

Round 9.0 Cooperative Forecast Results and Methods

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Pamela Zorich, Planner Coordinator

Cooperative Forecast Participation

- Round 1 – 1976
- Round 2 – 1979
- Round 3 – 1983
- Round 3.5 - 1985 Update
- Round 4 – 1987
- Round 4.1 – 1991
- Round 5 - January 1994
- Round 5.1 - May 1994
- Round 5.2 – 1995
- Round 5.3 – 1996
- Round 5.4 – 1997
- Round 6a – 1998
- Round 6.1 – 1999
- Round 6.2 – 2000
- Round 6.3 – 2003
- Round 6.4 - Never Adopted
- Round 6.4A – 2004
- Round 7.0 – 2005
- Round 7.0a – 2006
- Round 7.1 – 2008
- Round 7.2 – 2009
- Round 7.2A – 2009
- Round 8.0 – 2010
- Round 8.0a – 2011
- Round 8.1 – 2012
- Round 8.2 – 2013
- Round 8.3 - 2014
- **Round 9.0 – 2016**

Cooperative Forecast Participation

Maryland:

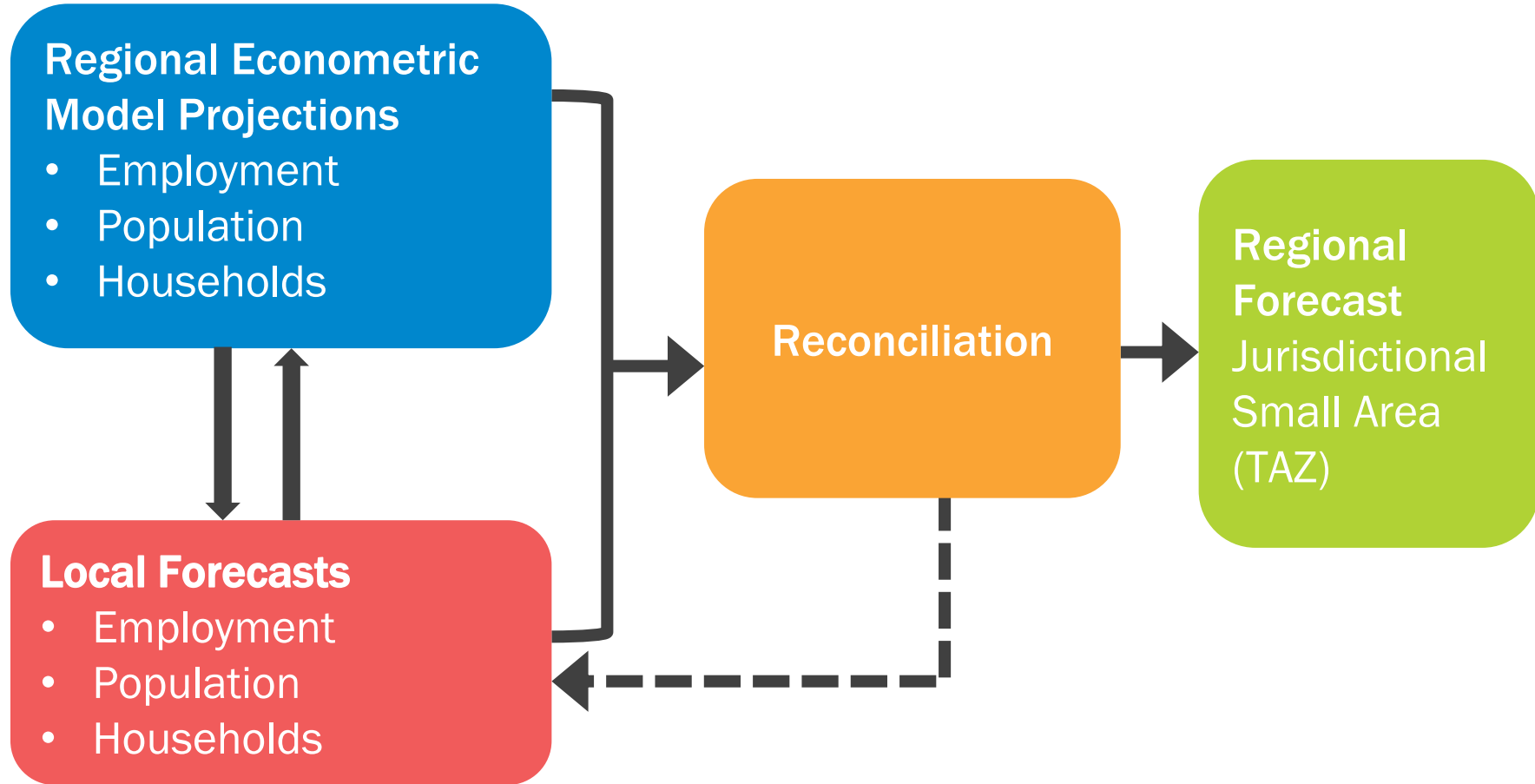
- Montgomery County
- Bowie
- Charles County
- College Park
- Frederick
- Frederick County
- Gaithersburg
- Greenbelt
- Prince George's County
- Rockville
- Takoma Park

