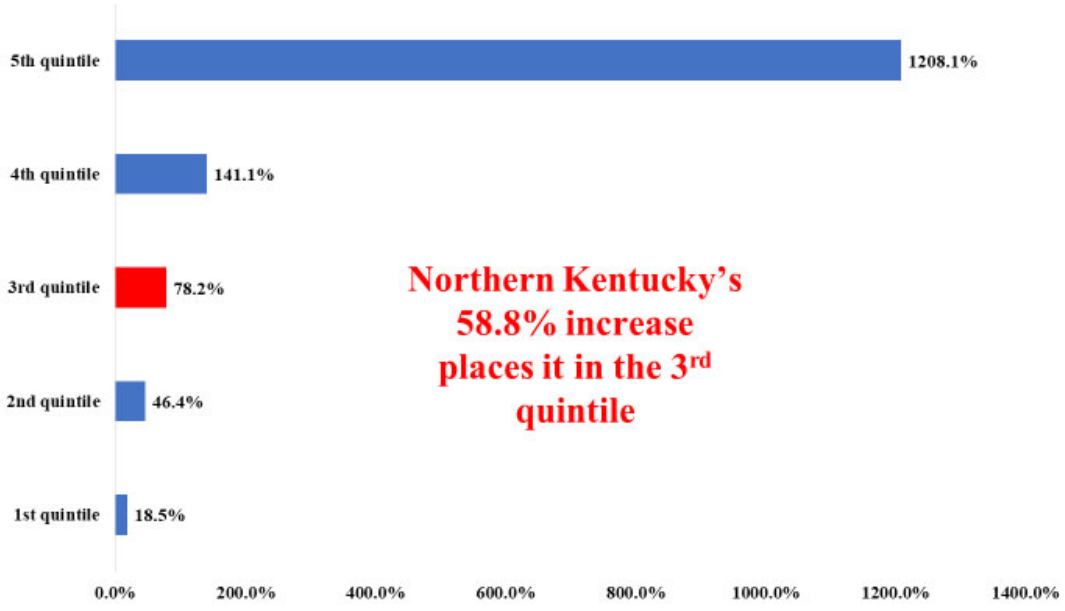
Data source: U.S. Bureau of Economic Analysis

Figure 6: Percent Change 1970-2020 MSAs: 2020 Population of 500,000 to 999,999



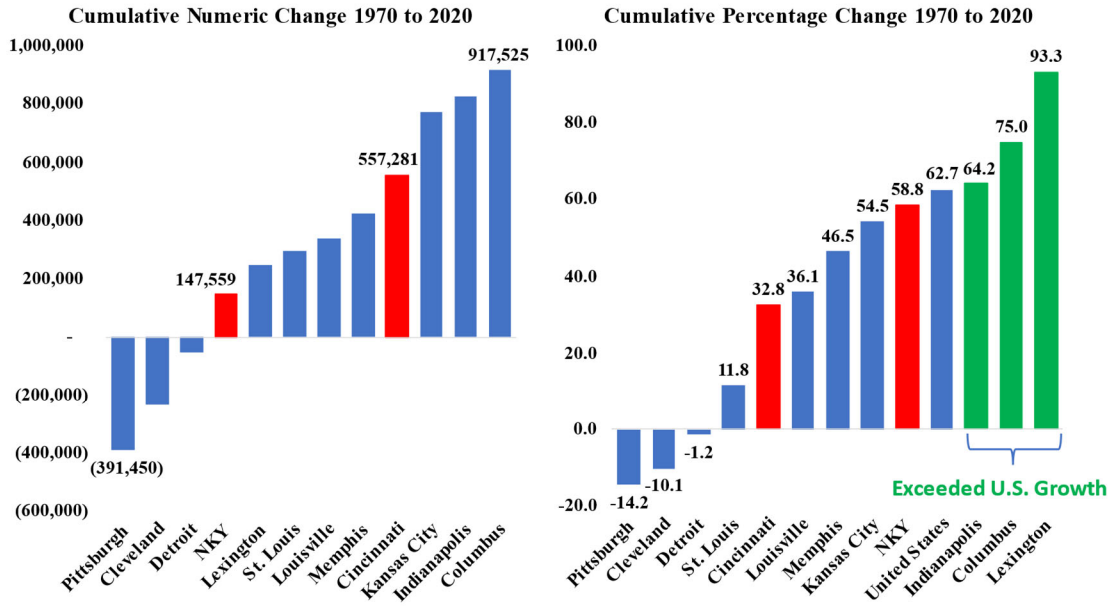
Data source: U.S. Bureau of Economic Analysis

Figure 7: Percent Change 1970-2020 MSAs: 2020 Population of Less than 500,000



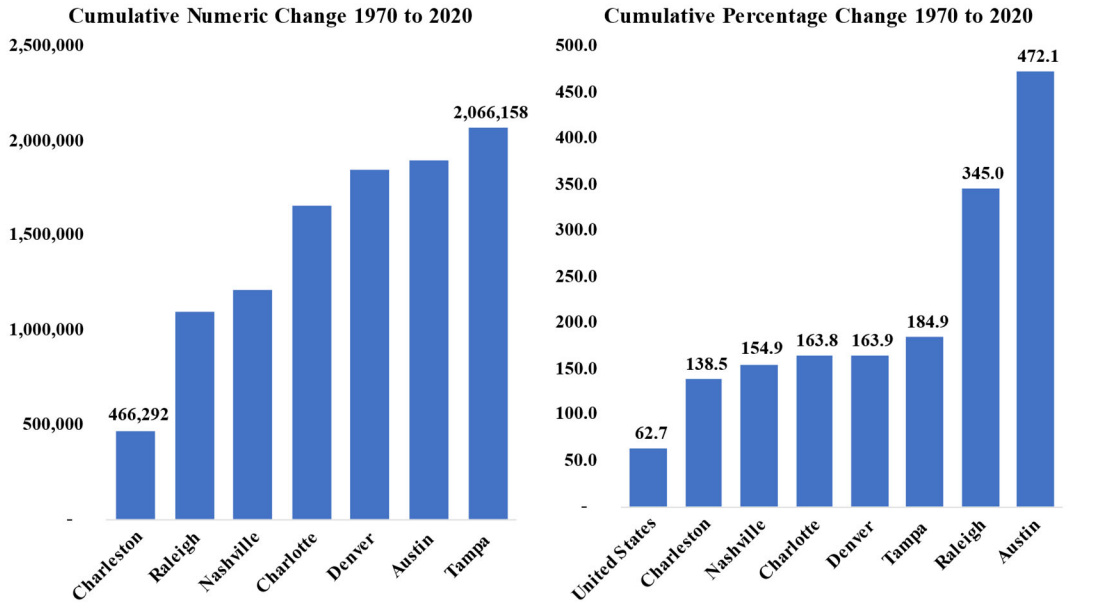
Data source: U.S. Bureau of Economic Analysis

Figure 8: Historical Change in Population 1970-2020, Close-Proximity MSAs



Data source: U.S. Bureau of Economic Analysis

Figure 9: Historical Change in Population 1970-2020, High-Growth Aspirational MSAs



Data source: U.S. Bureau of Economic Analysis

Section 2: Components of Population Change 2010 to 2022

There are three main components of population change: births, deaths, and migration. Across the country, fertility rates have been declining for most groups for decades, with variations in rates by race and age. Mortality rates, excluding the COVID-19 pandemic years, have been declining for most groups, again varying by age, race, and gender. However, migration rates differ substantially across the country.[4] Changing a community's migration rate via public policy efforts is the primary way to change a region's population trajectory.

So, what is driving the faster growth in our high-growth aspirational metros compared to our close-proximity metros? It is the rate of domestic net migration. Austin, Charleston, and Charlotte, for example, each have 60 percent or more of their overall change in population coming from domestic net migration.

Conversely, growth in the close-proximity metros depends more on international migration and natural increase (births minus deaths). Only three metros, Cleveland, Tampa, and Pittsburgh, had cumulative natural decreases in population between 2010 and 2022. All 18 metro areas of interest along with Northern Kentucky had cumulative increases in international net migration during the period. Six of the 18 metro areas had cumulative declines in domestic net migration, led by Detroit, with losses of more than 242,000. Tampa and Austin had domestic net migration of 434,969 and 423,939, respectively.

Cincinnati and Northern Kentucky have relatively low domestic net migration, with most of their population change coming from natural growth. Making your region attractive for domestic migration is a crucial strategy for population growth (Fig. 10, 11, 12).

Northern Kentucky's domestic net migration has averaged 433 people per year since 2010. For the Cincinnati MSA, domestic net migration averaged a *loss* of 1,803 people per year since 2010. During this same period, domestic net migration for Tampa averaged 33,459 people per year, accounting for 77.5 percent of its total population growth since 2010. In Charleston, domestic net migration averaged 9,552 people annually, accounting for 68.8 percent of its population growth since 2010. Conversely, in Detroit, domestic net migration has accounted for a loss of 18,637 people per year, on average, since 2010.

International migration can also affect a region's overall population growth. While Detroit, Cleveland, and St. Louis saw a significant exodus via domestic net migration, all three metros had positive international net migration. Since 2010, international net migration added 129,626 people to Detroit, 46,423 to Cleveland, and 45,230 to St. Louis metro areas. In the Cincinnati MSA, international net migration has totaled 45,264 since 2010, averaging nearly 3,500 people annually. In Northern Kentucky, international net migration has added almost 5,100 people since 2010, averaging 389 people annually (Fig. 13, 14).

Many communities experienced declines in natural growth during the pandemic years. Among our metros of interest, for example, Charleston, Charlotte, Cincinnati, and Denver, among others,

[4] Per the Census Bureau, "The estimates of net international migration include all foreign-born immigrants and emigrants, regardless of legal status. Thus, unauthorized migrants are implicitly included in Census Bureau estimates of net international migration, although it is not possible to tabulate separate estimates of unauthorized migrants."

had declines in natural growth in 2021 and 2022. Tampa and Pittsburgh saw the largest net declines in natural growth during the pandemic.

Another not-so-obvious variation that leads to different rates of population growth is a region's starting age profile. All else being equal, the younger a region's population is, the faster it is likely to grow since young adults have higher fertility rates. Likewise, all else being equal, the older a region's population, the slower it will grow since an aging population has fewer children and higher mortality rates. Across the 18 metros in the analysis and Northern Kentucky, the median age in 2022 ranged from a low of 35.9 years in Austin to a high of 42.9 years in Pittsburgh. The U.S. median age is 39 years. It's 38.3 in the Cincinnati MSA. Median age in Northern Kentucky ranges from a low of 37.7 in Boone County to a high of 39.8 in Campbell, with Kenton falling in between the two at 38 years (Fig 15). Seemingly minor differences in median age can significantly impact the natural rate of population increase. Across all metropolitan areas in the United States, the median age ranges from 25.7 years in Provo, Utah, to 68.6 years in The Villages, Florida.

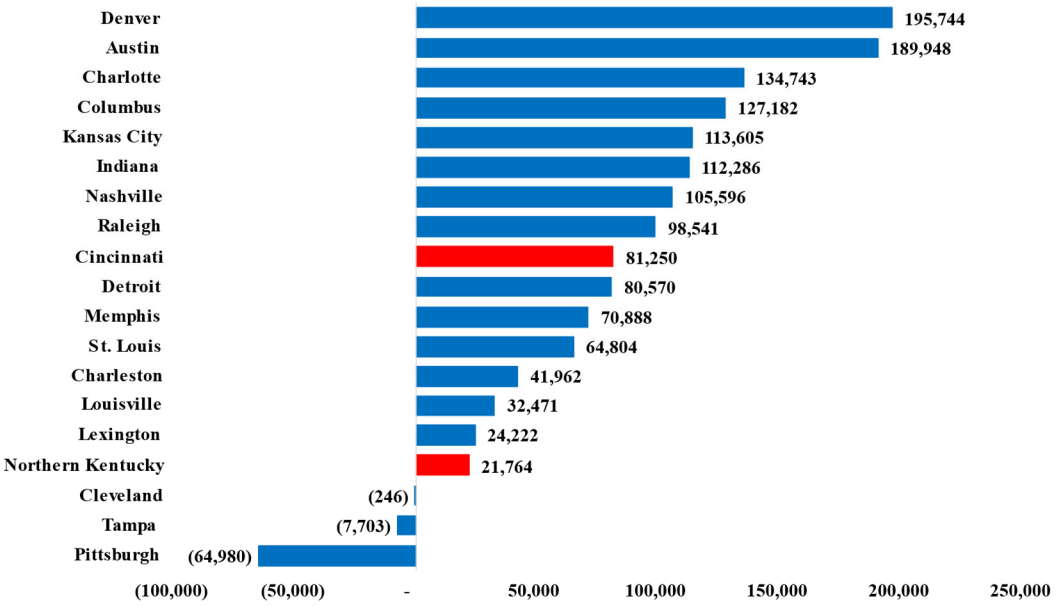
Demographics are not the only factor impacting the rate of population change across regions. Other factors include a region's economic conditions, such as having high/low poverty rates, high/low incomes, high/low rates of job growth, and the educational attainment levels of the population. A region's amenities, such as being a state capital, having a robust educational system, or having natural amenities such as mountains, all play a part in population attraction and retention.

It is a popular narrative that the only regions enjoying robust population growth are those in warm climates. While warm weather is undoubtedly a factor in migration patterns, it does not explain the rapid growth of regions such as Denver.

In particular, Nashville's rapid population growth has garnered national attention. From 1970 through 2020, the population of Nashville increased by more than 1.2 million, growing, on average, 3.1 percent annually. During this same period, Memphis added 423,000 people, growing, on average, just 0.9 percent annually. Despite similar weather, Nashville's population growth rate is three times that of Memphis. While warm weather is undoubtedly helpful in attracting people, weather alone is not enough.

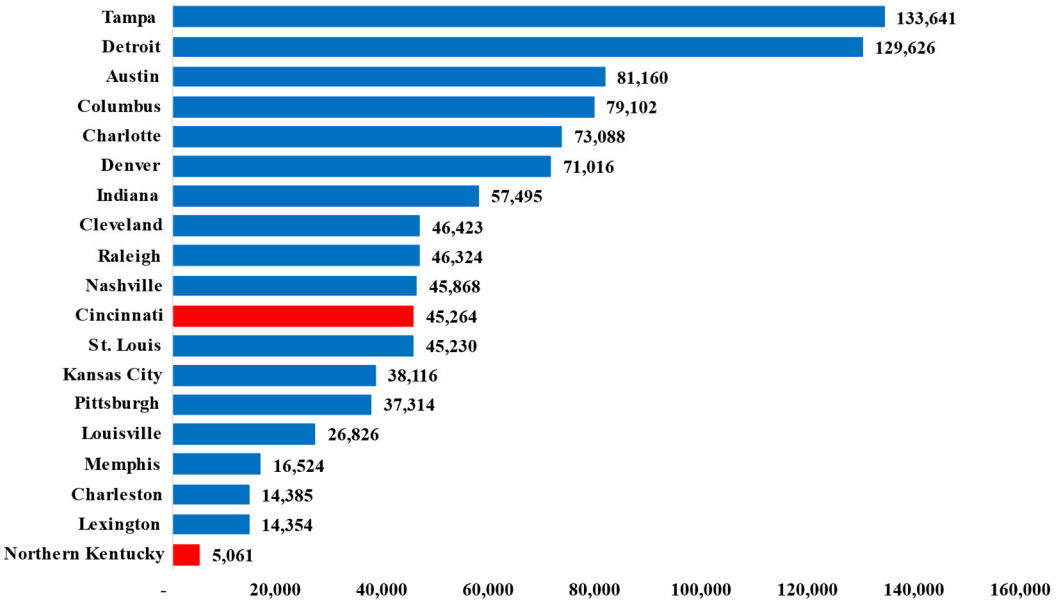
Appendix B provides data on the components of population change from 2010 through 2022 for the 18 metros of interest and Northern Kentucky.