Virginia:

- Alexandria
- Arlington County
- Fairfax
- Fairfax County
- Falls Church
- Loudoun County
- Manassas
- Manassas Park
- Prince William County
- District of Columbia



Cooperative Forecasting Process



Source: MWCOG, "ROUND 9.0 COOPERATIVE FORECASTS OF FUTURE GROWTH", March 9, 2016.

MONTGOMERY COUNTY

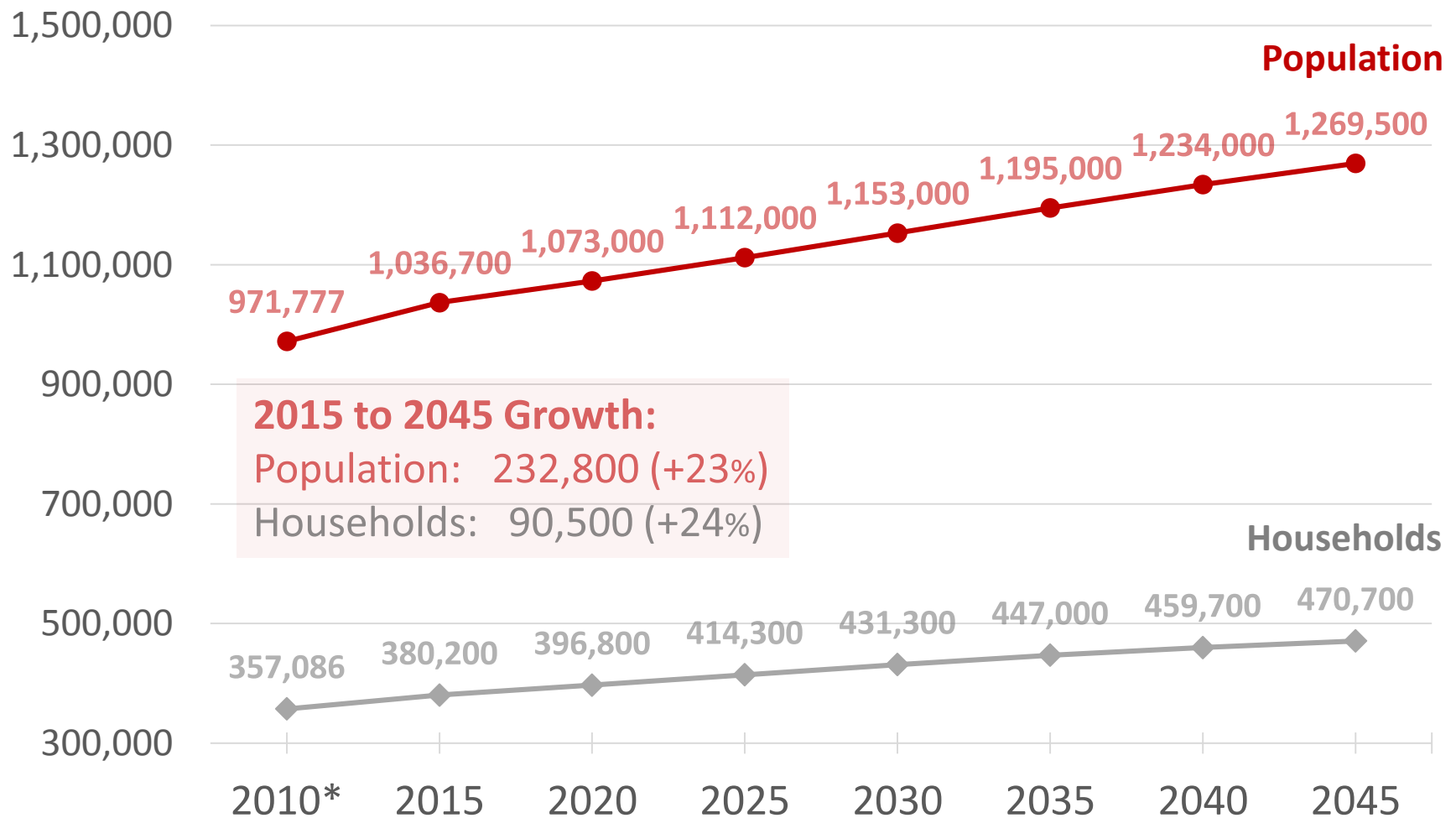
Population and Household

Cooperative Forecasts

Round 9.0

Population and Household Forecasts

Montgomery County, Round 9.0

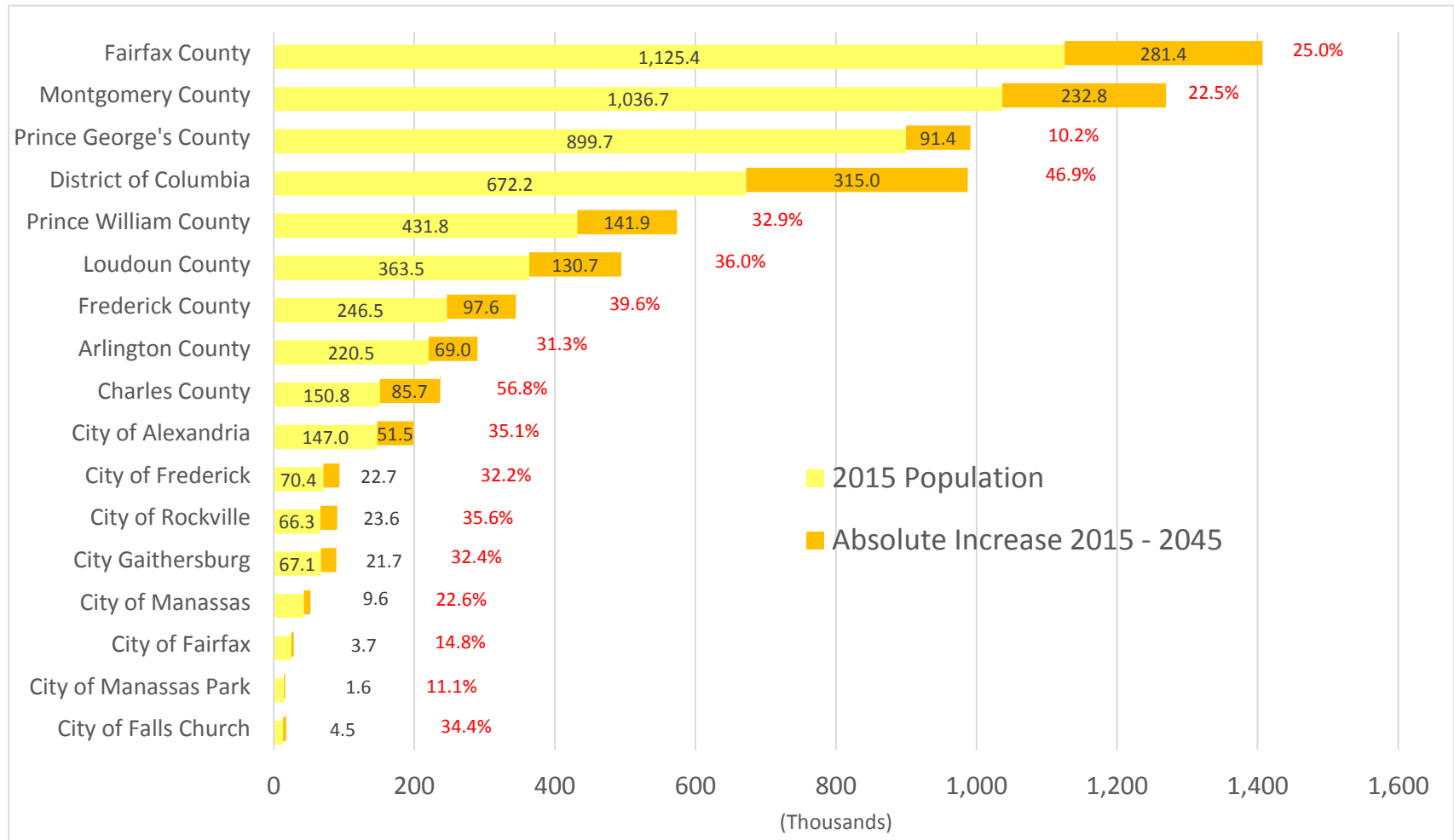


Source: MNCPPC, Montgomery County Planning Department, Research & Special Projects Division.

Draft Round 9.0 forecasts are subject to change.

Regional Comparison, Round 9.0 Cooperative Forecast (MWCOC Draft)