Figure 10: Cumulative Natural Increase (births minus deaths) 2010-2022



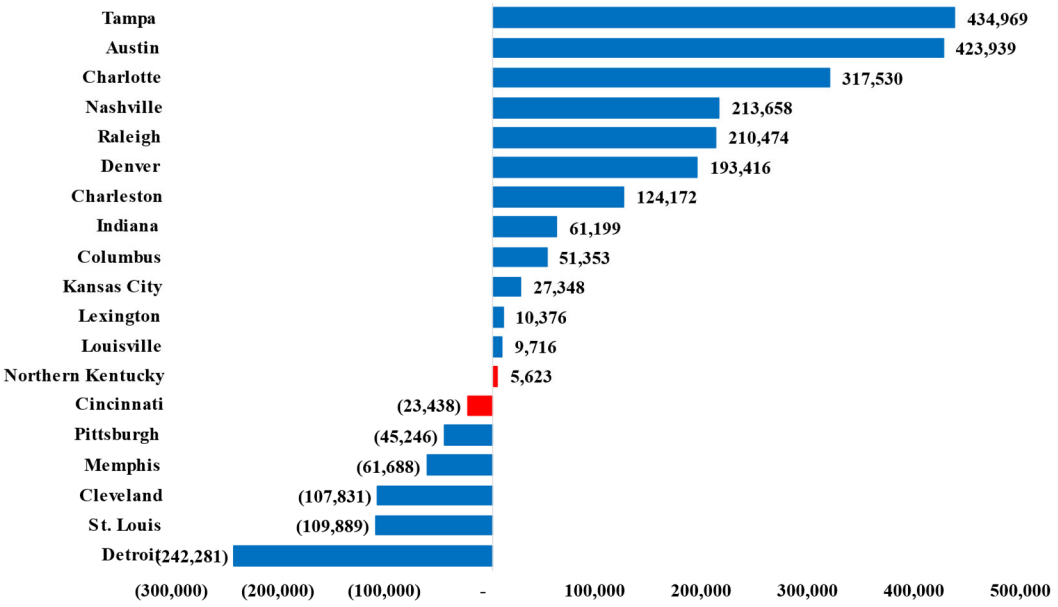
Data source: U.S. Census Bureau

Figure 11: Cumulative International Net Migration 2010-2022



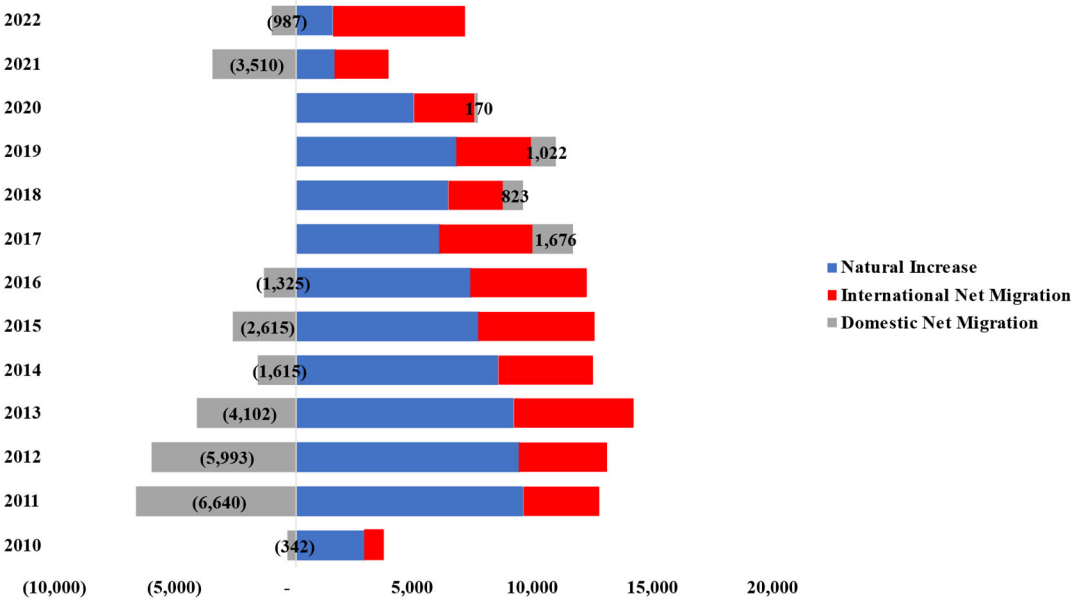
Data source: U.S. Census Bureau

Figure 12: Cumulative Domestic Net Migration 2010-2022



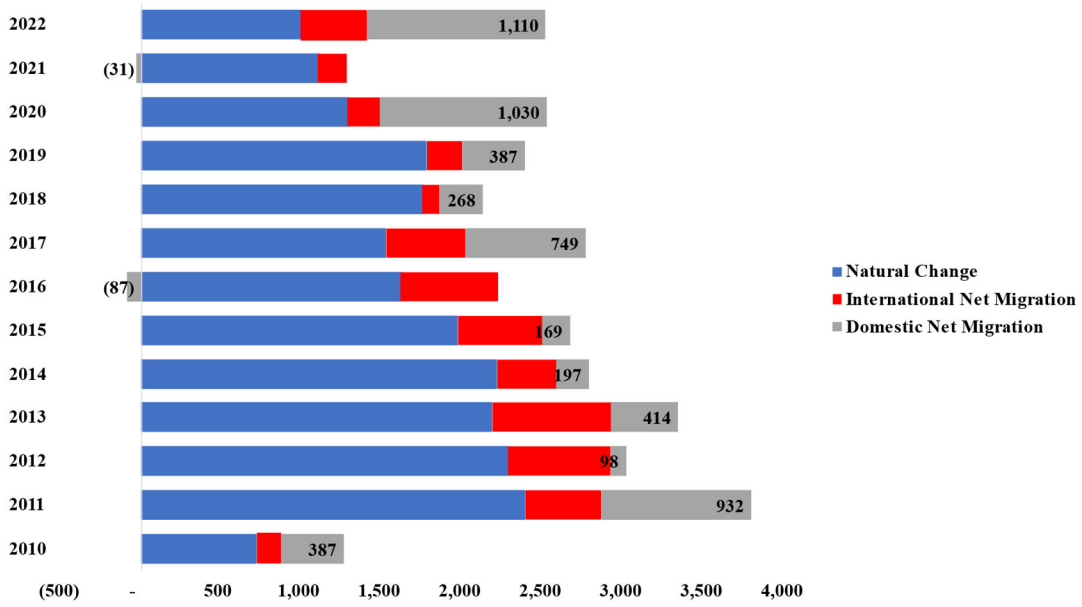
Data source: U.S. Census Bureau

Figure 13: Cincinnati Components of Population Change, 2010-2022



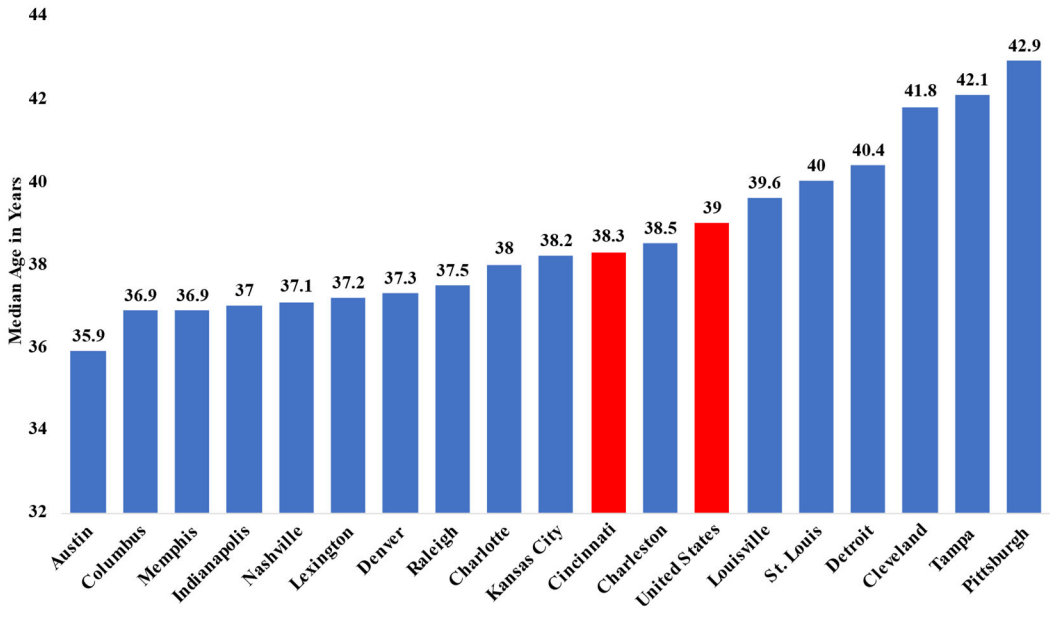
Data source: U.S. Census Bureau

Figure 14: Northern Kentucky Components of Population Change, 2010-2022



Data source: U.S. Census Bureau

Figure 15: Median Age, 2022, Selected Metropolitan Areas



Data Source: U.S. Census Bureau, American Community Survey, Table B01002

Table 2: Cincinnati MSA Components of Population Change, 2010-2022

	Total Change	Natural Change	International Net Migration	Domestic Net Migration
2010	5,288	2,868	752	(342)
2011	7,978	9,468	3,139	(6,640)
2012	8,933	9,313	3,601	(5,993)
2013	11,954	9,076	4,967	(4,102)
2014	12,774	8,424	3,951	(1,615)
2015	11,787	7,624	4,763	(2,615)
2016	12,751	7,308	4,752	(1,325)
2017	13,551	6,002	3,856	1,676
2018	11,452	6,343	2,268	823
2019	12,842	6,720	3,081	1,022
2020	9,613	4,905	2,518	170
2021	2,312	1,648	2,153	(3,510)
2022	8,049	1,551	5,463	(987)
Cumulative Change	129,284	81,250	45,264	(23,438)
Avg. Annual Change	9,945	6,250	3,482	(1,803)

Data source: U.S. Census Bureau

Table 3: Northern Kentucky Components of Population Change, 2010-2022

	Total Change	Natural Change	International Net Migration	Domestic Net Migration
2010	1,254	718	149	387
2011	3,784	2,382	470	932
2012	3,007	2,280	629	98
2013	3,331	2,178	739	414
2014	2,775	2,210	368	197
2015	2,657	1,967	521	169
2016	2,125	1,612	600	(87)
2017	2,757	1,521	487	749
2018	2,118	1,747	103	268
2019	2,378	1,772	219	387
2020	2,513	1,281	202	1,030
2021	1,238	1,101	168	(31)
2022	2,511	995	406	1,110
Cumulative Change	32,448	21,764	5,061	5,623
Avg. Annual Change	2,496	1,674	389	433

Data source: U.S. Census Bureau

Section 3: Population Projections 2020-2050

Given the lack of available county-level population projections, CEAD utilized an analysis from the Columbia University Center for International Earth Science Information Network.[5] The Columbia University projections provide data for every county in the United States, allowing CEAD to aggregate county-level data for each metro area of interest in the analysis. Further, these data included projections for each 5-year age cohort from 0 to 4 years through 85 years and over, which allowed CEAD to aggregate relevant age groups to estimate the size of a region's labor force over time. Also included are projections for population across four race and ethnic groups: White, Black, Hispanic, and Other.[6] CEAD benchmarked these projections to the 2020 Decennial Census. The projections included different scenarios. CEAD used four of those scenarios, titled:

- Optimistic
- Aspirational
- Baseline
- Pessimistic

To test our methodology, CEAD compared our Northern Kentucky baseline forecast for 2050 to that of the Kentucky State Data.[7] Over a 30-year forecast horizon, the difference in estimates for 2050 was fewer than 3,000 people or 0.64%. The Kentucky State Data uses cohort component methodology to forecast population similar to that of the U.S. Census Bureau. According to the State Data Center, the cohort component model "captures the impact of the primary components of population change – births, deaths, and net migration – to forecast changes in future population."

As noted by the author, Hauer,

> *"These projections, like all projections, involve the use of assumptions about future events that may or may not occur. Users of these projections should be aware that although the projections have been prepared with the use of standard methodologies, documentation of their creation, open-source computer code, and extensive evaluations of their accuracy and uncertainty, they might not accurately project the future population of a state, county, age, sex, or race group. The projections are based on historical trends and current estimates. Any small error in the projections early in the projection horizon could cascade into considerable errors decades later in the projection. Caveat emptor – users beware. These projections should be used only with full awareness of the inherent limitations of population projections in general."*

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[5] Hauer, M., and Center for International Earth Science Information Network (CIESIN), Columbia University. 2021. Georeferenced U.S. County-Level Population Projections, Total and by Sex, Race and Age, Based on the SSPs, 2020-2100. Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC). https://doi.org/10.7927/dv72-s254. Accessed 6/30/2023.

[6] In the remainder of the report, the non-Hispanic White population is simply referred to as White.

[7] CEAD also compared our population forecasts to those used in the Northern Kentucky Housing Data Analysis report published by the NKADD. The population projections in that report estimated average annual growth in population of 0.7 percent, which is slightly faster than CEAD's Aspirational forecast of 0.6 percent average yearly growth between 2020 and 2050. http://ksdc.louisville.edu/data-downloads/projections/

Each of the four scenarios examines how a region's demographics, economics, and policies might change over the projection horizon from 2020 through 2050.

The baseline projection is based on traditional cohort component methodology. **The baseline projection is expected to be the most likely scenario unless policy interventions change the trajectory of net migration**. This projection assumes that local policy will have little, if any, impact on birth and death rates.

The pessimistic projection asks what happens to the rate of population growth if the region adopts policies discouraging growth and investment. Or what happens if the region loses a major employer or has a major industry shrink substantially? The contraction of the auto industry in Detroit provides an example of how a pessimistic scenario might play out over time. Additionally, a region may not adapt to structural changes in the economy such as the transition from the internal combustion engine to electric vehicles, leading to job loss.

The aspirational projection is the converse of the pessimistic forecast. What happens to the rate of population growth if the region were to implement pro-growth policies? What happens if the region makes substantial investments in its assets, including everything from roads and highways to parks and recreation to education and childcare? An example of a potential policy change would be higher density residential zoning allowing for a more rapid expansion of affordable housing.

The optimistic projection assumes that in addition to the pro-growth policies and strategies noted under the aspirational projection, these policies start to have a significant impact on the attraction and retention of both employers and employees.

Each of the four scenarios has a different path to population growth or decline. They are not simply linear differences in projected growth rates. For example, if a region implements policies and makes investments to attract younger people to the region, that is likely to accelerate a region's growth rate. Younger people tend to have more children, all else equal. However, it is also possible to implement policies that attract and retain an older population. In this case, all else equal, an area attracting and retaining an older population may experience faster population growth, but nevertheless, have a small response to the size of its workforce. Like age, the diversity of a region's population impacts its rate of population growth via differences in birth and death rates.

The projections generally show a slowing rate of growth for Northern Kentucky and the Cincinnati MSA. Except for the pessimistic projection, the forecasts suggest modest population growth. Consistent across the four scenarios, the population in Northern Kentucky is projected to grow faster than in the Cincinnati MSA (Table 4, 5).

Sharp readers will notice that the 2020 population estimates shown in Section 1, Historical Population Trends, and the 2020 population estimates in this section do not match. The historical population estimates are the Census Bureau's mid-year population estimates as of July 1, 2020. The projections start with the 2020 Decennial Census population as of April 1, 2020. The difference between the two sets of numbers is slight. The difference for Cincinnati is 783 people or 0.035 percent. The difference for Northern Kentucky is 564 people or 0.141 percent.

Pessimistic Projection

The pessimistic projections anticipates population declines in Northern Kentucky and the Cincinnati MSA. The projection estimates a decrease of 10,641 for Northern Kentucky and a decline of 272,705 for the Cincinnati MSA. In this scenario, Northern Kentucky exhibits an average annual population decrease of 0.1 percent, while the Cincinnati MSA experiences an average yearly decline of 0.4 percent during the 30 years.

Baseline Projection

The baseline projections predict modest population increases. The projection estimates a population increase of 58,429 in Northern Kentucky and an increase of 86,653 for the Cincinnati MSA. In this scenario, Northern Kentucky is projected to see an average yearly population increase of 0.5 percent, and the Cincinnati MSA will see an average annual population increase of 0.1 percent over the next 30 years.

Aspirational Projection

The aspirational projections forecast population increases in Northern Kentucky and the Cincinnati MSA. The projection estimates a population increase of 69,020 in Northern Kentucky and an increase of 133,534 for the Cincinnati MSA. Under this scenario, Northern Kentucky is projected to experience an average yearly population increase of 0.6 percent, and the Cincinnati MSA is projected to experience an average annual population increase of 0.2 percent over 30 years.

As noted above, projections scenarios are not simply linear differences. The population of Northern Kentucky is 2.3 percent higher under the aspirational forecast compared to the baseline projection. The projected labor force in 2050 for Northern Kentucky is smaller under the aspirational forecast than under the baseline forecast. This is due to changes in the overall age structure. In the baseline projection in 2050 there are 111,344 people ages 65 and over compared to 125,428 people in this age group under the aspirational forecast, an increase of 12.6 percent. This has implications in the calculation of future labor force size in Section 7. All else equal, persons over the age of 65 have a lower labor force participation rate.

Optimistic Projection

The optimistic projections forecast population increases in Northern Kentucky and the Cincinnati MSA. The projection estimates a population increase of 130,480 in Northern Kentucky and an increase of 461,725 for the Cincinnati MSA. Under this scenario, Northern Kentucky is projected to experience an average yearly population increase of 1.1 percent, and the Cincinnati MSA is projected to experience an average annual population increase of 0.7 percent over 30 years.

Appendix C presents data tables showing the population projections from 2020 through 2050 for the other metros of interest for each of the four scenarios.

Table 4: Cincinnati MSA Population Projections, Four Scenarios

	Optimistic	Aspirational	Baseline	Pessimistic
2020 Census	2,256,884	2,256,884	2,256,884	2,256,884
2025	2,339,464	2,297,736	2,293,352	2,245,170
2030	2,425,136	2,333,668	2,323,808	2,217,249
2035	2,506,560	2,363,735	2,345,605	2,177,985
2040	2,581,280	2,383,498	2,355,053	2,124,743
2045	2,649,861	2,390,821	2,352,237	2,057,986
2050	2,718,609	2,390,418	2,343,537	1,984,179
30-Year Change	461,725	133,534	86,653	(272,705)
Avg. Annual Change	0.7%	0.2%	0.1%	-0.4%

Data source: U.S. Census Bureau and CEAD projections

Table 5: Northern Kentucky Population Projections, Four Scenarios

	Optimistic	Aspirational	Baseline	Pessimistic	Kentucky State Data Center
2020 Census	**398,108**	**398,108**	**398,108**	**398,108**	**398,108**
2025	**420,071**	**412,548**	**411,782**	**403,113**	**411,528**
2030	**442,924**	**426,410**	**424,563**	**405,229**	**422,862**
2035	**465,358**	**439,493**	**435,895**	**405,171**	**432,715**
2040	**486,870**	**450,735**	**444,850**	**402,045**	**441,044**
2045	**507,772**	**459,884**	**451,562**	**395,981**	**447,740**
2050	**528,588**	**467,128**	**456,537**	**387,467**	**453,604**
30-Year Change	**130,480**	**69,020**	**58,429**	**(10,641)**	**55,496**
Avg. Annual Change	**1.1%**	**0.6%**	**0.5%**	**-0.1%**	**0.5%**

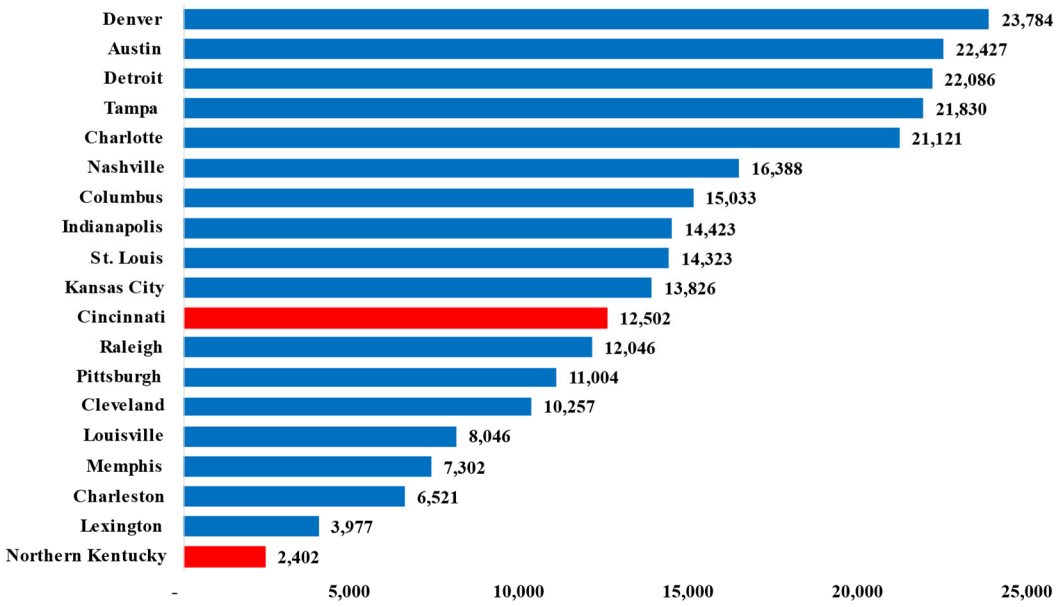
Data source: U.S. Census Bureau and CEAD projections

Section 4: Migration Across Projection Scenarios

The rate of domestic and international migration varies substantially across the 18 metros of interest. The close-proximity metros have relatively low levels of domestic net migration compared to the high-growth aspirational metros. As was illustrated in Section 2, Fig. 13, and Fig. 14, since 2010, domestic net migration in the Cincinnati MSA has been negative (down 1,803 on average annually) and slightly positive in Northern Kentucky (up 433 on average annually).

Assuming a constant rate of natural change, the Cincinnati MSA would need to attract 12,502 people annually to achieve the optimistic projection from the baseline projection. **For Northern Kentucky to reach the optimistic projection from the baseline projection holding natural change constant, the region must attract 2,402 people annually.**

Figure 16: Average Annual Net Migration Needed to Reach Optimistic Population Projection from Baseline



Data Source: CEAD calculations

Section 5: Changes in Population Age 2020-2050

Median age, as shown in Section 2, Figure 15, provides a snapshot of a region's age in comparison to other areas; yet "there is more to the age structure of the population than the snapshot that median age alone can provide."[8]

Two valuable measures are the Youth and Old Age Dependency Ratios. The Youth Dependency Ratio is the ratio of individuals under 15 years per 100 people of working age 15 to 64 years. The Old Age Dependency Ratio is the ratio of individuals 65 years and over per 100 people of working age 15 to 64 years of age. In 2020, Northern Kentucky and the Cincinnati MSA had relatively high Youth Dependency ratios among the 18 metros of interest, at 30.6 and 29.5, respectively. Memphis had the highest Youth Dependency ratio at 31 compared to Pittsburgh's low of 24.2 (Fig. 17).

The Old Age Dependency ratio ranged from a low of 17 in Austin to a high of 34.2 in Pittsburgh across the 18 metros of interest. Old Age Dependency ratio in the Cincinnati MSA was 24.7 and 23.2 in Northern Kentucky – the middle of the pack (Fig. 18).

As noted earlier, the demographics of a community today have an outsize impact on the future demographics of a region. That is evident across the five projections. Age distributions vary significantly by projection scenario, accounting for different birth, death, and migration rates across the MSAs.

Across the four projection scenarios, the population is predicted to age leading to an increase in the old-age dependency ratio for all 18 metros of interest and Northern Kentucky (Fig. 19). In Northern Kentucky, under the baseline projection, the old age dependency ratio will increase from 23.2 in 2020 to 41.5 in 2050, an increase of 18.3. The Cincinnati MSA old-age dependency ratio will rise from 24.7 in 2020 to 37.1 in 2050, an increase of 12.4. The baseline forecasts Lexington to have the lowest old-age dependency ratio in 2050 at 32.2, with Tampa having the highest at 46.6. The region experiencing the most significant increase in its old age dependency ratio is Raleigh, up 22.3 from 19 in 2020 to 41.3 in 2050.

Under the baseline projection, the youth dependency ratio fell in Northern Kentucky and the Cincinnati MSA. Eight of the metros of interest are projected to have an increase in their youth dependency ratio. In contrast, the other ten metros of interest are forecasted to have decreases in their ratios. In 2050, Memphis will continue to have the highest youth dependency ratio at 31.6, while Pittsburgh will have the lowest at 23.7 (Fig. 20).

While the youth and old age dependency ratios are important, they do not describe the population change that is working age.

In 2020, the percentage of the population in the Cincinnati MSA aged 15 to 64 years accounted for 64.8 percent of the population. By 2050, under the baseline projection, the percentage of the population in the prime working age will fall to 60.3 percent (Fig. 21). In Northern Kentucky, the percentage of the prime-age population will fall from 65 percent in 2020 to 58.8 percent in 2050 (Fig. 22).

[8] U.S. Census Bureau

Appendix D provides baseline projections data by age for Northern Kentucky and the 18 metros of interest.

Table 6: Population Projections by Age, BASELINE FORECAST, Cincinnati MSA

Cincinnati	2020	2025	2030	2035	2040	2045	2050
Total All Ages	2,256,884	2,293,352	2,323,808	2,345,605	2,355,053	2,352,237	2,343,537
0-4 Years	133,391	143,107	141,409	139,346	137,654	135,173	132,537
5-9 Years	144,146	143,433	144,214	142,323	140,120	138,306	135,744
10-14 Years	153,840	144,187	143,074	143,746	141,794	139,532	137,671
15-19 Years	156,021	154,287	140,937	140,181	141,030	139,342	137,369
20-24 Years	153,150	138,061	142,237	129,710	128,677	129,628	128,219
25-29 Years	144,379	136,534	145,300	149,378	136,609	134,908	135,602
30-34 Years	148,937	153,803	141,590	150,285	154,285	141,846	139,615
35-39 Years	145,453	158,367	155,260	143,300	151,949	155,830	143,754
40-44 Years	135,012	153,519	158,047	154,947	143,152	151,845	155,682
45-49 Years	134,681	135,522	151,748	156,579	153,551	141,929	150,710
50-54 Years	141,896	134,242	131,843	147,807	152,875	149,939	138,692
55-59 Years	154,241	134,705	128,188	126,013	141,629	147,037	144,250
60-64 Years	149,642	147,398	126,957	120,292	118,364	133,579	139,346
65-69 Years	123,498	138,191	136,706	117,058	110,194	108,605	123,346
70-74 Years	95,669	110,324	127,209	125,926	107,297	100,464	99,336
75-79 Years	61,558	81,594	97,065	113,140	112,136	95,056	88,569
80-84 Years	40,779	45,961	66,123	80,281	94,938	94,304	79,557
85 Years and Over	40,591	40,118	45,902	65,295	88,800	114,915	133,538

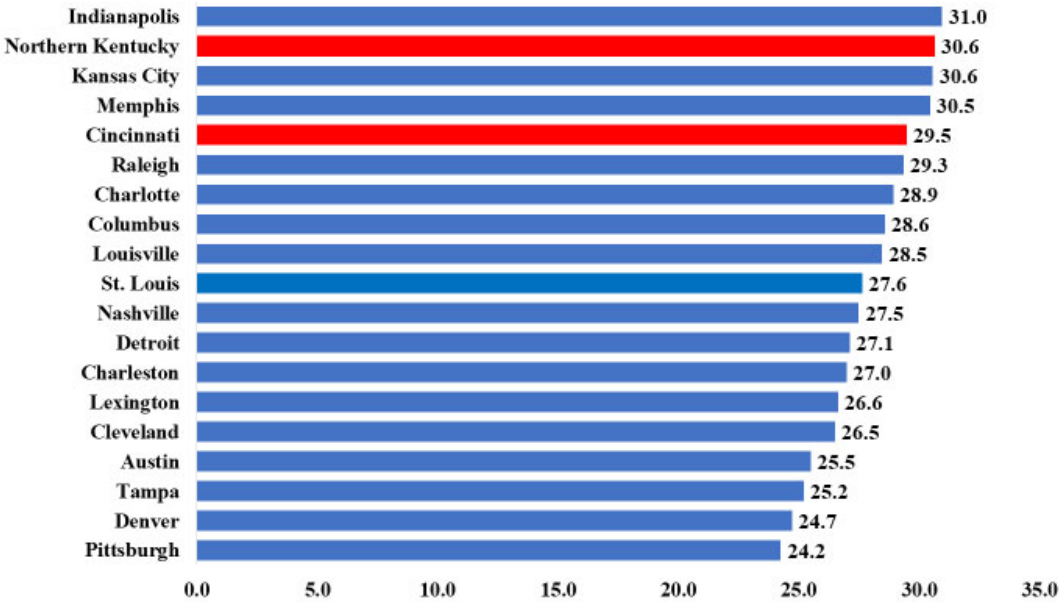
Data source: U.S. Census Bureau and CEAD projections

Table 7: Population Projections by Age, BASELINE FORECAST, Northern Kentucky

Northern Kentucky	2020	2025	2030	2035	2040	2045	2050
Total All Ages	398,108	411,782	424,563	435,895	444,850	451,562	456,537
0-4 Years	24,758	25,993	25,804	25,649	25,648	25,511	25,176
5-9 Years	26,702	25,862	26,361	26,134	25,951	25,926	25,770
10-14 Years	27,815	25,671	25,790	26,266	26,026	25,831	25,795
15-19 Years	26,223	26,124	23,461	23,532	24,008	23,827	23,671
20-24 Years	25,129	23,278	24,399	21,839	21,838	22,304	22,150
25-29 Years	26,744	26,156	27,585	28,864	26,084	26,094	26,513
30-34 Years	27,066	28,246	27,221	28,629	29,914	27,187	27,110
35-39 Years	26,708	28,486	28,430	27,477	28,873	30,145	27,488
40-44 Years	25,252	28,604	28,559	28,488	27,596	28,989	30,259
45-49 Years	24,268	25,728	28,443	28,438	28,379	27,545	28,947
50-54 Years	25,193	24,825	25,556	28,249	28,270	28,242	27,474
55-59 Years	26,870	24,806	24,248	25,026	27,671	27,722	27,742
60-64 Years	25,412	26,541	24,125	23,570	24,397	27,002	27,099
65-69 Years	21,065	24,443	25,308	23,012	22,443	23,330	25,883
70-74 Years	16,424	19,140	22,732	23,625	21,474	20,901	21,864
75-79 Years	10,121	13,969	16,977	20,432	21,340	19,398	18,867
80-84 Years	6,428	7,506	11,613	14,390	17,586	18,499	16,878
85 Years and Over	5,930	6,403	7,952	12,274	17,351	23,108	27,852

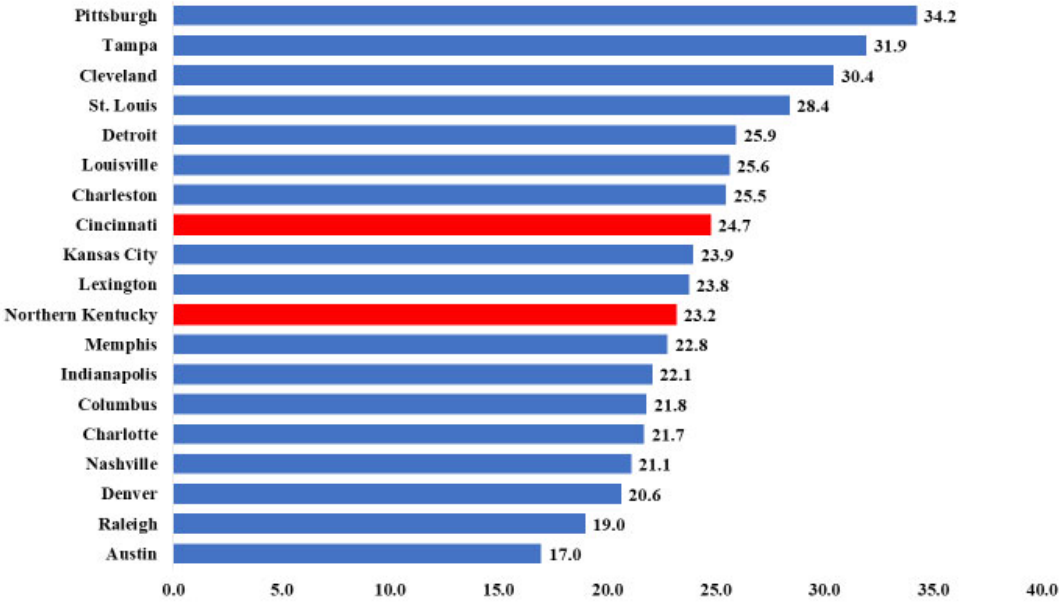
Data source: U.S. Census Bureau and CEAD projections

Figure 17: Youth Dependency Ratio, 2020



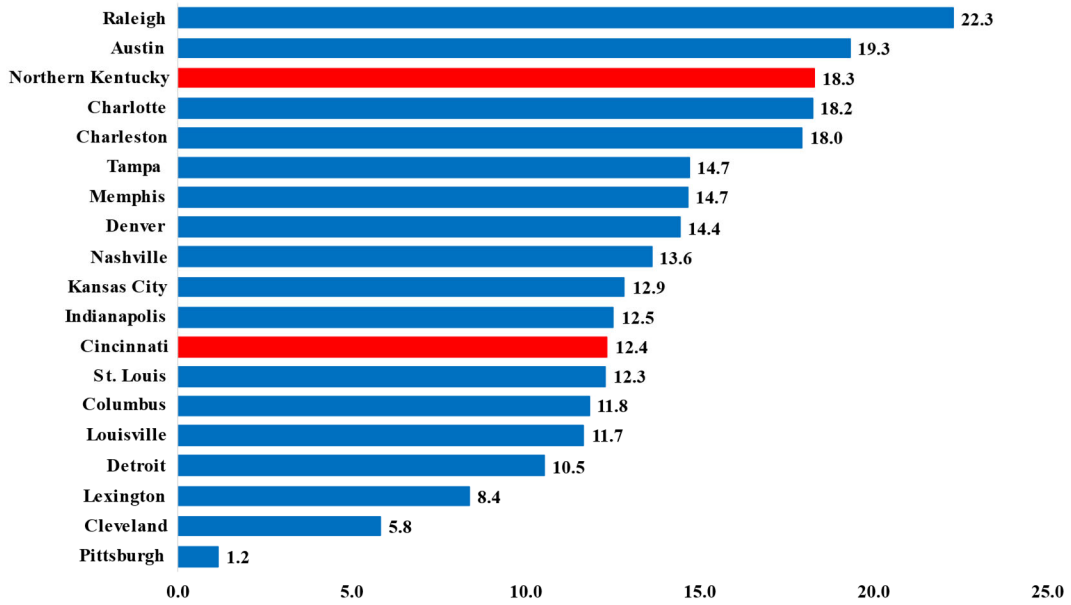
Data source: U.S. Census Bureau and CEAD calculations

Figure 18: Old Age Dependency Ratio, 2020



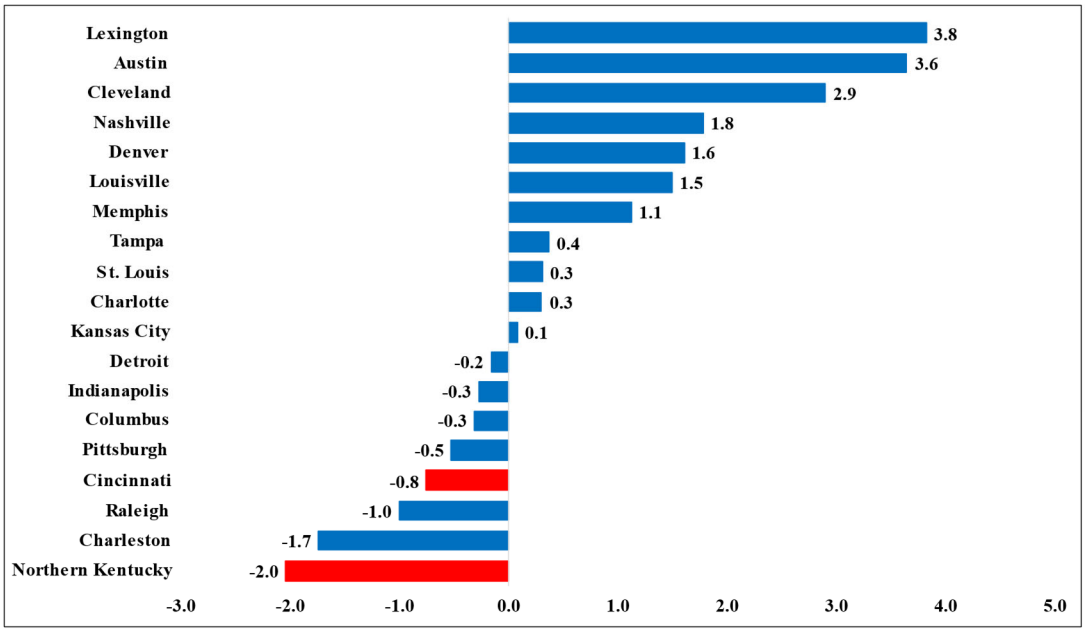
Data source: U.S. Census Bureau and CEAD calculations

Figure 19: BASELINE PROJECTION Change in Old Age Dependency Ratio 2020-2050



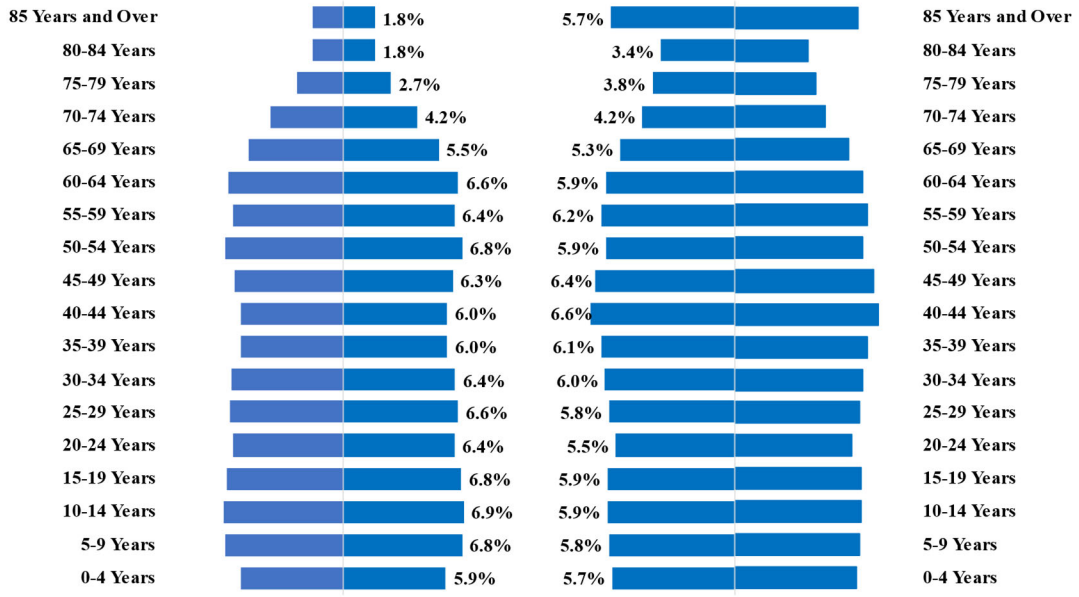
Data source: CEAD projections

Figure 20: BASELINE PROJECTION Change in Youth Dependency Ratio 2020-2050



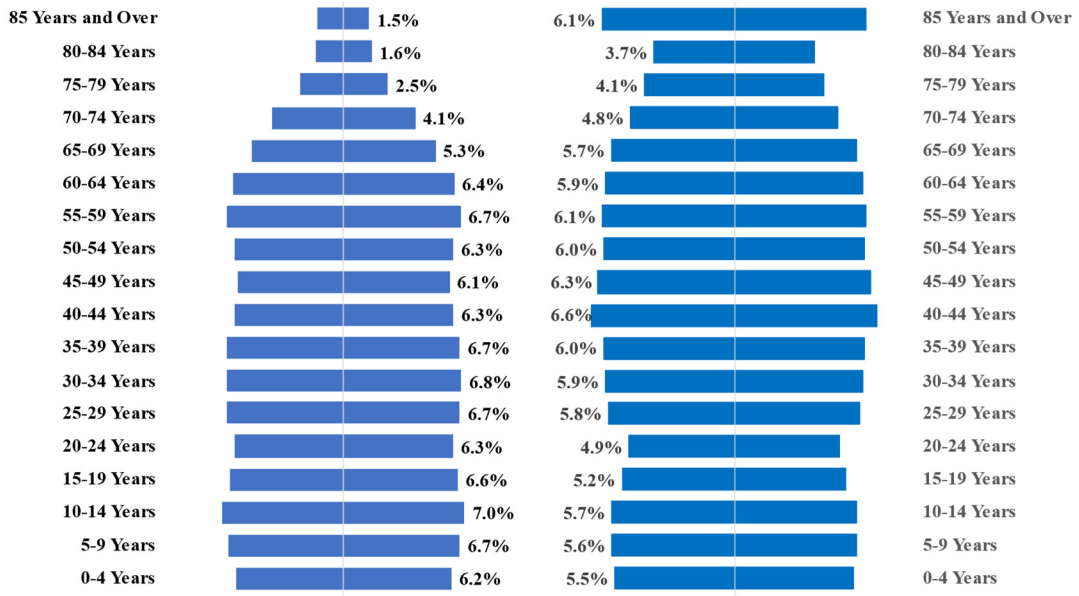
Data source: CEAD projections

Figure 21: BASELINE PROJECTION: Cincinnati MSA Population by Age Cohort



Data source: U.S. Census Bureau and CEAD projections

Figure 22: BASELINE PROJECTION: Northern Kentucky Population by Age Cohort



Data source: U.S. Census Bureau and CEAD projections

Section 6: Changes in Population Diversity by Race and Hispanic Origin 2020-2050

Just as the population of the United States will age over the 30-year projection horizon, it will also become more racially diverse. How do you define racial diversity? The Census Bureau's concept of racial and ethnic diversity refers to "the representation and the relative size of different racial and ethnic groups within a population. Diversity is maximized when all groups are represented in an area and have equal shares of the population."[9]

The diversity index is one method for measuring diversity. The index estimates the probability that two people chosen at random will be from different race and ethnic groups. The diversity index can range from 0 to 1. A zero value indicates that everyone in the population has the same racial and ethnic characteristics, while a value close to 100 indicates that everyone in the population has different characteristics. A diversity index of 61 means that there is a 61 percent chance that two people chosen at random were from different racial or ethnic groups.[10]

In 2020, among the 18 metros of interest the diversity index was the lowest for Pittsburgh (31.5), followed by Cincinnati at 40.5. The highest diversity index was in Austin (64.1), followed by Memphis (61.5). Northern Kentucky's Diversity Index was just 27.5 (Fig. 23).

Racial and ethnic diversity can play a significant role in economic growth by:

- Promoting innovation and creativity
- Increasing the utilization of a region's talent/workforce
- Fueling entrepreneurship and small business growth
- Ensuring firms can meet their diversity, equity, and inclusion (DEI) and Environmental, Social, and Governance (ESG) goals

The population projections for the four scenarios provide data on four race and ethnic groups including White, Black, Hispanic, and All Other. Except for the Charleston MSA, across the 18 metros of interest, the White population is projected to shrink between 2020 and 2050 as a percentage of the total population. While the Cincinnati MSA and Northern Kentucky will become more diverse, they will remain less diverse than many of the metros of interest.