Population 2015 - 2045

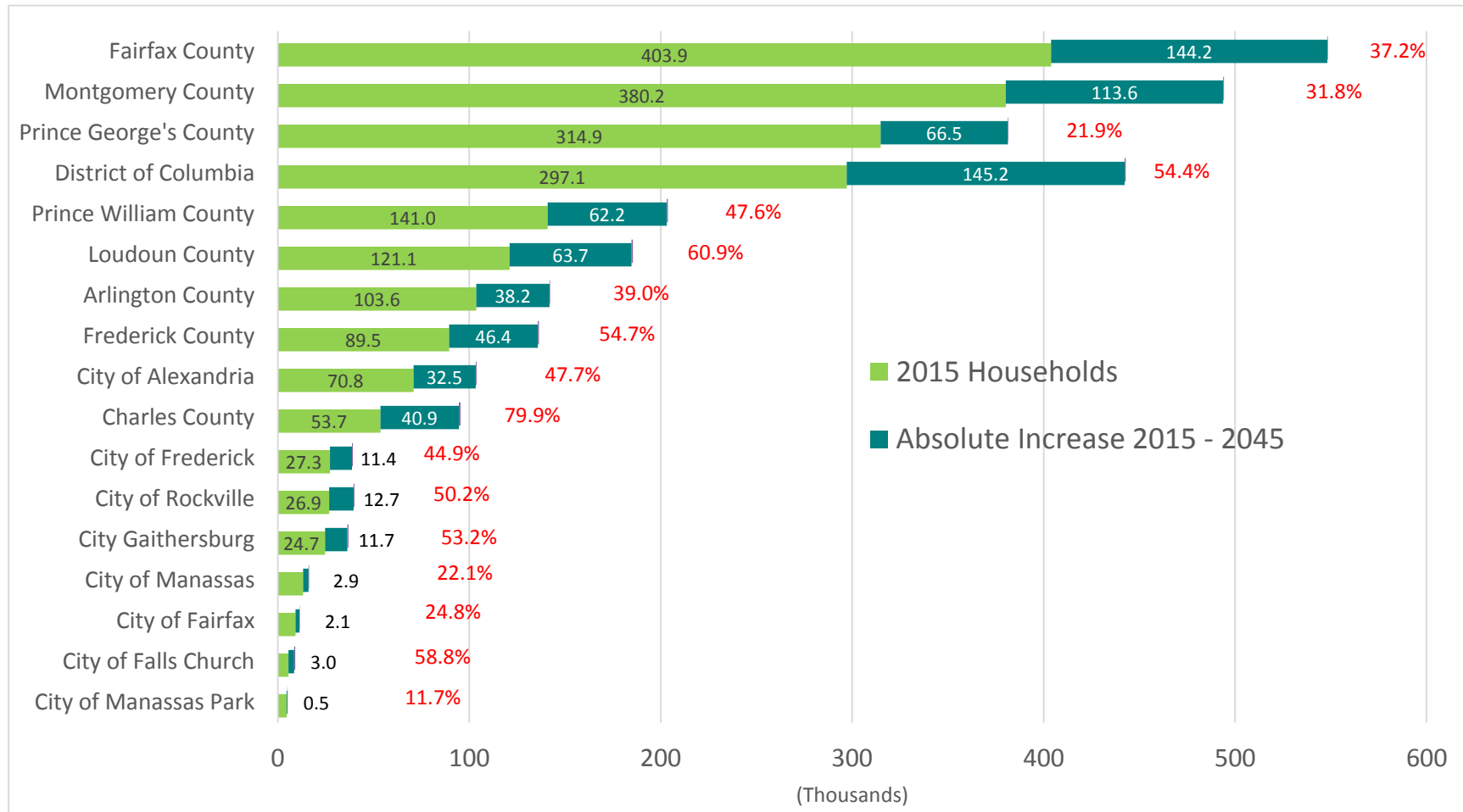


Source: MWCOC, "ROUND 9.0 COOPERATIVE FORECASTS OF FUTURE GROWTH", March 9, 2016.

Draft Round 9.0 forecasts are subject to change.

Regional Comparison, Round 9.0 Cooperative Forecast (MWCOC Draft)

Households 2015 - 2045



Source: MWCOC, "ROUND 9.0 COOPERATIVE FORECASTS OF FUTURE GROWTH", March 9, 2016.

Draft Round 9.0 forecasts are subject to change.