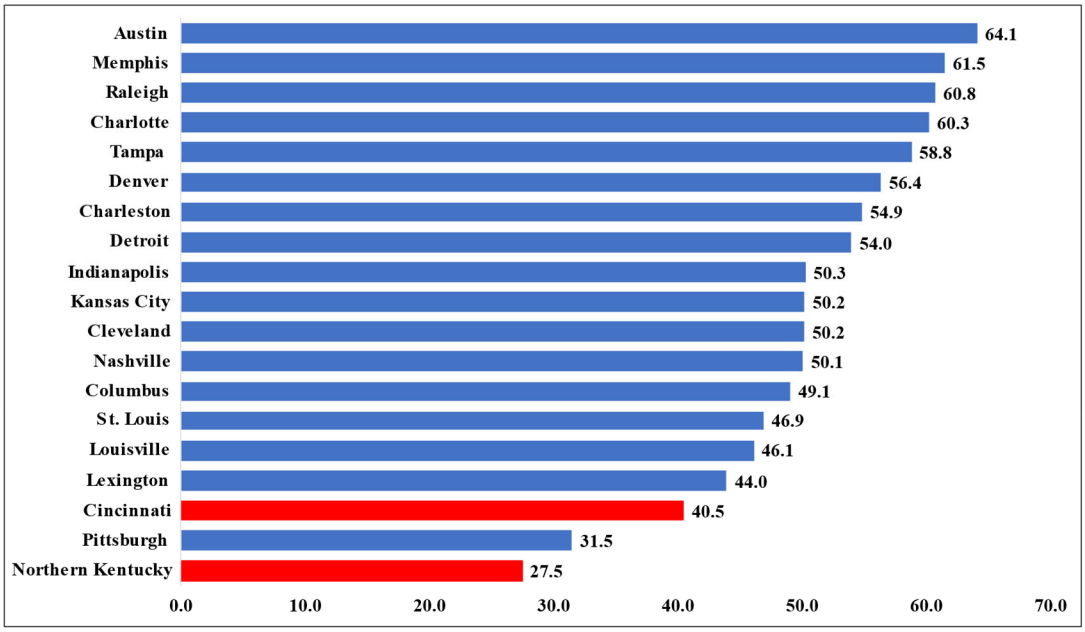
Nationally, less than half the U.S. population is projected to be White by 2050. Across the 18 metros of interest, Memphis will have the smallest White population at 30.5 percent compared to Pittsburgh's 74 percent. A challenge for Northern Kentucky is its relative lack of racial and ethnic diversity. Northern Kentucky will become more diverse between 2020 and 2050, with the White population falling from 84.8 percent in 2020 to 82.6 percent in 2050. However, the region will remain less diverse than any of the 18 metros of interest (Fig. 24).

Appendix E provides baseline population projections by race and ethnic origin for Northern Kentucky and the 18 metros of interest.

[9] *Examining the Racial and Ethnic Diversity of Adults and Children*, May 22, 2023, Angelica Menchaca, Bev Pratt, Eric Jensen, and Nicholas Jones, Population Division, U.S. Census Bureau

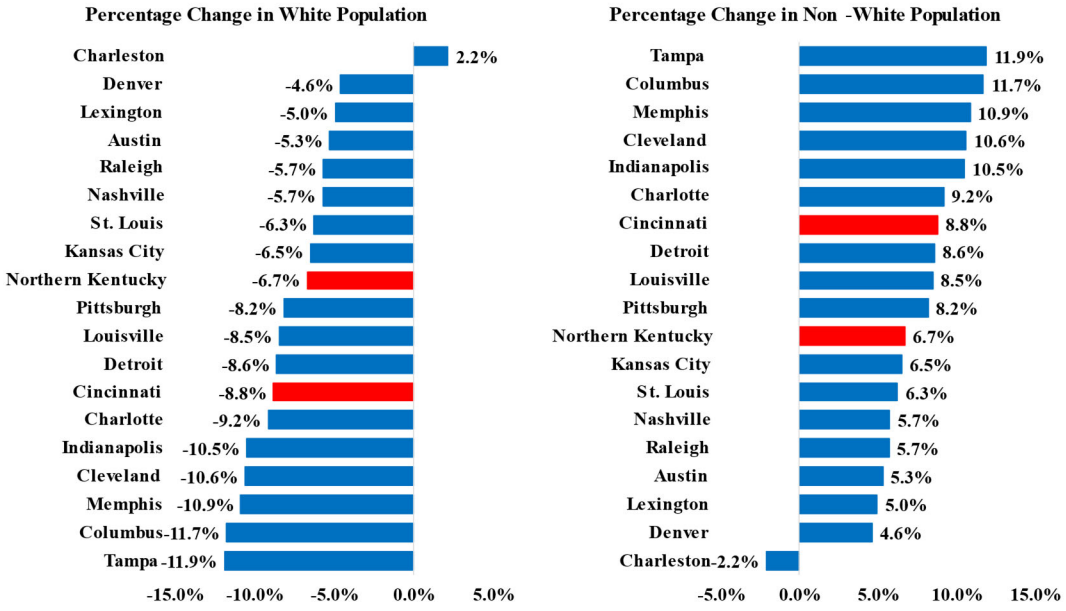
[10] *Measuring Racial and Ethnic Diversity for the 2020 Census,* August 2021, written by Census staff including Eric Jensen, Lauren Median, Marc Perry, Ben Bolendar, and Karen Battle.

Figure 23: Diversity Index by Selected MSA, 2020 Decennial Census



Data Source: U.S. Census Bureau and CEAD calculations

Figure 24: Baseline Projections Change in Percent of Total Population 2020-2050



Data Source: U.S. Census Bureau and CEAD calculations

Section 7: Labor Force Projections 2020-2050

Several demographic factors impact the size of a region's labor force, including:

- overall size of the population
- age distribution of the population
- the ethnic and racial diversity of the population, and
- the labor force participation rate of individual demographic groups

Other non-demographic factors often impact a region's labor force participation rate including educational attainment levels, retirement trends, economic conditions, government policies, technology changes, and cultural and social factors.

Demographic and non-demographic factors often work together. For example, immigration can boost a region's labor force by bringing in new workers. A region's overall quality of life, including healthcare, housing, and recreational opportunities, can help attract immigrants.

To estimate the size of the workforce of each region of interest, CEAD first determined the population within prime working ages, 16 to 64 years of age. This calculation determined the maximum potential workforce, assuming everyone in the age group opted to participate in the labor force. CEAD then applied region-specific, age-specific labor force participation rates (LFPR) to the prime working-age population. **In the absence of forecasts of labor force participation rates from 2020 through 2050, CEAD made the simplifying assumption that age-specific LFPR rates would remain constant through the forecast period.**

Cincinnati and Northern Kentucky both generally follow a normal distribution of labor force participation rates that would be expected, with individuals aged 20-59 having the highest labor force participation rates and the younger and older groups having lower rates (Fig. 25).

The baseline projection for the Cincinnati MSA is forecasting a decline of 31,685 in the labor force between 2020 and 2050. Of the four forecast scenarios, only the optimistic projection predicts an increase in Cincinnati's labor force (100,261).

The baseline projection for Northern Kentucky is forecasting a slight increase of 8,450 in the labor force between 2020 and 2050. Only the pessimistic forecast predicts a decline in the region's labor force of 17,950 (Tables 8, 9).

One striking feature of the labor force predictions is that the increase in the labor force is forecasted to be less under the aspirational forecast than under the baseline forecast. The age distribution of the population varies across the four projection scenarios. The baseline projection has a larger labor force than the aspirational projection. This difference is due to the baseline projections, which have a smaller but younger population, which all else being equal, have higher labor force participation rates. A region's labor force is as much a function of its age distribution as its population. For example, Memphis has the lowest LFPR among the 18 metros of interest, given that the region has a relatively large share of its population under 16 years of age. On the other hand, Tampa has the second lowest LFPR, given the large share of its population over the age of 65 years.

In general, across the high-growth MSAs, labor force growth is predicted for each of the four scenarios. While the high-growth metros are experiencing the same phenomenon of rapid aging, their overall population growth, mainly driven by domestic net migration, is enough to result in a net increase in their working-age population and, thus, their workforce.

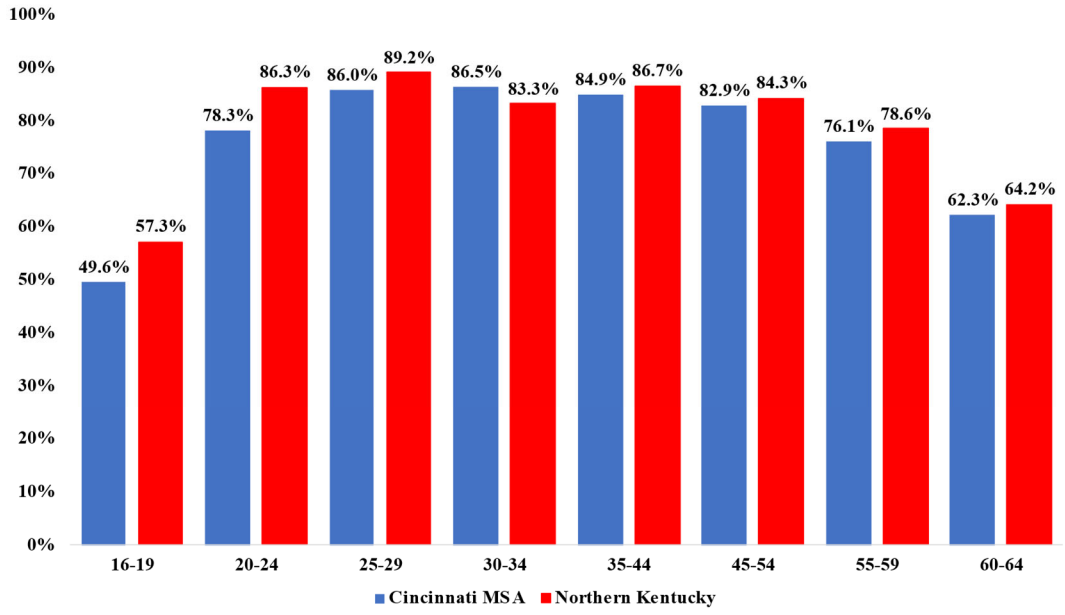
There is a strong correlation between population growth and labor force growth. While events such as the Pandemic and the Great Recession can create periods of increasing population growth with a decline in employment, the relationship between population and labor force growth is positive over the long run.

Among the Proximity Metros, given the relatively modest population projections, the forecasts for labor force growth are modest, and in some cases, negative.

While the analysis assumed constant LFPR, there is further risk if these rates continue to decline over time. Potential levers that could help overcome this limited growth in labor force are explored in section 8.

Appendix F provides labor force projections across each of the four scenarios for the 18 metros of interest and Northern Kentucky.

Figure 25: Labor Force Participation Rates, 2020



Data source: U.S. Census Bureau

Table 8: Labor Force Projections, Four Scenarios, Cincinnati MSA

Cincinnati	Optimistic	Aspirational	Baseline	Pessimistic
2020	1,128,095	1,128,095	1,128,095	1,128,095
2025	1,122,936	1,117,863	1,117,638	1,111,180
2030	1,129,051	1,107,290	1,106,230	1,081,805
2035	1,150,061	1,106,802	1,105,721	1,059,348
2040	1,178,156	1,107,577	1,107,507	1,034,642
2045	1,208,299	1,105,090	1,107,387	1,003,736
2050	1,228,356	1,090,739	1,096,410	961,787
30-Year Change	100,261	(37,356)	(31,685)	(166,308)
Avg. Annual Change	0.30%	-0.10%	-0.10%	-0.50%

Data source: U.S. Census Bureau, CEAD calculations

Table 9: Labor Force Projections, Four Scenarios, Northern Kentucky

Northern Kentucky	Optimistic	Aspirational	Baseline	Pessimistic
2020	207,293	207,293	207,293	207,293
2025	211,516	210,662	210,568	209,404
2030	215,548	211,523	211,258	206,662
2035	221,495	213,321	213,037	204,184
2040	228,567	215,012	214,914	200,830
2045	235,866	215,882	216,246	196,073
2050	241,599	214,716	215,743	189,343
30-Year Change	34,306	7,423	8,450	(17,950)
Avg. Annual Change	0.60%	0.10%	0.10%	-0.30%

Data source: U.S. Census Bureau, CEAD calculations

Section 8: High, Low, and Stagnant Population Growth Tradeoffs

Just as there is no universally agreed-upon threshold for what rate of inflation is considered "too high," as it can depend on various factors, including economic conditions, policy objectives, and public expectations, there is no universally agreed-upon threshold for the optimal rate of population growth in a region. Central banks and policymakers often target a specific inflation rate that they believe is consistent with their goals for economic stability and growth. Likewise, a community needs to target a rate of population growth that it believes is consistent with its goals for the community.

At the regional level, there are costs and benefits to population growth, status quo, and decline.

The benefits of population growth are easy to enumerate: increases in income, jobs, innovation and entrepreneurship, consumer demand for goods and services, and an increased tax base. There are downsides to population growth as well. These include resource scarcity, environmental degradation, infrastructure strain, housing shortages, and pressure on the educational system. An unfortunate outcome of rapid population growth is often housing shortages, which in turn can lead to higher levels of homelessness. Among our metros of interest, Austin has experienced a rapid increase in homelessness as a result of housing scarcity and higher prices.

Population decline comes with challenges as well. If a region's population declines, there is little reason to build new housing. However, as housing preferences change, current residents may move further out to suburbs, where new housing developments offer a wider array of housing options. Population decline often leads to large numbers of vacant homes in the inner city with little resale value. The poster child for this phenomenon is the city of Detroit. The large-scale demolition of houses in Detroit began in the early 2000s and gained momentum over the years in response to population declines within the city.

Population stagnation, or status quo, is not without challenges. Chief among the challenges is limited economic growth. Additionally, declining or stagnant growth often correlates with an aging population, resulting in a higher old-age dependency ratio, which strains a region's social services and healthcare systems. The relatively high old-age dependency ratios in Pittsburgh, Cleveland, St. Louis, and Detroit are due in no small part to a lack of robust population growth. A lack of population growth can limit the expansion of the tax base, which may lead to fiscal challenges for local governments in funding public services, especially the repair and replacement of vital infrastructure.

An aging population presents several economic challenges for a region. Increased healthcare costs and the pressure on social security are often discussed. Additionally, slow labor force growth or shrinkage can increase dependency ratios in some areas. As a result, governments may face long-term fiscal challenges as they grapple with the need to fund pensions, healthcare, and social services for an aging population. Population stagnation or decline coupled with an aging population could lead to difficult decisions about taxation, public spending, and the overall structure of social welfare programs. For example, how does a region prioritize spending on services for younger people, such as public education, versus providing services for an aging population, such as senior services?

The rate of a region's population growth has significant implications for a region's labor force growth and composition. A shrinking population coupled with falling labor force participation rates will likely limit a region's ability to grow its economy or maintain its current economic status.

What are potential solutions for labor shortages? Two often discussed solutions are increased immigration and the automation of jobs.

Immigration has long been at the heart of U.S. labor force policy. Many policies have been used to increase or decrease the immigrant population in the U.S. over the years. At the regional level, whether a region attracts domestic or international immigrants depends on numerous factors.

Automation is another option when a region faces the possibility of a stagnant or shrinking labor force. If the manufacturing industry can automate a certain percentage of open jobs, then even with a shrinking labor force, there would be a better chance that economic efficiency would be maintained. Automation could also benefit the labor force by eliminating dangerous or undesirable jobs. Suppose automation is not effective in filling positions that are left open, and immigration does not fill available jobs; in that case, there is a risk that innovation and economic productivity will decline.

Conclusion

The analysis of historical population trends, components of population change, and population projections for the period 1970 to 2050 provides valuable insights into the demographic dynamics of the Cincinnati Metropolitan Statistical Area, Northern Kentucky, and the other 17 comparison metros.

Over the past 50 years, the U.S. experienced significant population growth, with the rate of growth peaking between 1990 and 2000. The Cincinnati MSA and Northern Kentucky followed similar trends, although their growth rates did not match the overall U.S. growth.

The examination of components of population change, from 2010 to 2022 highlights the critical role of migration, both domestic and international, in shaping population trends. High Growth metros like Austin, Charleston, and Charlotte attribute a substantial portion of their population change to domestic net migration, while close-proximity metros, including Cincinnati and Northern Kentucky, rely more on international net migration and natural increase.

The population projections for 2020 to 2050 reveal four distinct scenarios—Optimistic, Aspirational, Baseline, and Pessimistic—each based on Shared Socioeconomic Pathways. These scenarios anticipate varying rates of growth or decline for Northern Kentucky and the Cincinnati MSA. Notably, the Pessimistic Projection foresees population declines, emphasizing the importance of understanding potential challenges and planning for mitigating factors.

The analysis extends to the changing age structure of the population, with projections indicating an aging population across all scenarios. The Youth and Old Age Dependency Ratios shed light on the demographic challenges and opportunities, emphasizing the importance of understanding age-related dynamics in population change.

Racial and ethnic diversity emerges as a crucial aspect, with Diversity Index measures revealing the relative homogeneity of Northern Kentucky compared to other metros. Despite projections showing increased diversity, the region lags behind in overall diversity, posing challenges for economic growth.

Labor force projections further illuminate the intricate relationship between demographic factors and economic considerations. Cincinnati and Northern Kentucky exhibit unique labor force dynamics, influenced by age distribution, racial distribution, and migration patterns, across the various projection scenarios.

In summary, this analysis underscores the complexity of population dynamics in the Cincinnati MSA, Northern Kentucky, and other metros. While historical trends provide context, the future trajectory is subject to various factors, making it imperative for policymakers, planners, and community leaders to consider these findings in shaping strategies for sustainable growth, addressing challenges, and fostering inclusive development.

Appendix A: Historical Population, 1970-2020, Selected MSAs

Austin	**1970**	**1980**	**1990**	**2000**	**2010**	**2020**
Total Population	401,871	589,582	851,898	1,264,950	1,727,600	2,299,125
Numeric Change		187,711	262,316	413,052	462,650	571,525
Percent Change		46.7%	44.5%	48.5%	36.6%	33.1%
Avg. Annual Percent Change		4.7%	4.4%	4.8%	3.7%	3.3%

Charleston	**1970**	**1980**	**1990**	**2000**	**2010**	**2020**
Total Population	336,669	433,615	508,851	550,916	667,147	802,961
Numeric Change		96,946	75,236	42,065	116,231	135,814
Percent Change		28.8%	17.4%	8.3%	21.1%	20.4%
Avg. Annual Percent Change		2.9%	1.7%	0.8%	2.1%	2.0%

Charlotte	**1970**	**1980**	**1990**	**2000**	**2010**	**2020**
Total Population	1,011,955	1,168,323	1,373,345	1,753,958	2,249,938	2,669,665
Numeric Change		156,368	205,022	380,613	495,980	419,727
Percent Change		15.5%	17.5%	27.7%	28.3%	18.7%
Avg. Annual Percent Change		1.5%	1.8%	2.8%	2.8%	1.9%

Cincinnati	**1970**	**1980**	**1990**	**2000**	**2010**	**2020**
Total Population	1,700,386	1,762,711	1,856,819	2,021,806	2,141,549	2,257,667
Numeric Change		62,325	94,108	164,987	119,743	116,118
Percent Change		3.7%	5.3%	8.9%	5.9%	5.4%
Avg. Annual Percent Change		0.4%	0.5%	0.9%	0.6%	0.5%

Cleveland	**1970**	**1980**	**1990**	**2000**	**2010**	**2020**
Total Population	2,318,811	2,172,438	2,104,288	2,147,532	2,076,521	2,085,357
Numeric Change		-146,373	-68,150	43,244	-71,011	8,836
Percent Change		-6.3%	-3.1%	2.1%	-3.3%	0.4%
Avg. Annual Percent Change		-0.6%	-0.3%	0.2%	-0.3%	0.0%

Columbus	**1970**	**1980**	**1990**	**2000**	**2010**	**2020**
Total Population	1,223,517	1,329,236	1,468,263	1,682,068	1,906,456	2,141,042
Numeric Change		105,719	139,027	213,805	224,388	234,586
Percent Change		8.6%	10.5%	14.6%	13.3%	12.3%
Avg. Annual Percent Change		0.9%	1.0%	1.5%	1.3%	1.2%

Appendix A: Historical Population, 1970-2020, Selected MSAs, Continued

Denver	**1970**	**1980**	**1990**	**2000**	**2010**	**2020**
Total Population	1,125,162	1,460,960	1,658,024	2,170,977	2,554,106	2,969,289
Numeric Change		335,798	197,064	512,953	383,129	415,183
Percent Change		29.8%	13.5%	30.9%	17.6%	16.3%
Avg. Annual Percent Change		3.0%	1.3%	3.1%	1.8%	1.6%

Detroit	**1970**	**1980**	**1990**	**2000**	**2010**	**2020**
Total Population	4,439,498	4,339,778	4,250,986	4,455,503	4,293,284	4,385,748
Numeric Change		-99,720	-88,792	204,517	-162,219	92,464
Percent Change		-2.2%	-2.0%	4.8%	-3.6%	2.2%
Avg. Annual Percent Change		-0.2%	-0.2%	0.5%	-0.4%	0.2%

Indianapolis	**1970**	**1980**	**1990**	**2000**	**2010**	**2020**
Total Population	1,287,512	1,348,738	1,431,307	1,663,995	1,893,178	2,113,700
Numeric Change		61,226	82,569	232,688	229,183	220,522
Percent Change		4.8%	6.1%	16.3%	13.8%	11.6%
Avg. Annual Percent Change		0.5%	0.6%	1.6%	1.4%	1.2%

Kansas City	**1970**	**1980**	**1990**	**2000**	**2010**	**2020**
Total Population	1,419,593	1,484,234	1,618,905	1,817,929	2,013,908	2,193,578
Numeric Change		64,641	134,671	199,024	195,979	179,670
Percent Change		4.6%	9.1%	12.3%	10.8%	8.9%
Avg. Annual Percent Change		0.5%	0.9%	1.2%	1.1%	0.9%

Lexington	**1970**	**1980**	**1990**	**2000**	**2010**	**2020**
Total Population	267,481	318,175	350,161	409,924	473,358	517,028
Numeric Change		50,694	31,986	59,763	63,434	43,670
Percent Change		19.0%	10.1%	17.1%	15.5%	9.2%
Avg. Annual Percent Change		1.9%	1.0%	1.7%	1.5%	0.9%

Louisville	**1970**	**1980**	**1990**	**2000**	**2010**	**2020**
Total Population	944,381	997,538	998,334	1,092,810	1,205,068	1,285,058
Numeric Change		53,157	796	94,476	112,258	79,990
Percent Change		5.6%	0.1%	9.5%	10.3%	6.6%
Avg. Annual Percent Change		0.6%	0.0%	0.9%	1.0%	0.7%

Appendix A: Historical Population, 1970-2020, Selected MSAs, Continued

Memphis	**1970**	**1980**	**1990**	**2000**	**2010**	**2020**
Total Population	912,644	997,527	1,070,570	1,208,223	1,317,291	1,337,311
Numeric Change		84,883	73,043	137,653	109,068	20,020
Percent Change		9.3%	7.3%	12.9%	9.0%	1.5%
Avg. Annual Percent Change		0.9%	0.7%	1.3%	0.9%	0.2%

Nashville	**1970**	**1980**	**1990**	**2000**	**2010**	**2020**
Total Population	782,791	951,182	1,091,656	1,364,950	1,651,630	1,995,343
Numeric Change		168,391	140,474	273,294	286,680	343,713
Percent Change		21.5%	14.8%	25.0%	21.0%	20.8%
Avg. Annual Percent Change		2.2%	1.5%	2.5%	2.1%	2.1%

Northern Kentucky	**1970**	**1980**	**1990**	**2000**	**2010**	**2020**
Total Population	251,113	266,448	284,438	327,453	370,184	398,672
Numeric Change		15,335	17,990	43,015	42,731	28,488
Percent Change		6.1%	6.8%	15.1%	13.0%	7.7%
Avg. Annual Percent Change		0.6%	0.7%	1.5%	1.3%	0.8%

Pittsburgh	**1970**	**1980**	**1990**	**2000**	**2010**	**2020**
Total Population	2,758,743	2,646,406	2,469,681	2,428,303	2,358,574	2,367,293
Numeric Change		-112,337	-176,725	-41,378	-69,729	8,719
Percent Change		-4.1%	-6.7%	-1.7%	-2.9%	0.4%
Avg. Annual Percent Change		-0.4%	-0.7%	-0.2%	-0.3%	0.0%

Raleigh	**1970**	**1980**	**1990**	**2000**	**2010**	**2020**
Total Population	319,135	404,305	548,874	804,157	1,137,404	1,420,225
Numeric Change		85,170	144,569	255,283	333,247	282,821
Percent Change		26.7%	35.8%	46.5%	41.4%	24.9%
Avg. Annual Percent Change		2.7%	3.6%	4.7%	4.1%	2.5%

St. Louis	**1970**	**1980**	**1990**	**2000**	**2010**	**2020**
Total Population	2,520,475	2,486,989	2,565,020	2,678,822	2,790,459	2,818,267
Numeric Change		-33,486	78,031	113,802	111,637	27,808
Percent Change		-1.3%	3.1%	4.4%	4.2%	1.0%
Avg. Annual Percent Change		-0.1%	0.3%	0.4%	0.4%	0.1%

Appendix A: Historical Population, 1970-2020, Selected MSAs, Continued

Tampa	**1970**	**1980**	**1990**	**2000**	**2010**	**2020**
Total Population	1,117,227	1,626,975	2,077,857	2,404,013	2,787,185	3,183,385
Numeric Change		509,748	450,882	326,156	383,172	396,200
Percent Change		45.6%	27.7%	15.7%	15.9%	14.2%
Avg. Annual Percent Change		4.6%	2.8%	1.6%	1.6%	1.4%

Appendix B: Components of Population Change, 2010-2022

	Change in Population, 2010-2022			Average Annual Change, 2010-2022		
	Natural	International Net Migration	Domestic Net Migration	Natural	International Net Migration	Domestic Net Migration
Austin	189,948	81,160	423,939	14,611	6,243	32,611
Charleston	41,962	14,385	124,172	3,228	1,107	9,552
Charlotte	134,743	73,088	317,530	10,365	5,622	24,425
Cincinnati	**81,250**	**45,264**	**-23,438**	**6,250**	**3,482**	**-1,803**
Cleveland	-246	46,423	-107,831	-19	3,571	-8,295
Columbus	127,182	79,102	51,353	9,783	6,085	3,950
Denver	195,744	71,016	193,416	15,057	5,463	14,878
Detroit	80,570	129,626	-242,281	6,198	9,971	-18,637
Indiana	112,286	57,495	61,199	8,637	4,423	4,708
Kansas City	113,605	38,116	27,348	8,739	2,932	2,104
Lexington	24,222	14,354	10,376	1,863	1,104	798
Louisville	32,471	26,826	9,716	2,498	2,064	747
Memphis	70,888	16,524	-61,688	5,453	1,271	-4,745
Nashville	105,596	45,868	213,658	8,123	3,528	16,435
Northern Kentucky	**21,764**	**5,061**	**5,623**	**1,674**	**389**	**433**
Pittsburgh	-64,980	37,314	-45,246	-4,998	2,870	-3,480
Raleigh	98,541	46,324	210,474	7,580	3,563	16,190
St. Louis	64,804	45,230	-109,889	4,985	3,479	-8,453
Tampa	-7,703	133,641	434,969	-593	10,280	33,459

Appendix C: Population Projections, Four Scenarios, Selected Metros

Austin	**Optimistic**	**Aspirational**	**Baseline**	**Pessimistic**
2020 Census	2,283,371	2,283,371	2,283,371	2,283,371
2025	2,664,989	2,613,395	2,610,075	2,552,563
2030	3,074,512	2,951,861	2,943,018	2,804,383
2035	3,505,463	3,298,697	3,279,429	3,043,769
2040	3,959,548	3,650,774	3,615,892	3,265,801
2045	4,445,602	4,008,155	3,954,476	3,468,135
2050	4,964,062	4,365,660	4,291,250	3,644,036
30-Year Change	2,680,691	2,082,289	2,007,879	1,360,665
Avg. Annual Change	3.9%	3.0%	2.9%	2.0%
Charleston	**Optimistic**	**Aspirational**	**Baseline**	**Pessimistic**
2020 Census	799,636	799,636	799,636	799,636
2025	900,713	885,129	883,262	865,002
2030	1,008,491	972,214	967,434	924,243
2035	1,119,775	1,059,583	1,050,156	977,697
2040	1,233,748	1,145,241	1,129,536	1,023,404
2045	1,351,949	1,228,943	1,205,966	1,061,174
2050	1,474,582	1,309,719	1,278,964	1,090,269
30-Year Change	674,946	510,083	479,328	290,633
Avg. Annual Change	2.8%	2.1%	2.0%	1.2%
Charlotte	**Optimistic**	**Aspirational**	**Baseline**	**Pessimistic**
2020 Census	2,660,329	2,660,329	2,660,329	2,660,329
2025	2,952,326	2,898,233	2,893,154	2,831,319
2030	3,265,471	3,140,874	3,128,211	2,983,832
2035	3,592,632	3,388,211	3,363,133	3,124,034
2040	3,934,531	3,636,274	3,594,123	3,247,362
2045	4,292,848	3,880,682	3,818,658	3,349,361
2050	4,665,808	4,114,926	4,032,172	3,423,780
30-Year Change	2,005,479	1,454,597	1,371,843	763,451
Avg. Annual Change	2.5%	1.8%	1.7%	1.0%

Appendix C: Population Projections, Four Scenarios, Selected Metros, Continued

Cincinnati	**Optimistic**	**Aspirational**	**Baseline**	**Pessimistic**
2020 Census	2,256,884	2,256,884	2,256,884	2,256,884
2025	2,339,464	2,297,736	2,293,352	2,245,170
2030	2,425,136	2,333,668	2,323,808	2,217,249
2035	2,506,560	2,363,735	2,345,605	2,177,985
2040	2,581,280	2,383,498	2,355,053	2,124,743
2045	2,649,861	2,390,821	2,352,237	2,057,986
2050	2,718,609	2,390,418	2,343,537	1,984,179
30-Year Change	461,725	133,534	86,653	(272,705)
Avg. Annual Change	0.7%	0.2%	0.1%	-0.4%
Cleveland	**Optimistic**	**Aspirational**	**Baseline**	**Pessimistic**
2020 Census	2,088,251	2,088,251	2,088,251	2,088,251
2025	2,124,930	2,087,222	2,082,401	2,038,002
2030	2,159,330	2,078,194	2,068,180	1,972,344
2035	2,186,179	2,061,710	2,045,161	1,898,233
2040	2,207,458	2,037,743	2,014,142	1,817,155
2045	2,226,835	2,007,594	1,978,187	1,732,106
2050	2,251,842	1,977,203	1,944,130	1,648,753
30-Year Change	163,591	(111,048)	(144,121)	(439,498)
Avg. Annual Change	0.3%	-0.2%	-0.2%	-0.7%
Columbus	**Optimistic**	**Aspirational**	**Baseline**	**Pessimistic**
2020 Census	2,138,926	2,138,926	2,138,926	2,138,926
2025	2,312,388	2,269,354	2,265,891	2,217,242
2030	2,497,840	2,400,469	2,392,321	2,281,208
2035	2,689,592	2,532,737	2,516,767	2,336,690
2040	2,885,108	2,660,240	2,633,761	2,377,926
2045	3,088,055	2,782,175	2,744,418	2,404,637
2050	3,301,871	2,899,277	2,850,875	2,418,038
30-Year Change	1,162,945	760,351	711,949	279,112
Avg. Annual Change	1.8%	1.2%	1.1%	0.4%

Appendix C: Population Projections, Four Scenarios, Selected Metros, Continued

Denver	**Optimistic**	**Aspirational**	**Baseline**	**Pessimistic**
2020 Census	2,963,821	2,963,821	2,963,821	2,963,821
2025	3,317,532	3,255,759	3,250,390	3,180,122
2030	3,694,656	3,553,218	3,539,659	3,376,349
2035	4,084,827	3,854,161	3,826,673	3,557,542
2040	4,487,713	4,151,280	4,104,928	3,715,263
2045	4,910,518	4,444,362	4,376,996	3,849,371
2050	5,355,564	4,730,770	4,642,051	3,955,976
30-Year Change	2,391,743	1,766,949	1,678,230	992,155
Avg. Annual Change	2.7%	2.0%	1.9%	1.1%
Detroit	**Optimistic**	**Aspirational**	**Baseline**	**Pessimistic**
2020 Census	4,392,041	4,392,041	4,392,041	4,392,041
2025	4,506,575	4,426,678	4,417,321	4,324,110
2030	4,617,918	4,446,415	4,426,105	4,224,398
2035	4,717,499	4,454,501	4,419,686	4,109,108
2040	4,807,852	4,448,565	4,396,955	3,977,679
2045	4,892,335	4,427,700	4,360,410	3,832,779
2050	4,981,430	4,398,530	4,318,852	3,680,478
30-Year Change	589,389	6,489	(73,189)	(711,563)
Avg. Annual Change	0.4%	0.0%	-0.1%	-0.5%
Indianapolis	**Optimistic**	**Aspirational**	**Baseline**	**Pessimistic**
2020 Census	2,111,040	2,111,040	2,111,040	2,111,040
2025	2,265,570	2,222,273	2,218,900	2,170,089
2030	2,429,943	2,333,260	2,325,349	2,215,129
2035	2,597,687	2,443,764	2,428,285	2,251,567
2040	2,768,952	2,550,058	2,524,397	2,275,406
2045	2,945,553	2,650,122	2,613,657	2,285,954
2050	3,129,813	2,743,343	2,697,129	2,282,999
30-Year Change	1,018,773	632,303	586,089	171,959
Avg. Annual Change	1.6%	1.0%	0.9%	0.3%

Appendix C: Population Projections, Four Scenarios, Selected Metros, Continued

Kansas City	**Optimistic**	**Aspirational**	**Baseline**	**Pessimistic**
2020 Census	2,192,035	2,192,035	2,192,035	2,192,035
2025	2,321,957	2,278,251	2,274,309	2,224,475
2030	2,457,727	2,361,632	2,352,438	2,241,472
2035	2,592,769	2,442,151	2,424,579	2,249,108
2040	2,728,226	2,516,697	2,488,357	2,244,161
2045	2,866,488	2,584,048	2,544,712	2,227,117
2050	3,009,888	2,644,027	2,595,121	2,198,317
30-Year Change	817,853	451,992	403,086	6,282
Avg. Annual Change	1.2%	0.7%	0.6%	0.0%
Lexington	**Optimistic**	**Aspirational**	**Baseline**	**Pessimistic**
2020 Census	516,811	516,811	516,811	516,811
2025	560,743	550,409	549,559	537,863
2030	608,505	584,631	582,672	555,519
2035	658,698	618,850	615,143	569,971
2040	712,747	653,937	648,011	582,423
2045	770,113	688,373	680,196	591,577
2050	831,413	722,289	712,105	597,980
30-Year Change	314,602	205,478	195,294	81,169
Avg. Annual Change	2.0%	1.3%	1.3%	0.5%
Louisville	**Optimistic**	**Aspirational**	**Baseline**	**Pessimistic**
2020 Census	1,285,439	1,285,439	1,285,439	1,285,439
2025	1,359,833	1,334,894	1,332,452	1,303,800
2030	1,437,890	1,382,889	1,377,211	1,313,280
2035	1,515,890	1,429,140	1,418,424	1,316,776
2040	1,593,872	1,471,582	1,454,507	1,312,607
2045	1,673,156	1,509,441	1,485,970	1,301,078
2050	1,755,653	1,543,160	1,514,269	1,283,134
30-Year Change	470,214	257,721	228,830	(2,305)
Avg. Annual Change	1.2%	0.7%	0.6%	0.0%

Appendix C: Population Projections, Four Scenarios, Selected Metros, Continued

Memphis	**Optimistic**	**Aspirational**	**Baseline**	**Pessimistic**
2020 Census	1,337,779	1,337,779	1,337,779	1,337,779
2025	1,379,965	1,353,846	1,351,607	1,321,959
2030	1,422,394	1,366,157	1,361,148	1,296,646
2035	1,462,765	1,376,264	1,367,016	1,267,178
2040	1,501,703	1,383,087	1,368,450	1,232,748
2045	1,539,651	1,385,631	1,365,493	1,193,360
2050	1,578,802	1,384,825	1,359,753	1,149,931
30-Year Change	241,023	47,046	21,974	(187,848)
Avg. Annual Change	0.6%	0.1%	0.1%	-0.5%
Nashville	**Optimistic**	**Aspirational**	**Baseline**	**Pessimistic**
2020 Census	1,989,519	1,989,519	1,989,519	1,989,519
2025	2,214,343	2,173,011	2,169,594	2,122,795
2030	2,457,403	2,361,585	2,353,257	2,243,637
2035	2,712,805	2,554,002	2,537,488	2,354,973
2040	2,982,326	2,748,315	2,720,604	2,454,486
2045	3,268,012	2,941,714	2,901,524	2,539,550
2050	3,570,804	3,131,684	3,079,153	2,607,796
30-Year Change	1,581,285	1,142,165	1,089,634	618,277
Avg. Annual Change	2.6%	1.9%	1.8%	1.0%
Northern Kentucky	**Optimistic**	**Aspirational**	**Baseline**	**Pessimistic**
2020 Census	398,108	398,108	398,108	398,108
2025	420,071	412,548	411,782	403,113
2030	442,924	426,410	424,563	405,229
2035	465,358	439,493	435,895	405,171
2040	486,870	450,735	444,850	402,045
2045	507,772	459,884	451,562	395,981
2050	528,588	467,128	456,537	387,467
30-Year Change	130,480	69,020	58,429	(10,641)
Avg. Annual Change	1.1%	0.6%	0.5%	-0.1%

Appendix C: Population Projections, Four Scenarios, Selected Metros, Continued

Pittsburgh	**Optimistic**	**Aspirational**	**Baseline**	**Pessimistic**
2020 Census	2,370,930	2,370,930	2,370,930	2,370,930
2025	2,403,403	2,364,567	2,358,897	2,312,389
2030	2,436,243	2,351,536	2,340,004	2,238,881
2035	2,463,273	2,331,580	2,312,865	2,156,056
2040	2,481,150	2,300,084	2,273,805	2,061,963
2045	2,495,200	2,259,764	2,227,937	1,961,914
2050	2,516,414	2,220,613	2,186,288	1,866,627
30-Year Change	145,484	(150,317)	(184,642)	(504,303)
Avg. Annual Change	0.2%	-0.2%	-0.3%	-0.7%
Raleigh	**Optimistic**	**Aspirational**	**Baseline**	**Pessimistic**
2020 Census	1,413,982	1,413,982	1,413,982	1,413,982
2025	1,598,171	1,569,124	1,566,451	1,533,321
2030	1,794,953	1,727,003	1,720,079	1,641,387
2035	2,000,926	1,888,040	1,873,887	1,741,616
2040	2,215,568	2,049,441	2,024,938	1,830,728
2045	2,440,289	2,209,009	2,172,060	1,906,334
2050	2,673,075	2,362,194	2,311,692	1,964,275
30-Year Change	1,259,093	948,212	897,710	550,293
Avg. Annual Change	3.0%	2.2%	2.1%	1.3%
St. Louis	**Optimistic**	**Aspirational**	**Baseline**	**Pessimistic**
2020 Census	2,820,253	2,820,253	2,820,253	2,820,253
2025	2,898,390	2,847,540	2,841,162	2,781,412
2030	2,973,757	2,864,299	2,850,357	2,720,607
2035	3,037,921	2,869,840	2,845,854	2,645,657
2040	3,092,528	2,862,774	2,827,182	2,556,503
2045	3,142,271	2,844,375	2,797,987	2,456,534
2050	3,196,432	2,821,855	2,766,748	2,353,077
30-Year Change	376,179	1,602	(53,505)	(467,176)
Avg. Annual Change	0.4%	0.0%	-0.1%	-0.6%

Appendix C: Population Projections, Four Scenarios, Selected Metros, Continued

Tampa	**Optimistic**	**Aspirational**	**Baseline**	**Pessimistic**
2020 Census	3,175,275	3,175,275	3,175,275	3,175,275
2025	3,446,705	3,389,657	3,380,391	3,311,229
2030	3,734,849	3,605,013	3,583,533	3,424,643
2035	4,030,404	3,819,682	3,780,774	3,520,903
2040	4,331,666	4,027,964	3,967,034	3,595,246
2045	4,639,377	4,225,386	4,140,223	3,644,870
2050	4,955,499	4,409,717	4,300,595	3,669,205
30-Year Change	1,780,224	1,234,442	1,125,320	493,930
Avg. Annual Change	1.9%	1.3%	1.2%	0.5%

Appendix D: Population Projections by Age, BASELINE FORECAST

Austin	2020	2025	2030	2035	2040	2045	2050
Total All Ages	2,283,371	2,610,075	2,943,018	3,279,429	3,615,892	3,954,476	4,291,250
0-4 Years	130,152	191,410	202,983	217,061	230,874	244,906	257,698
5-9 Years	130,152	183,989	200,831	212,010	225,814	239,385	253,128
10-14 Years	148,419	149,883	190,889	207,468	218,356	231,920	245,288
15-19 Years	146,136	165,518	163,355	201,452	216,704	226,451	238,792
20-24 Years	159,836	159,412	176,180	173,091	210,117	224,744	233,903
25-29 Years	187,236	163,973	192,309	210,993	207,406	247,327	262,278
30-34 Years	203,220	196,297	193,489	221,935	241,936	238,299	279,326
35-39 Years	196,370	225,230	215,566	212,666	241,101	261,954	258,583
40-44 Years	182,670	213,796	239,824	229,971	227,056	255,479	277,023
45-49 Years	152,986	178,975	223,817	250,258	240,435	237,613	266,107
50-54 Years	141,569	164,619	186,069	231,644	258,533	248,895	246,370
55-59 Years	116,452	139,620	171,062	193,041	239,439	266,889	257,543
60-64 Years	116,452	132,862	143,978	176,248	198,778	245,992	274,179
65-69 Years	93,618	115,333	134,100	145,950	178,932	202,102	250,111
70-74 Years	77,635	90,711	112,425	131,366	143,881	177,219	201,068
75-79 Years	52,518	64,502	84,739	105,712	124,421	137,479	170,753
80-84 Years	25,117	36,409	56,991	75,755	95,227	113,185	126,801
85 Years and Over	22,834	37,537	54,410	82,809	116,883	154,639	192,298

Appendix D: Population Projections by Age, BASELINE FORECAST, Continued

Charleston	2020	2025	2030	2035	2040	2045	2050
Total All Ages	799,636	883,262	967,434	1,050,156	1,129,536	1,205,966	1,278,964
0-4 Years	44,780	54,582	56,939	58,738	60,297	62,205	63,970
5-9 Years	47,179	52,472	56,349	58,611	60,340	61,839	63,685
10-14 Years	49,577	49,815	54,646	58,450	60,629	62,299	63,753
15-19 Years	47,978	54,653	52,904	57,514	61,024	62,961	64,473
20-24 Years	53,576	52,154	58,798	56,754	61,322	64,681	66,460
25-29 Years	51,976	53,243	60,781	68,044	65,862	70,739	74,134
30-34 Years	60,772	60,536	58,137	65,513	73,024	70,998	75,866
35-39 Years	60,772	69,195	64,318	61,945	69,127	76,724	74,952
40-44 Years	55,175	65,550	72,883	68,199	65,755	72,927	80,690
45-49 Years	45,579	54,243	69,137	76,671	72,047	69,597	76,766
50-54 Years	47,978	52,646	58,279	73,547	81,189	76,613	74,171
55-59 Years	47,978	51,821	56,318	62,092	77,748	85,583	81,083
60-64 Years	52,776	56,203	54,915	59,700	65,627	81,676	89,725
65-69 Years	43,980	50,297	56,863	55,842	60,833	66,956	83,289
70-74 Years	37,583	40,709	48,695	55,343	54,630	59,744	66,091
75-79 Years	23,189	31,216	37,251	44,959	51,529	51,202	56,393
80-84 Years	15,993	18,214	26,772	32,380	39,525	45,837	46,060
85 Years and Over	12,794	15,714	23,448	35,853	49,027	63,385	77,401

Appendix D: Population Projections by Age, BASELINE FORECAST, Continued

Charlotte	2020	2025	2030	2035	2040	2045	2050
Total All Ages	2,660,329	2,893,154	3,128,211	3,363,133	3,594,123	3,818,658	4,032,172
0-4 Years	154,299	185,357	192,998	202,728	213,488	221,590	227,570
5-9 Years	170,261	188,695	198,896	206,078	215,517	226,041	233,817
10-14 Years	186,223	179,267	198,824	208,767	215,623	224,826	235,164
15-19 Years	180,902	181,172	171,411	189,265	198,618	205,050	213,586
20-24 Years	164,940	162,159	175,791	166,188	183,157	192,193	198,426
25-29 Years	180,902	181,183	198,210	213,651	202,876	221,365	230,359
30-34 Years	186,223	203,161	203,082	219,988	236,311	225,639	244,429
35-39 Years	183,563	206,401	218,860	218,939	235,669	252,639	242,214
40-44 Years	178,242	204,301	217,994	230,489	230,727	247,352	264,851
45-49 Years	186,223	185,862	212,046	226,069	238,743	239,215	255,827
50-54 Years	178,242	193,931	191,019	217,597	231,920	244,982	245,885
55-59 Years	172,921	181,958	197,242	194,585	221,466	236,158	249,801
60-64 Years	154,299	176,706	182,538	198,353	195,983	223,104	238,328
65-69 Years	127,696	150,877	173,910	180,724	197,011	195,067	222,431
70-74 Years	106,413	117,590	143,610	166,810	174,582	191,214	189,985
75-79 Years	69,169	92,029	106,871	131,960	154,830	163,582	180,554
80-84 Years	42,565	55,166	77,899	91,637	114,849	136,688	146,593
85 Years and Over	37,245	47,340	67,011	99,307	132,753	171,954	212,349

Appendix D: Population Projections by Age, BASELINE FORECAST, Continued

Cincinnati	2020	2025	2030	2035	2040	2045	2050
Total All Ages	2,256,884	2,293,352	2,323,808	2,345,605	2,355,053	2,352,237	2,343,537
0-4 Years	133,391	143,107	141,409	139,346	137,654	135,173	132,537
5-9 Years	144,146	143,433	144,214	142,323	140,120	138,306	135,744
10-14 Years	153,840	144,187	143,074	143,746	141,794	139,532	137,671
15-19 Years	156,021	154,287	140,937	140,181	141,030	139,342	137,369
20-24 Years	153,150	138,061	142,237	129,710	128,677	129,628	128,219
25-29 Years	144,379	136,534	145,300	149,378	136,609	134,908	135,602
30-34 Years	148,937	153,803	141,590	150,285	154,285	141,846	139,615
35-39 Years	145,453	158,367	155,260	143,300	151,949	155,830	143,754
40-44 Years	135,012	153,519	158,047	154,947	143,152	151,845	155,682
45-49 Years	134,681	135,522	151,748	156,579	153,551	141,929	150,710
50-54 Years	141,896	134,242	131,843	147,807	152,875	149,939	138,692
55-59 Years	154,241	134,705	128,188	126,013	141,629	147,037	144,250
60-64 Years	149,642	147,398	126,957	120,292	118,364	133,579	139,346
65-69 Years	123,498	138,191	136,706	117,058	110,194	108,605	123,346
70-74 Years	95,669	110,324	127,209	125,926	107,297	100,464	99,336
75-79 Years	61,558	81,594	97,065	113,140	112,136	95,056	88,569
80-84 Years	40,779	45,961	66,123	80,281	94,938	94,304	79,557
85 Years and Over	40,591	40,118	45,902	65,295	88,800	114,915	133,538

Appendix D: Population Projections by Age, BASELINE FORECAST, Continued

Cleveland	2020	2025	2030	2035	2040	2045	2050
Total All Ages	2,088,251	2,082,401	2,068,180	2,045,161	2,014,142	1,978,187	1,944,130
0-4 Years	108,798	128,122	124,366	122,122	119,752	115,150	111,352
5-9 Years	117,986	130,058	127,635	123,861	121,647	119,329	114,815
10-14 Years	125,922	119,541	129,678	127,210	123,430	121,214	118,913
15-19 Years	128,219	118,936	108,798	117,857	115,961	112,823	111,031
20-24 Years	126,339	106,612	104,314	95,182	103,414	101,847	99,188
25-29 Years	134,066	121,770	116,947	113,800	104,155	112,785	110,616
30-34 Years	134,066	145,601	127,872	122,654	119,438	110,000	118,583
35-39 Years	125,922	139,208	146,536	129,305	123,979	120,942	111,885
40-44 Years	117,986	133,297	138,231	145,720	128,920	123,587	120,658
45-49 Years	122,789	117,983	131,220	136,360	144,073	127,663	122,381
50-54 Years	135,319	120,754	114,353	127,214	132,544	140,585	124,654
55-59 Years	150,981	125,235	114,992	108,881	121,227	126,766	135,247
60-64 Years	155,157	139,607	117,364	107,577	101,839	113,604	119,401
65-69 Years	131,769	137,971	128,112	107,700	98,570	93,315	104,414
70-74 Years	104,413	112,559	123,822	115,189	96,944	88,756	84,181
75-79 Years	69,539	84,442	95,681	106,064	98,902	83,352	76,445
80-84 Years	47,403	50,620	65,484	74,908	83,947	78,635	66,606
85 Years and Over	51,580	50,084	52,775	63,558	75,400	87,836	93,760

Appendix D: Population Projections by Age, BASELINE FORECAST, Continued

Columbus	2020	2025	2030	2035	2040	2045	2050
Total All Ages	2,138,926	2,265,891	2,392,321	2,516,767	2,633,761	2,744,418	2,850,875
0-4 Years	130,474	150,292	154,719	158,571	161,180	164,280	166,944
5-9 Years	132,613	147,096	153,252	157,447	161,125	163,576	166,539
10-14 Years	143,308	142,378	148,147	154,152	158,224	161,791	164,151
15-19 Years	141,169	146,862	143,922	149,567	155,212	158,912	162,205
20-24 Years	141,169	132,441	141,347	138,437	143,717	149,203	152,840
25-29 Years	156,142	146,561	159,958	170,086	166,697	172,481	177,828
30-34 Years	166,836	168,184	158,226	171,587	182,084	179,167	184,718
35-39 Years	149,725	185,936	173,948	164,164	177,483	188,158	185,775
40-44 Years	154,003	164,506	188,407	176,200	166,654	179,997	190,771
45-49 Years	128,336	139,821	165,021	189,336	177,094	167,799	181,230
50-54 Years	134,752	135,728	139,079	164,363	189,073	176,854	167,879
55-59 Years	128,336	126,855	132,610	136,312	161,525	186,779	174,571
60-64 Years	121,919	129,442	122,326	128,183	132,170	157,263	183,170
65-69 Years	100,530	116,835	121,442	114,994	120,811	125,142	150,017
70-74 Years	87,696	91,228	108,298	113,061	107,329	113,169	117,942
75-79 Years	55,612	68,487	81,174	97,532	102,401	97,600	103,573
80-84 Years	36,362	38,708	56,605	68,321	83,371	88,226	84,739
85 Years and Over	29,945	34,531	43,840	64,454	87,611	114,021	135,984

Appendix D: Population Projections by Age, BASELINE FORECAST, Continued

Denver	2020	2025	2030	2035	2040	2045	2050
Total All Ages	2,963,821	3,250,390	3,539,659	3,826,673	4,104,928	4,376,996	4,642,051
0-4 Years	157,083	213,203	222,168	231,659	241,417	247,700	251,995
5-9 Years	163,010	205,788	220,221	228,808	238,028	247,543	253,582
10-14 Years	183,757	183,706	210,469	224,646	232,984	241,996	251,333
15-19 Years	177,829	182,039	169,825	193,948	207,190	215,084	223,491
20-24 Years	180,793	173,569	186,009	173,539	196,870	209,595	217,073
25-29 Years	240,070	225,907	244,818	260,554	245,082	271,571	284,206
30-34 Years	263,780	266,386	261,116	279,716	296,801	280,989	308,191
35-39 Years	237,106	270,741	284,965	279,810	298,161	315,932	300,400
40-44 Years	225,250	258,602	280,958	295,202	290,316	308,567	326,781
45-49 Years	189,685	212,405	264,572	287,408	301,894	297,353	315,624
50-54 Years	186,721	200,599	214,749	267,332	290,657	305,630	301,676
55-59 Years	163,010	179,220	200,591	215,238	268,219	292,142	307,842
60-64 Years	174,865	178,256	175,937	197,724	212,894	266,161	290,872
65-69 Years	139,300	162,342	171,578	170,165	192,241	208,013	261,543
70-74 Years	118,553	131,532	153,963	163,462	162,963	185,208	201,670
75-79 Years	77,059	98,856	120,839	142,507	152,152	152,727	175,037
80-84 Years	44,457	55,241	85,334	105,695	125,801	135,392	137,463
85 Years and Over	41,493	51,998	71,546	109,258	151,258	195,392	233,269

Appendix D: Population Projections by Age, BASELINE FORECAST, Continued

Detroit	2020	2025	2030	2035	2040	2045	2050
Total All Ages	4,392,041	4,417,321	4,426,105	4,419,686	4,396,955	4,360,410	4,318,852
0-4 Years	243,168	261,614	254,851	250,586	244,595	233,491	223,894
5-9 Years	260,260	272,353	266,002	259,000	254,613	248,612	237,549
10-14 Years	274,809	266,472	274,240	268,002	261,056	256,742	250,944
15-19 Years	283,165	246,053	228,753	235,841	231,525	226,410	223,417
20-24 Years	269,277	219,391	215,352	199,873	206,512	203,299	199,342
25-29 Years	301,358	272,250	258,436	253,984	237,036	243,790	239,446
30-34 Years	293,578	330,047	287,761	273,281	268,823	252,361	258,832
35-39 Years	267,118	310,973	335,425	294,936	280,342	276,108	260,327
40-44 Years	257,248	285,061	312,651	336,901	298,519	284,185	280,285
45-49 Years	279,805	258,173	282,838	309,896	334,210	297,959	284,080
50-54 Years	298,416	278,575	254,593	279,173	305,829	330,533	296,232
55-59 Years	314,701	282,826	268,148	245,585	269,696	295,901	321,241
60-64 Years	305,247	296,650	264,815	251,271	230,650	254,069	279,607
65-69 Years	249,842	274,085	270,133	242,146	230,028	211,785	234,394
70-74 Years	194,549	216,861	243,763	241,825	217,927	207,599	192,090
75-79 Years	129,449	160,273	183,713	208,248	208,380	189,325	181,521
80-84 Years	81,454	96,462	123,718	143,452	164,423	166,493	153,392
85 Years and Over	88,597	89,200	100,913	125,686	152,790	181,748	202,259

Appendix D: Population Projections by Age, BASELINE FORECAST, Continued

Indianapolis	2020	2025	2030	2035	2040	2045	2050
Total All Ages	2,111,040	2,218,900	2,325,349	2,428,285	2,524,397	2,613,657	2,697,129
0-4 Years	131,018	152,328	155,030	157,965	161,721	163,483	164,095
5-9 Years	144,339	152,547	157,637	160,072	162,823	166,426	168,026
10-14 Years	151,651	146,689	155,113	160,053	162,352	164,992	168,503
15-19 Years	141,687	138,333	131,066	138,401	143,191	145,592	148,177
20-24 Years	133,030	123,405	132,688	125,640	132,487	137,164	139,558
25-29 Years	145,835	147,636	153,296	164,007	155,989	163,632	168,130
30-34 Years	147,629	163,953	157,870	163,303	174,350	166,699	174,169
35-39 Years	147,303	159,635	168,942	163,161	168,418	179,653	172,440
40-44 Years	136,380	156,438	161,128	170,483	165,022	170,222	181,566
45-49 Years	132,829	135,251	155,359	160,307	169,810	164,684	169,915
50-54 Years	130,059	131,690	132,961	152,914	158,083	167,892	163,206
55-59 Years	137,243	123,163	127,572	129,088	148,920	154,223	164,465
60-64 Years	127,549	132,216	118,500	122,986	124,798	144,513	150,145
65-69 Years	104,086	118,782	124,816	111,763	116,258	118,455	137,953
70-74 Years	81,277	92,687	109,981	116,153	103,919	108,468	111,165
75-79 Years	52,839	68,102	82,608	99,229	105,466	94,427	99,187
80-84 Years	33,647	40,226	56,047	69,446	84,771	90,926	81,723
85 Years and Over	32,639	35,819	44,735	63,316	86,018	112,207	134,707

Appendix D: Population Projections by Age, BASELINE FORECAST, Continued

Kansas City	2020	2025	2030	2035	2040	2045	2050
Total All Ages	2,192,035	2,274,309	2,352,438	2,424,579	2,488,357	2,544,712	2,595,121
0-4 Years	133,252	154,905	154,726	155,233	157,681	157,841	156,754
5-9 Years	146,253	153,923	156,818	156,432	156,783	159,092	159,153
10-14 Years	154,056	145,340	154,139	156,905	156,442	156,714	158,949
15-19 Years	142,688	136,324	125,548	133,088	135,950	135,947	136,446
20-24 Years	131,414	119,888	126,751	116,682	123,710	126,579	126,770
25-29 Years	150,669	148,092	151,978	160,193	148,772	156,705	159,260
30-34 Years	154,302	163,606	157,043	160,676	169,092	157,959	165,700
35-39 Years	153,924	158,866	166,623	160,445	163,910	172,363	161,649
40-44 Years	139,280	162,367	158,754	166,488	160,699	164,122	172,565
45-49 Years	133,590	139,774	161,346	157,960	165,789	160,356	163,817
50-54 Years	132,183	134,148	137,254	158,673	155,455	163,496	158,544
55-59 Years	144,416	125,783	129,578	132,947	154,209	151,146	159,461
60-64 Years	136,275	138,556	119,850	123,675	127,456	148,474	145,684
65-69 Years	113,983	127,186	129,699	111,834	115,590	119,727	140,393
70-74 Years	89,907	102,008	117,617	120,388	103,545	107,329	111,882
75-79 Years	59,865	76,815	90,991	105,885	108,926	93,583	97,546
80-84 Years	37,626	45,773	63,573	76,595	90,201	93,437	80,328
85 Years and Over	38,352	40,954	50,150	70,481	94,146	119,844	140,220

Appendix D: Population Projections by Age, BASELINE FORECAST, Continued

Lexington	2020	2025	2030	2035	2040	2045	2050
Total All Ages	516,811	549,559	582,672	615,143	648,011	680,196	712,105
0-4 Years	28,425	37,985	38,870	40,486	42,755	44,496	46,115
5-9 Years	31,009	36,383	37,996	38,837	40,416	42,646	44,363
10-14 Years	32,042	31,386	36,703	38,278	39,088	40,638	42,837
15-19 Years	35,660	40,185	38,433	43,615	45,051	45,667	47,032
20-24 Years	44,963	46,530	49,620	47,339	52,656	53,986	54,403
25-29 Years	37,727	35,936	42,451	45,322	43,452	48,742	50,090
30-34 Years	34,626	37,716	35,941	42,567	45,401	43,763	49,013
35-39 Years	35,143	34,919	37,331	35,676	42,368	45,175	43,718
40-44 Years	33,076	35,649	34,540	37,226	35,657	42,150	44,946
45-49 Years	31,009	32,531	35,819	34,763	37,483	35,966	42,515
50-54 Years	29,975	32,010	32,277	35,534	34,572	37,368	35,940
55-59 Years	29,458	29,128	31,441	31,754	34,957	34,108	37,018
60-64 Years	32,042	31,051	28,240	30,585	30,950	34,097	33,296
65-69 Years	27,391	28,174	29,461	26,794	29,144	29,577	32,652
70-74 Years	21,706	23,420	26,293	27,613	25,110	27,459	27,992
75-79 Years	16,538	17,590	20,980	23,754	25,084	22,820	25,161
80-84 Years	8,269	9,948	14,760	17,900	20,474	21,789	19,899
85 Years and Over	7,752	9,018	11,514	17,101	23,393	29,750	35,114

Appendix D: Population Projections by Age, BASELINE FORECAST, Continued

Louisville	2020	2025	2030	2035	2040	2045	2050
Total All Ages	1,285,439	1,332,452	1,377,211	1,418,424	1,454,507	1,485,970	1,514,269
0-4 Years	74,288	86,884	86,978	88,091	89,404	89,606	89,503
5-9 Years	79,551	86,710	88,082	88,073	89,113	90,363	90,512
10-14 Years	83,543	80,187	87,677	88,979	88,924	89,918	91,126
15-19 Years	80,252	75,820	71,440	78,065	79,433	79,573	80,591
20-24 Years	79,788	69,281	72,311	68,132	74,387	75,751	75,950
25-29 Years	84,800	84,420	84,621	88,226	83,569	90,394	91,575
30-34 Years	86,602	94,207	89,036	89,025	92,716	88,314	95,086
35-39 Years	85,076	93,276	96,286	91,277	91,115	94,827	90,688
40-44 Years	81,088	91,012	94,397	97,417	92,557	92,335	96,088
45-49 Years	81,454	81,873	91,728	95,270	98,366	93,637	93,379
50-54 Years	80,383	81,936	81,797	91,633	95,304	98,539	93,997
55-59 Years	89,242	77,825	80,323	80,318	90,043	93,872	97,322
60-64 Years	85,586	86,483	74,433	76,935	77,082	86,620	90,662
65-69 Years	72,932	79,746	81,296	69,648	72,088	72,417	81,733
70-74 Years	58,009	64,056	73,353	74,995	63,887	66,260	66,846
75-79 Years	37,277	49,177	56,826	65,711	67,437	57,165	59,559
80-84 Years	23,059	27,677	39,820	46,856	54,961	56,722	47,763
85 Years and Over	22,509	21,882	26,806	39,772	54,120	69,659	81,890

Appendix D: Population Projections by Age, BASELINE FORECAST, Continued

Memphis	2020	2025	2030	2035	2040	2045	2050
Total All Ages	1,337,779	1,351,607	1,361,148	1,367,016	1,368,450	1,365,493	1,359,753
0-4 Years	82,192	92,139	90,179	88,495	87,154	84,613	82,384
5-9 Years	88,454	93,454	92,282	90,304	88,640	87,325	84,825
10-14 Years	95,255	92,485	92,855	91,693	89,750	88,125	86,852
15-19 Years	92,347	87,414	81,823	82,121	81,348	79,857	78,592
20-24 Years	87,743	75,419	79,677	74,567	74,679	74,060	72,800
25-29 Years	91,862	86,491	83,015	87,434	82,137	81,990	81,056
30-34 Years	89,631	97,974	86,889	83,253	87,723	82,916	82,552
35-39 Years	88,278	93,313	96,368	85,677	81,968	86,459	82,088
40-44 Years	84,063	88,195	90,529	94,216	83,789	79,772	84,289
45-49 Years	83,894	79,739	85,448	87,992	92,109	82,002	77,802
50-54 Years	83,385	81,203	77,246	82,693	85,416	90,047	80,230
55-59 Years	88,359	77,291	77,743	74,017	79,151	82,079	87,223
60-64 Years	83,540	81,763	72,661	73,375	69,904	74,713	77,906
65-69 Years	70,859	74,286	74,989	67,024	68,081	64,961	69,429
70-74 Years	54,040	59,436	66,352	67,565	60,811	62,250	59,594
75-79 Years	33,721	43,327	50,980	57,591	59,229	53,766	55,609
80-84 Years	20,793	24,339	33,976	40,959	47,054	49,092	45,193
85 Years and Over	19,363	23,338	28,135	38,039	49,506	61,466	71,329

Appendix D: Population Projections by Age, BASELINE FORECAST, Continued

Nashville	2020	2025	2030	2035	2040	2045	2050
Total All Ages	1,989,519	2,169,594	2,353,257	2,537,488	2,720,604	2,901,524	3,079,153
0-4 Years	117,382	144,756	152,255	160,506	169,654	177,415	183,784
5-9 Years	119,371	142,508	152,399	159,589	167,630	176,596	184,138
10-14 Years	131,308	132,927	148,268	157,963	164,927	172,794	181,612
15-19 Years	123,350	137,000	133,562	147,809	156,813	163,174	170,394
20-24 Years	137,277	135,500	149,806	145,480	159,646	168,250	174,116
25-29 Years	147,224	144,063	158,308	174,005	169,369	184,519	193,208
30-34 Years	157,172	159,175	158,574	172,770	189,124	184,819	200,091
35-39 Years	143,245	161,209	167,632	167,281	181,378	198,133	194,250
40-44 Years	141,256	156,689	167,861	174,324	174,129	188,169	205,282
45-49 Years	123,350	135,657	161,383	172,815	179,415	179,416	193,473
50-54 Years	125,340	132,837	138,732	164,777	176,444	183,298	183,635
55-59 Years	121,361	121,898	133,485	139,704	165,949	177,930	185,188
60-64 Years	119,371	126,473	120,770	132,662	139,182	165,568	177,973
65-69 Years	97,486	111,907	122,352	117,282	129,382	136,276	162,738
70-74 Years	77,591	88,498	105,390	115,970	111,597	123,802	131,172
75-79 Years	51,727	66,057	80,349	96,642	107,163	103,675	115,965
80-84 Years	29,843	38,240	55,479	68,698	83,782	93,958	91,761
85 Years and Over	25,864	34,199	46,653	69,211	95,021	123,736	150,373

Appendix D: Population Projections by Age, BASELINE FORECAST, Continued

Northern Kentucky	2020	2025	2030	2035	2040	2045	2050
Total All Ages	398,108	411,782	424,563	435,895	444,850	451,562	456,537
0-4 Years	24,758	25,993	25,804	25,649	25,648	25,511	25,176
5-9 Years	26,702	25,862	26,361	26,134	25,951	25,926	25,770
10-14 Years	27,815	25,671	25,790	26,266	26,026	25,831	25,795
15-19 Years	26,223	26,124	23,461	23,532	24,008	23,827	23,671
20-24 Years	25,129	23,278	24,399	21,839	21,838	22,304	22,150
25-29 Years	26,744	26,156	27,585	28,864	26,084	26,094	26,513
30-34 Years	27,066	28,246	27,221	28,629	29,914	27,187	27,110
35-39 Years	26,708	28,486	28,430	27,477	28,873	30,145	27,488
40-44 Years	25,252	28,604	28,559	28,488	27,596	28,989	30,259
45-49 Years	24,268	25,728	28,443	28,438	28,379	27,545	28,947
50-54 Years	25,193	24,825	25,556	28,249	28,270	28,242	27,474
55-59 Years	26,870	24,806	24,248	25,026	27,671	27,722	27,742
60-64 Years	25,412	26,541	24,125	23,570	24,397	27,002	27,099
65-69 Years	21,065	24,443	25,308	23,012	22,443	23,330	25,883
70-74 Years	16,424	19,140	22,732	23,625	21,474	20,901	21,864
75-79 Years	10,121	13,969	16,977	20,432	21,340	19,398	18,867
80-84 Years	6,428	7,506	11,613	14,390	17,586	18,499	16,878
85 Years and Over	5,930	6,403	7,952	12,274	17,351	23,108	27,852

Appendix D: Population Projections by Age, BASELINE FORECAST, Continued

Pittsburgh	2020	2025	2030	2035	2040	2045	2050
Total All Ages	2,370,930	2,358,897	2,340,004	2,312,865	2,273,805	2,227,937	2,186,288
0-4 Years	113,805	121,273	119,203	115,671	110,929	107,706	105,231
5-9 Years	125,659	123,954	122,854	120,588	116,894	112,013	108,678
10-14 Years	123,288	126,386	124,226	123,019	120,684	116,933	112,014
15-19 Years	139,885	142,512	134,467	133,359	132,444	130,211	126,828
20-24 Years	137,514	124,496	126,999	119,852	118,686	118,033	116,198
25-29 Years	146,998	124,461	130,836	133,149	126,159	124,431	123,445
30-34 Years	161,223	153,435	131,167	137,391	139,706	133,042	130,874
35-39 Years	154,110	177,275	157,499	135,086	141,191	143,472	137,111
40-44 Years	142,256	163,291	178,870	158,807	136,479	142,552	144,810
45-49 Years	128,030	135,579	162,716	178,637	158,454	136,320	142,458
50-54 Years	149,369	135,848	133,557	160,600	176,872	156,626	134,749
55-59 Years	151,740	144,243	130,964	129,012	155,804	172,496	152,166
60-64 Years	184,933	161,888	136,321	123,164	121,615	148,072	165,275
65-69 Years	163,594	166,755	149,711	125,310	112,252	111,136	137,187
70-74 Years	135,143	141,201	152,516	136,524	113,730	101,139	100,704
75-79 Years	97,208	105,395	121,999	132,504	118,125	97,708	86,126
80-84 Years	59,273	61,879	82,241	96,811	105,964	93,823	76,757
85 Years and Over	56,902	49,027	43,857	53,380	67,816	82,225	85,676

Appendix D: Population Projections by Age, BASELINE FORECAST, Continued

Raleigh	2020	2025	2030	2035	2040	2045	2050
Total All Ages	1,413,982	1,566,451	1,720,079	1,873,887	2,024,938	2,172,060	2,311,692
0-4 Years	82,484	100,261	104,555	110,372	116,823	122,307	126,259
5-9 Years	94,029	102,100	108,543	112,565	118,212	124,526	129,812
10-14 Years	103,187	95,924	108,309	114,599	118,425	123,928	130,129
15-19 Years	100,033	105,702	99,132	110,704	116,541	119,986	125,011
20-24 Years	92,085	93,832	102,104	95,648	106,627	112,262	115,607
25-29 Years	97,632	94,114	110,119	119,261	112,286	124,076	129,754
30-34 Years	101,077	104,260	107,487	123,595	133,296	126,279	138,314
35-39 Years	102,067	114,297	115,330	118,570	134,670	144,839	137,841
40-44 Years	100,371	115,480	123,170	124,167	127,409	143,493	154,064
45-49 Years	100,920	106,379	120,412	128,278	129,341	132,699	148,834
50-54 Years	94,580	108,490	110,477	124,809	132,836	134,051	137,623
55-59 Years	88,533	99,095	110,995	113,152	127,682	135,922	137,375
60-64 Years	75,986	94,304	100,547	112,822	115,172	129,912	138,456
65-69 Years	62,414	77,893	93,716	100,477	113,075	115,688	130,627
70-74 Years	50,274	59,312	75,168	91,049	98,280	111,094	114,105
75-79 Years	31,951	43,840	54,968	70,261	85,858	93,505	106,473
80-84 Years	18,995	25,976	38,568	48,887	63,065	77,933	86,049
85 Years and Over	17,364	25,192	36,479	54,670	75,341	99,561	125,358

Appendix D: Population Projections by Age, BASELINE FORECAST, Continued

St. Louis	2020	2025	2030	2035	2040	2045	2050
Total All Ages	2,820,253	2,841,162	2,850,357	2,845,854	2,827,182	2,797,987	2,766,748
0-4 Years	155,114	173,366	167,823	162,314	157,956	152,956	148,379
5-9 Years	160,754	175,933	173,311	167,694	162,153	157,792	152,849
10-14 Years	183,316	169,934	174,713	172,126	166,609	161,164	156,920
15-19 Years	174,856	170,156	156,184	160,742	158,950	154,427	149,916
20-24 Years	172,035	149,775	153,605	140,932	145,181	143,863	140,055
25-29 Years	180,496	162,719	163,531	167,554	154,579	158,890	157,130
30-34 Years	191,777	190,253	167,946	168,564	172,676	160,354	164,433
35-39 Years	194,597	198,477	191,335	169,687	170,138	174,172	162,428
40-44 Years	183,316	200,768	197,212	190,046	169,002	169,421	173,412
45-49 Years	160,754	170,902	197,976	194,665	187,587	167,223	167,721
50-54 Years	169,215	165,360	167,418	194,136	191,149	184,318	164,703
55-59 Years	183,316	165,854	160,824	163,292	189,573	186,935	180,430
60-64 Years	197,418	192,566	158,616	154,149	156,968	182,658	180,596
65-69 Years	169,215	181,503	179,298	148,130	144,371	147,602	172,494
70-74 Years	135,372	142,023	164,136	163,142	135,159	132,203	135,995
75-79 Years	93,068	103,415	122,406	142,874	143,152	119,147	117,315
80-84 Years	59,225	63,776	81,327	97,302	115,234	116,865	98,166
85 Years and Over	56,405	64,383	72,696	88,506	106,747	127,995	143,805

Appendix D: Population Projections by Age, BASELINE FORECAST, Continued

Tampa	2020	2025	2030	2035	2040	2045	2050
Total All Ages	3,175,275	3,380,391	3,583,533	3,780,774	3,967,034	4,140,223	4,300,595
0-4 Years	152,110	184,910	190,888	195,851	199,628	202,201	204,119
5-9 Years	171,509	189,885	197,888	203,408	208,077	211,625	213,887
10-14 Years	185,572	188,564	199,697	207,442	212,639	217,089	220,480
15-19 Years	187,556	184,748	182,883	193,144	200,462	205,307	209,458
20-24 Years	185,357	162,679	177,845	175,888	185,450	192,523	197,244
25-29 Years	195,107	188,604	196,449	213,438	211,047	221,452	228,361
30-34 Years	204,041	223,076	209,067	216,525	234,359	232,380	242,759
35-39 Years	201,150	239,617	240,826	226,671	233,737	252,312	250,674
40-44 Years	189,715	231,052	254,748	255,884	241,620	248,401	267,662
45-49 Years	198,117	202,375	241,402	265,516	266,787	252,545	259,169
50-54 Years	209,038	207,480	210,481	250,214	274,761	276,371	262,306
55-59 Years	230,121	207,362	214,468	217,769	258,209	283,307	285,454
60-64 Years	220,693	232,842	215,613	223,533	227,183	268,593	294,398
65-69 Years	198,795	219,500	237,732	221,519	230,248	234,407	276,821
70-74 Years	174,408	181,999	211,803	230,467	215,598	224,770	229,728
75-79 Years	120,994	149,707	165,242	193,992	212,586	199,622	209,200
80-84 Years	76,757	94,752	124,457	138,892	165,433	183,308	173,167
85 Years and Over	74,235	91,239	112,042	150,622	189,211	234,009	275,709

Appendix E: Population Projections by Race and Ethnicity, BASELINE FORECAST

Austin	Total	White	Black	Hispanic	Other	Residual
2020 Census	2,283,371	1,133,113	151,516	728,021	270,721	0
2025	2,610,075	1,267,667	173,213	848,074	331,988	-10,867
2030	2,943,018	1,401,270	195,404	973,807	394,741	-22,205
2035	3,279,429	1,531,808	217,836	1,105,044	458,895	-34,154
2040	3,615,892	1,657,650	240,009	1,241,095	523,743	-46,604
2045	3,954,476	1,781,406	261,708	1,381,458	589,354	-59,450
2050	4,291,250	1,902,451	282,918	1,523,852	654,171	-72,143
30-Year Change	2,007,879	769,338	131,402	795,831	383,450	
Avg. Annual Change	2.9%	2.3%	2.9%	3.6%	4.7%	
Charleston	**Total**	**White**	**Black**	**Hispanic**	**Other**	**Residual**
2020 Census	799,636	500,545	181,808	60,469	56,814	0
2025	883,262	558,096	194,563	66,875	66,860	-3,132
2030	967,434	615,568	207,213	74,249	77,091	-6,687
2035	1,050,156	671,883	219,251	82,265	87,372	-10,615
2040	1,129,536	726,151	230,118	90,554	97,558	-14,843
2045	1,205,966	778,413	239,968	99,358	107,651	-19,423
2050	1,278,964	828,167	248,987	108,552	117,457	-24,199
30-Year Change	479,328	327,622	67,179	48,083	60,643	
Avg. Annual Change	2.0%	2.2%	1.2%	2.7%	3.6%	
Charlotte	**Total**	**White**	**Black**	**Hispanic**	**Other**	**Residual**
2020 Census	2,660,329	1,537,545	572,695	312,184	237,905	0
2025	2,893,154	1,622,007	637,949	361,121	290,569	-18,491
2030	3,128,211	1,703,781	704,444	413,006	345,249	-38,267
2035	3,363,133	1,780,672	771,494	468,901	401,489	-59,423
2040	3,594,123	1,849,883	837,439	530,157	458,889	-82,246
2045	3,818,658	1,910,216	901,709	596,241	517,162	-106,669
2050	4,032,172	1,960,481	963,360	665,013	575,625	-132,307
30-Year Change	1,371,843	422,936	390,665	352,829	337,720	
Avg. Annual Change	1.7%	0.9%	2.3%	3.8%	4.7%	

Appendix E: Population Projections by Race and Ethnicity, BASELINE, Continued

Cincinnati	Total	White	Black	Hispanic	Other	Residual
2020 Census	2,256,884	1,712,872	270,805	95,073	178,134	0
2025	2,293,352	1,712,219	284,616	107,013	207,717	-18,211
2030	2,323,808	1,704,496	298,482	120,258	238,120	-37,547
2035	2,345,605	1,687,419	312,306	134,754	269,132	-58,006
2040	2,355,053	1,658,624	325,026	150,527	300,673	-79,797
2045	2,352,237	1,618,438	336,603	167,479	332,407	-102,690
2050	2,343,537	1,572,518	347,966	185,331	363,377	-125,655
30-Year Change	86,653	-140,354	77,161	90,258	185,243	
Avg. Annual Change	0.1%	-0.3%	0.9%	3.2%	3.5%	
Cleveland	**Total**	**White**	**Black**	**Hispanic**	**Other**	**Residual**
2020 Census	2,088,251	1,407,943	402,294	133,862	144,152	0
2025	2,082,401	1,372,774	405,066	154,510	161,922	-11,871
2030	2,068,180	1,330,177	406,134	176,258	179,913	-24,302
2035	2,045,161	1,279,736	405,420	199,239	198,027	-37,261
2040	2,014,142	1,223,072	402,060	223,474	216,216	-50,680
2045	1,978,187	1,163,058	395,950	249,123	234,485	-64,429
2050	1,944,130	1,104,240	389,547	275,958	252,234	-77,850
30-Year Change	-144,121	-303,703	-12,747	142,096	108,082	
Avg. Annual Change	-0.2%	-0.7%	-0.1%	3.5%	2.5%	
Columbus	**Total**	**White**	**Black**	**Hispanic**	**Other**	**Residual**
2020 Census	2,138,926	1,478,968	330,686	110,967	218,305	0
2025	2,265,891	1,521,845	370,418	126,557	265,864	-18,793
2030	2,392,321	1,559,732	412,439	143,655	315,308	-38,812
2035	2,516,767	1,591,516	456,631	162,210	366,447	-60,038
2040	2,633,761	1,613,447	501,805	182,401	418,668	-82,561
2045	2,744,418	1,627,604	547,241	204,037	471,715	-106,178
2050	2,850,875	1,636,551	593,174	226,773	524,501	-130,124
30-Year Change	711,949	157,583	262,488	115,806	306,196	
Avg. Annual Change	1.1%	0.4%	2.6%	3.5%	4.7%	

Appendix E: Population Projections by Race and Ethnicity, BASELINE, Continued

Denver	Total	White	Black	Hispanic	Other	Residual
2020 Census	2,963,821	1,814,213	157,965	691,711	299,932	0
2025	3,250,390	1,962,929	177,019	771,620	349,050	-10,229
2030	3,539,659	2,109,678	196,761	854,805	399,498	-21,083
2035	3,826,673	2,250,825	217,040	940,716	450,594	-32,501
2040	4,104,928	2,382,049	237,464	1,028,305	501,576	-44,467
2045	4,376,996	2,506,840	257,885	1,116,612	552,440	-56,782
2050	4,642,051	2,627,341	278,550	1,202,996	601,799	-68,635
30-Year Change	1,678,230	813,128	120,585	511,285	301,867	
Avg. Annual Change	1.9%	1.5%	2.5%	2.5%	3.4%	
Detroit	**Total**	**White**	**Black**	**Hispanic**	**Other**	**Residual**
2020 Census	4,392,041	2,799,533	952,462	219,953	420,093	0
2025	4,417,321	2,765,991	954,771	240,609	486,240	-30,290
2030	4,426,105	2,717,322	954,829	262,155	553,940	-62,142
2035	4,419,686	2,652,803	954,736	284,746	622,659	-95,257
2040	4,396,955	2,572,185	954,418	308,197	691,373	-129,217
2045	4,360,410	2,478,715	953,847	332,158	759,146	-163,455
2050	4,318,852	2,381,401	953,872	356,002	824,349	-196,772
30-Year Change	-73,189	-418,132	1,410	136,049	404,256	
Avg. Annual Change	-0.1%	-0.5%	0.0%	2.1%	3.2%	
Indianapolis	**Total**	**White**	**Black**	**Hispanic**	**Other**	**Residual**
2020 Census	2,111,040	1,439,031	313,376	177,787	180,846	0
2025	2,218,900	1,474,569	344,234	197,257	221,899	-19,058
2030	2,325,349	1,505,333	376,225	218,466	264,961	-39,636
2035	2,428,285	1,529,704	409,235	241,371	309,578	-61,602
2040	2,524,397	1,545,331	442,523	266,169	355,433	-85,059
2045	2,613,657	1,553,219	475,681	292,401	401,985	-109,629
2050	2,697,129	1,555,089	509,067	319,084	448,485	-134,596
30-Year Change	586,089	116,058	195,691	141,297	267,639	
Avg. Annual Change	0.9%	0.3%	2.1%	2.6%	4.9%	

Appendix E: Population Projections by Race and Ethnicity, BASELINE, Continued

Kansas City	Total	White	Black	Hispanic	Other	Residual
2020 Census	2,192,035	1,501,275	257,939	229,233	203,588	0
2025	2,274,309	1,534,892	268,644	253,150	232,492	-14,868
2030	2,352,438	1,563,803	278,816	278,327	262,198	-30,706
2035	2,424,579	1,586,070	288,537	305,080	292,376	-47,484
2040	2,488,357	1,599,829	297,481	333,609	322,587	-65,149
2045	2,544,712	1,606,586	305,304	363,653	352,720	-83,551
2050	2,595,121	1,608,379	312,529	394,118	382,077	-101,982
30-Year Change	403,086	107,104	54,590	164,885	178,489	
Avg. Annual Change	0.6%	0.2%	0.7%	2.4%	2.9%	
Lexington	**Total**	**White**	**Black**	**Hispanic**	**Other**	**Residual**
2020 Census	516,811	379,636	56,534	40,213	40,428	0
2025	549,559	399,427	61,888	43,178	47,919	-2,853
2030	582,672	418,896	67,463	46,534	55,761	-5,982
2035	615,143	437,018	73,178	50,619	63,773	-9,445
2040	648,011	454,711	79,101	55,308	72,129	-13,238
2045	680,196	471,554	84,946	60,324	80,607	-17,236
2050	712,105	487,828	90,860	65,743	88,964	-21,291
30-Year Change	195,294	108,192	34,326	25,530	48,536	
Avg. Annual Change	1.3%	0.9%	2.0%	2.1%	4.0%	
Louisville	**Total**	**White**	**Black**	**Hispanic**	**Other**	**Residual**
2020 Census	1,285,439	918,741	187,481	82,964	96,253	0
2025	1,332,452	935,069	200,925	95,618	111,878	-11,038
2030	1,377,211	948,164	214,490	109,492	127,978	-22,913
2035	1,418,424	956,944	227,987	124,717	144,470	-35,694
2040	1,454,507	960,155	241,070	141,540	161,200	-49,458
2045	1,485,970	958,634	253,496	159,862	177,994	-64,017
2050	1,514,269	953,866	265,704	179,194	194,201	-78,696
30-Year Change	228,830	35,125	78,223	96,230	97,948	
Avg. Annual Change	0.6%	0.1%	1.4%	3.9%	3.4%	

Appendix E: Population Projections by Race and Ethnicity, BASELINE, Continued

Memphis	Total	White	Black	Hispanic	Other	Residual
2020 Census	1,337,779	552,793	609,275	94,948	80,763	0
2025	1,351,607	533,232	634,412	100,124	87,805	-3,967
2030	1,361,148	511,529	657,259	105,857	94,755	-8,253
2035	1,367,016	488,150	677,509	112,787	101,525	-12,955
2040	1,368,450	463,720	693,880	120,947	107,975	-18,072
2045	1,365,493	438,921	706,079	129,913	114,061	-23,482
2050	1,359,753	414,339	715,400	139,396	119,417	-28,799
30-Year Change	21,974	-138,454	106,125	44,448	38,654	
Avg. Annual Change	0.1%	-0.8%	0.6%	1.6%	1.6%	
Nashville	**Total**	**White**	**Black**	**Hispanic**	**Other**	**Residual**
2020 Census	1,989,519	1,359,362	281,767	193,873	154,517	0
2025	2,169,594	1,460,444	313,284	223,098	185,386	-12,618
2030	2,353,257	1,561,548	345,797	254,936	217,232	-26,256
2035	2,537,488	1,659,975	378,802	290,089	249,834	-41,212
2040	2,720,604	1,753,994	411,714	329,732	283,061	-57,898
2045	2,901,524	1,843,035	444,196	373,926	316,624	-76,256
2050	3,079,153	1,926,982	476,375	421,804	349,507	-95,515
30-Year Change	1,089,634	567,620	194,608	227,931	194,990	
Avg. Annual Change	1.8%	1.4%	2.3%	3.9%	4.2%	
Northern Kentucky	**Total**	**White**	**Black**	**Hispanic**	**Other**	**Residual**
2020 Census	398,108	337,512	16,466	17,757	26,373	0
2025	411,782	345,048	18,334	20,273	31,159	-3,033
2030	424,563	351,419	20,296	23,026	36,091	-6,270
2035	435,895	356,127	22,322	26,058	41,088	-9,700
2040	444,850	358,326	24,367	29,398	46,129	-13,369
2045	451,562	358,245	26,370	33,023	51,137	-17,214
2050	456,537	356,433	28,357	36,840	56,047	-21,139
30-Year Change	58,429	18,921	11,891	19,083	29,674	
Avg. Annual Change	0.5%	0.2%	2.4%	3.6%	3.8%	

Appendix E: Population Projections by Race and Ethnicity, BASELINE, Continued

Pittsburgh	Total	White	Black	Hispanic	Other	Residual
2020 Census	2,370,930	1,947,870	196,784	52,920	173,356	0
2025	2,358,897	1,911,760	199,094	63,931	205,211	-21,098
2030	2,340,004	1,868,437	200,873	75,835	238,144	-43,286
2035	2,312,865	1,816,604	202,245	88,575	271,903	-66,461
2040	2,273,805	1,753,487	202,564	102,085	306,434	-90,765
2045	2,227,937	1,683,852	201,931	116,551	341,382	-115,779
2050	2,186,288	1,617,513	201,343	132,042	375,827	-140,438
30-Year Change	-184,642	-330,357	4,559	79,122	202,471	
Avg. Annual Change	-0.3%	-0.6%	0.1%	5.0%	3.9%	
Raleigh	**Total**	**White**	**Black**	**Hispanic**	**Other**	**Residual**
2020 Census	1,413,982	823,769	253,361	169,603	167,249	0
2025	1,566,451	895,975	281,165	193,294	206,139	-10,123
2030	1,720,079	967,249	309,071	218,373	246,385	-21,000
2035	1,873,887	1,036,614	336,885	245,397	287,621	-32,631
2040	2,024,938	1,101,360	364,018	275,032	329,887	-45,359
2045	2,172,060	1,161,340	390,038	306,962	372,776	-59,055
2050	2,311,692	1,215,305	414,467	340,002	415,206	-73,288
30-Year Change	897,710	391,536	161,106	170,399	247,957	
Avg. Annual Change	2.1%	1.6%	2.1%	3.3%	4.9%	
St. Louis	**Total**	**White**	**Black**	**Hispanic**	**Other**	**Residual**
2020 Census	2,820,253	1,983,321	503,344	106,269	227,319	0
2025	2,841,162	1,974,632	510,127	119,310	254,320	-17,227
2030	2,850,357	1,955,443	515,594	133,260	281,269	-35,210
2035	2,845,854	1,923,715	519,955	148,109	308,060	-53,984
2040	2,827,182	1,879,651	522,777	163,734	334,410	-73,390
2045	2,797,987	1,826,975	523,776	180,279	360,088	-93,132
2050	2,766,748	1,772,608	524,558	197,509	384,297	-112,224
30-Year Change	-53,505	-210,713	21,214	91,240	156,978	
Avg. Annual Change	-0.1%	-0.4%	0.1%	2.9%	2.3%	

Appendix E: Population Projections by Race and Ethnicity, BASELINE, Continued

Tampa	Total	White	Black	Hispanic	Other	Residual
2020 Census	3,175,275	1,888,689	357,018	652,022	277,546	0
2025	3,380,391	1,934,533	391,731	752,643	317,316	-15,833
2030	3,583,533	1,974,738	426,839	857,128	356,686	-31,859
2035	3,780,774	2,006,867	462,030	964,633	395,310	-48,066
2040	3,967,034	2,028,984	496,240	1,073,591	432,554	-64,335
2045	4,140,223	2,041,144	529,105	1,182,210	468,429	-80,666
2050	4,300,595	2,045,783	561,053	1,288,005	502,167	-96,412
30-Year Change	1,125,320	157,094	204,035	635,983	224,621	
Avg. Annual Change	1.2%	0.3%	1.9%	3.3%	2.7%	

Appendix F: Labor Force Projections, Four Scenarios, Selected MSAs

Austin	Optimistic	Aspirational	Baseline	Pessimistic
2020	1,272,965	1,272,965	1,272,965	1,272,965
2025	1,382,884	1,378,194	1,376,719	1,369,156
2030	1,542,568	1,516,454	1,513,277	1,481,661
2035	1,718,952	1,660,485	1,656,448	1,590,635
2040	1,901,802	1,795,981	1,792,979	1,680,280
2045	2,093,098	1,923,119	1,924,035	1,750,064
2050	2,273,834	2,026,447	2,034,387	1,789,455
30-Year Change	1,000,869	753,482	761,422	516,490
Avg. Annual Change	2.60%	2.00%	2.00%	1.40%
Charleston	**Optimistic**	**Aspirational**	**Baseline**	**Pessimistic**
2020	394,232	394,232	394,232	394,232
2025	431,038	428,884	428,764	426,047
2030	468,240	459,477	458,924	448,923
2035	510,104	491,774	491,034	471,034
2040	553,349	521,519	521,092	487,796
2045	597,040	547,929	548,543	498,712
2050	634,614	565,365	567,817	499,594
30-Year Change	240,382	171,132	173,584	105,362
Avg. Annual Change	2.00%	1.40%	1.50%	0.90%
Charlotte	**Optimistic**	**Aspirational**	**Baseline**	**Pessimistic**
2020	1,378,430	1,378,430	1,378,430	1,378,430
2025	1,465,121	1,458,873	1,458,027	1,449,409
2030	1,567,891	1,539,473	1,537,097	1,503,937
2035	1,680,443	1,620,622	1,617,758	1,551,901
2040	1,800,896	1,697,412	1,695,863	1,587,382
2045	1,938,852	1,778,905	1,780,981	1,618,853
2050	2,072,185	1,845,981	1,854,023	1,631,228
30-Year Change	693,755	467,551	475,593	252,798
Avg. Annual Change	1.70%	1.10%	1.20%	0.60%

Appendix F: Labor Force Projections, Four Scenarios, Selected MSAs, Continued

Cincinnati	**Optimistic**	**Aspirational**	**Baseline**	**Pessimistic**
2020	1,128,095	1,128,095	1,128,095	1,128,095
2025	1,122,936	1,117,863	1,117,638	1,111,180
2030	1,129,051	1,107,290	1,106,230	1,081,805
2035	1,150,061	1,106,802	1,105,721	1,059,348
2040	1,178,156	1,107,577	1,107,507	1,034,642
2045	1,208,299	1,105,090	1,107,387	1,003,736
2050	1,228,356	1,090,739	1,096,410	961,787
30-Year Change	100,261	-37,356	-31,685	-166,308
Avg. Annual Change	0.30%	-0.10%	-0.10%	-0.50%
Cleveland	**Optimistic**	**Aspirational**	**Baseline**	**Pessimistic**
2020	1,014,318	1,014,318	1,014,318	1,014,318
2025	983,147	977,611	978,026	971,875
2030	967,146	947,573	947,177	925,777
2035	970,662	933,705	933,212	893,968
2040	984,251	925,583	925,814	865,442
2045	1,002,039	917,359	919,412	834,479
2050	1,011,662	899,508	904,243	794,576
30-Year Change	-2,656	-114,810	-110,075	-219,742
Avg. Annual Change	0.00%	-0.40%	-0.40%	-0.70%
Columbus	**Optimistic**	**Aspirational**	**Baseline**	**Pessimistic**
2020	1,100,887	1,100,887	1,100,887	1,100,887
2025	1,148,789	1,143,854	1,143,172	1,136,357
2030	1,210,739	1,188,423	1,186,693	1,160,856
2035	1,285,092	1,238,994	1,236,953	1,186,437
2040	1,364,797	1,285,996	1,284,914	1,202,462
2045	1,448,353	1,328,091	1,329,756	1,207,955
2050	1,521,893	1,354,406	1,360,506	1,195,730
30-Year Change	421,006	253,519	259,619	94,843
Avg. Annual Change	1.30%	0.80%	0.80%	0.30%

Appendix F: Labor Force Projections, Four Scenarios, Selected MSAs, Continued

Denver	**Optimistic**	**Aspirational**	**Baseline**	**Pessimistic**
2020	1,670,066	1,670,066	1,670,066	1,670,066
2025	1,770,534	1,761,799	1,760,814	1,749,255
2030	1,921,243	1,885,151	1,882,287	1,840,399
2035	2,091,558	2,017,630	2,013,787	1,931,940
2040	2,267,911	2,140,311	2,137,518	2,002,632
2045	2,454,396	2,255,773	2,257,110	2,054,493
2050	2,620,437	2,338,305	2,347,105	2,068,028
30-Year Change	950,371	668,239	677,039	397,962
Avg. Annual Change	1.90%	1.30%	1.40%	0.80%
Detroit	**Optimistic**	**Aspirational**	**Baseline**	**Pessimistic**
2020	2,120,416	2,120,416	2,120,416	2,120,416
2025	2,099,158	2,087,690	2,087,680	2,073,992
2030	2,087,835	2,046,489	2,044,591	1,998,204
2035	2,104,420	2,026,468	2,024,072	1,939,745
2040	2,138,068	2,014,220	2,013,048	1,883,822
2045	2,185,192	2,006,528	2,008,730	1,827,366
2050	2,214,204	1,976,814	1,984,385	1,749,629
30-Year Change	93,788	-143,602	-136,031	-370,787
Avg. Annual Change	0.10%	-0.20%	-0.20%	-0.60%
Indianapolis	**Optimistic**	**Aspirational**	**Baseline**	**Pessimistic**
2020	1,083,053	1,083,053	1,083,053	1,083,053
2025	1,113,799	1,109,491	1,108,836	1,102,698
2030	1,160,085	1,139,058	1,137,437	1,113,027
2035	1,222,573	1,178,843	1,176,990	1,129,087
2040	1,291,748	1,217,193	1,216,351	1,138,425
2045	1,368,054	1,254,251	1,256,105	1,141,082
2050	1,437,463	1,279,010	1,285,094	1,129,457
30-Year Change	354,410	195,957	202,041	46,404
Avg. Annual Change	1.10%	0.60%	0.60%	0.10%

Appendix F: Labor Force Projections, Four Scenarios, Selected MSAs, Continued

Kansas City	**Optimistic**	**Aspirational**	**Baseline**	**Pessimistic**
2020	1,113,937	1,113,937	1,113,937	1,113,937
2025	1,134,251	1,129,682	1,129,296	1,123,149
2030	1,165,723	1,144,036	1,142,712	1,117,972
2035	1,216,297	1,172,252	1,170,701	1,122,785
2040	1,269,927	1,195,973	1,195,392	1,118,330
2045	1,327,715	1,216,754	1,218,764	1,106,694
2050	1,375,092	1,223,231	1,229,198	1,080,221
30-Year Change	261,155	109,294	115,261	-33,716
Avg. Annual Change	0.80%	0.30%	0.30%	-0.10%
Lexington	**Optimistic**	**Aspirational**	**Baseline**	**Pessimistic**
2020	262,728	262,728	262,728	262,728
2025	272,369	271,363	271,267	269,894
2030	286,766	281,653	281,360	275,557
2035	306,426	294,800	294,599	282,295
2040	329,051	308,226	308,551	287,550
2045	354,242	321,594	322,940	290,942
2050	380,164	334,188	336,881	292,760
30-Year Change	117,436	71,461	74,154	30,032
Avg. Annual Change	1.50%	0.90%	0.90%	0.40%
Louisville	**Optimistic**	**Aspirational**	**Baseline**	**Pessimistic**
2020	647,585	647,585	647,585	647,585
2025	658,475	655,412	655,281	651,399
2030	673,386	660,584	659,891	645,398
2035	700,500	674,730	673,923	646,051
2040	730,895	687,894	687,685	643,060
2045	764,276	699,858	701,173	636,335
2050	793,800	705,506	709,131	622,682
30-Year Change	146,215	57,921	61,546	-24,903
Avg. Annual Change	0.80%	0.30%	0.30%	-0.10%

Appendix F: Labor Force Projections, Four Scenarios, Selected MSAs, Continued

Memphis	**Optimistic**	**Aspirational**	**Baseline**	**Pessimistic**
2020	631,835	631,835	631,835	631,835
2025	626,501	624,088	623,693	620,215
2030	625,275	613,976	613,058	599,888
2035	632,008	609,521	608,510	583,803
2040	640,456	603,633	603,157	564,594
2045	652,434	598,411	599,207	544,490
2050	661,206	588,772	591,404	520,079
30-Year Change	29,371	-43,063	-40,432	-111,756
Avg. Annual Change	0.20%	-0.20%	-0.20%	-0.60%
Nashville	**Optimistic**	**Aspirational**	**Baseline**	**Pessimistic**
2020	1,051,497	1,051,497	1,051,497	1,051,497
2025	1,110,800	1,106,007	1,105,386	1,098,814
2030	1,198,149	1,176,234	1,174,562	1,149,188
2035	1,301,521	1,254,687	1,252,726	1,201,545
2040	1,412,798	1,330,446	1,329,637	1,243,878
2045	1,533,269	1,404,282	1,406,629	1,276,725
2050	1,648,511	1,464,728	1,472,159	1,292,181
30-Year Change	597,014	413,231	420,662	240,684
Avg. Annual Change	1.90%	1.30%	1.30%	0.80%
Northern Kentucky	**Optimistic**	**Aspirational**	**Baseline**	**Pessimistic**
2020	207,293	207,293	207,293	207,293
2025	211,516	210,662	210,568	209,404
2030	215,548	211,523	211,258	206,662
2035	221,495	213,321	213,037	204,184
2040	228,567	215,012	214,914	200,830
2045	235,866	215,882	216,246	196,073
2050	241,599	214,716	215,743	189,343
30-Year Change	34,306	7,423	8,450	-17,950
Avg. Annual Change	0.60%	0.10%	0.10%	-0.30%

Appendix F: Labor Force Projections, Four Scenarios, Selected MSAs, Continued

Pittsburgh	**Optimistic**	**Aspirational**	**Baseline**	**Pessimistic**
2020	1,155,472	1,155,472	1,155,472	1,155,472
2025	1,141,228	1,133,289	1,134,231	1,126,076
2030	1,134,809	1,110,444	1,110,435	1,084,492
2035	1,147,046	1,102,349	1,102,120	1,055,215
2040	1,168,407	1,098,204	1,098,615	1,026,694
2045	1,187,570	1,087,274	1,089,600	989,085
2050	1,188,172	1,056,563	1,062,014	933,493
30-Year Change	32,701	-98,908	-93,458	-221,978
Avg. Annual Change	0.10%	-0.30%	-0.30%	-0.60%
Raleigh	**Optimistic**	**Aspirational**	**Baseline**	**Pessimistic**
2020	746,916	746,916	746,916	746,916
2025	805,072	801,972	801,231	796,570
2030	872,982	857,707	856,013	837,733
2035	944,531	911,883	909,760	873,176
2040	1,018,763	961,962	960,372	899,958
2045	1,100,433	1,011,838	1,012,144	921,471
2050	1,181,166	1,054,861	1,058,484	933,222
30-Year Change	434,250	307,946	311,568	186,306
Avg. Annual Change	1.90%	1.40%	1.40%	0.80%
St. Louis	**Optimistic**	**Aspirational**	**Baseline**	**Pessimistic**
2020	1,272,965	1,394,877	1,394,877	1,394,877
2025	1,373,392	1,366,162	1,366,309	1,357,793
2030	1,363,651	1,337,312	1,336,268	1,306,864
2035	1,378,445	1,328,061	1,326,660	1,272,326
2040	1,398,438	1,317,493	1,316,964	1,232,800
2045	1,416,117	1,298,768	1,300,812	1,182,383
2050	1,418,545	1,262,786	1,268,916	1,116,140
30-Year Change	145,580	-132,091	-125,961	-278,737
Avg. Annual Change	0.40%	-0.30%	-0.30%	-0.70%

Appendix F: Labor Force Projections, Four Scenarios, Selected MSAs, Continued

Tampa	Optimistic	Aspirational	Baseline	Pessimistic
2020	1,514,291	1,514,291	1,514,291	1,514,291
2025	1,566,198	1,556,127	1,557,317	1,546,800
2030	1,648,652	1,615,092	1,614,791	1,578,477
2035	1,752,630	1,687,178	1,686,310	1,616,731
2040	1,864,906	1,756,321	1,756,438	1,644,393
2045	1,982,636	1,819,382	1,822,751	1,658,554
2050	2,083,724	1,857,652	1,866,742	1,645,284
30-Year Change	569,433	343,361	352,451	130,993
Avg. Annual Change	1.30%	0.80%	0.80%	0.30%