Population Forecast Methodology

AGE COHORT-COMPONENT MODEL

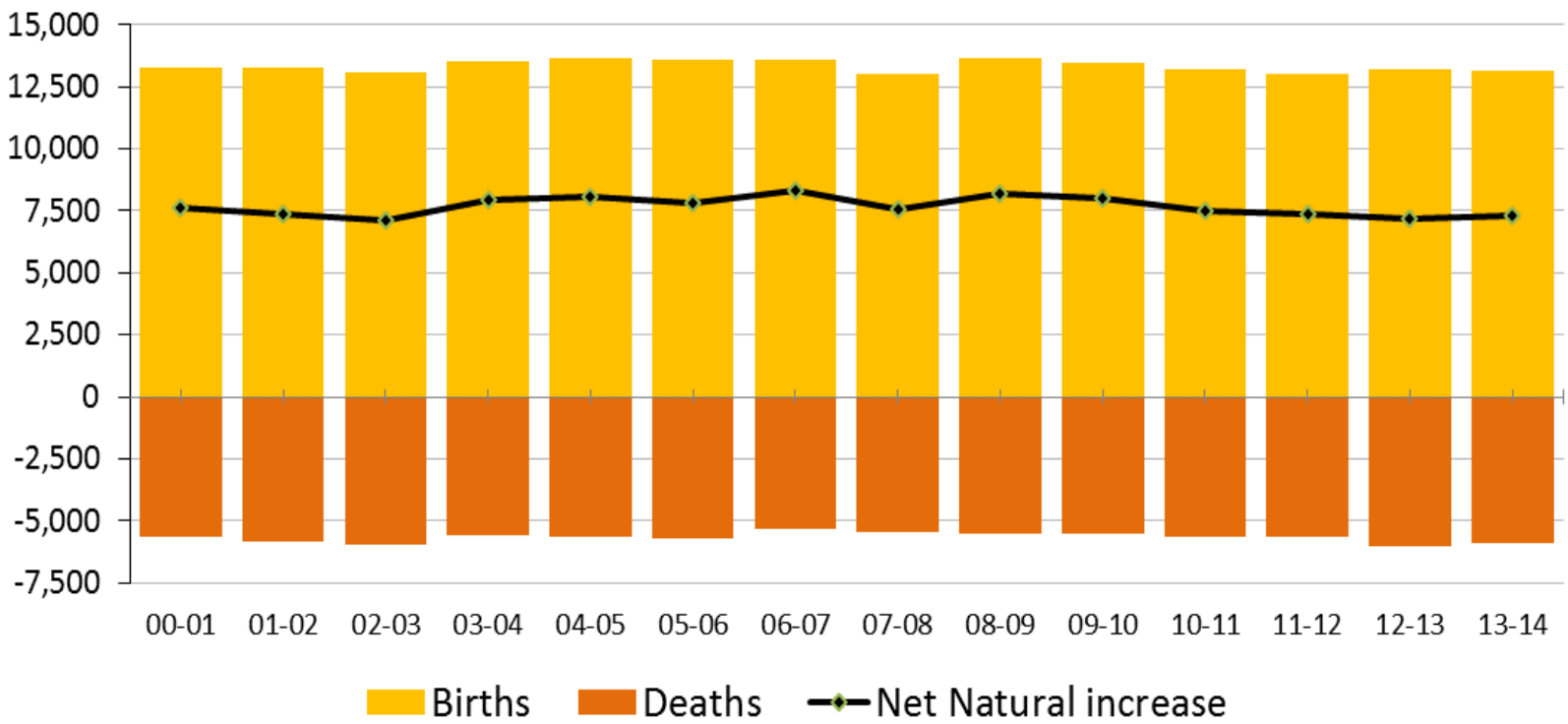
2020 to 2025						
Females		★			★	
AGE	NUMBER		AGE			FEMALES
INTERVALS (t)	IN 2020	SURV RATES	INTERVALS (t)	SURVIVORS	MIGRATION	POPULATION
		2020		2025	RATES	2025
			Add BIRTHS			
0-4	38,229	0.999080	0-4	34,333	2.35%	35,140
5-9	32,262	0.999495	5-9	33,199	-2.18%	32,474
10-14	34,537	0.998988	10-14	32,246	2.98%	33,207
15-19	30,956	0.998128	15-19	34,502	-6.87%	32,132
20-24	30,260	0.997476	20-24	30,898	-0.69%	30,686
25-29	38,478	0.996775	25-29	30,184	37.48%	41,497
30-34	37,784	0.995631	30-34	38,354	10.93%	42,545
35-39	38,137	0.993624	35-39	37,619	3.43%	38,908
40-44	36,708	0.989902	40-44	37,894	0.15%	37,950
45-49	37,552	0.984393	45-49	36,337	-0.05%	36,319
50-54	37,749	0.977735	50-54	36,966	-1.90%	36,262
55-59	38,174	0.967934	55-59	36,909	-4.00%	35,433
60-64	34,634	0.951412	60-64	36,950	-6.07%	34,706
65-69	28,820	0.924681	65-69	32,951	-5.25%	31,220
70-74	23,119	0.881485	70-74	26,650	-0.70%	26,463
75-79	15,949	0.809356	75-79	20,379	2.95%	20,980
80-84	10,593	0.690046	80-84	12,908	4.10%	13,438
85+	12,336	0.420138	85+	12,492	1.41%	12,668
TOTALS	551,277					572,027

Steps in Age Cohort-Component Model:

- Age cohorts by sex
- Apply survival rates
- “Age” survivors by 5 years
- Add births
- Apply migration rates
- Forecasts age by sex for next 5 years
- Repeat for 5-year increments until 2045

Natural Increase, Largest Component of Montgomery's Population Growth

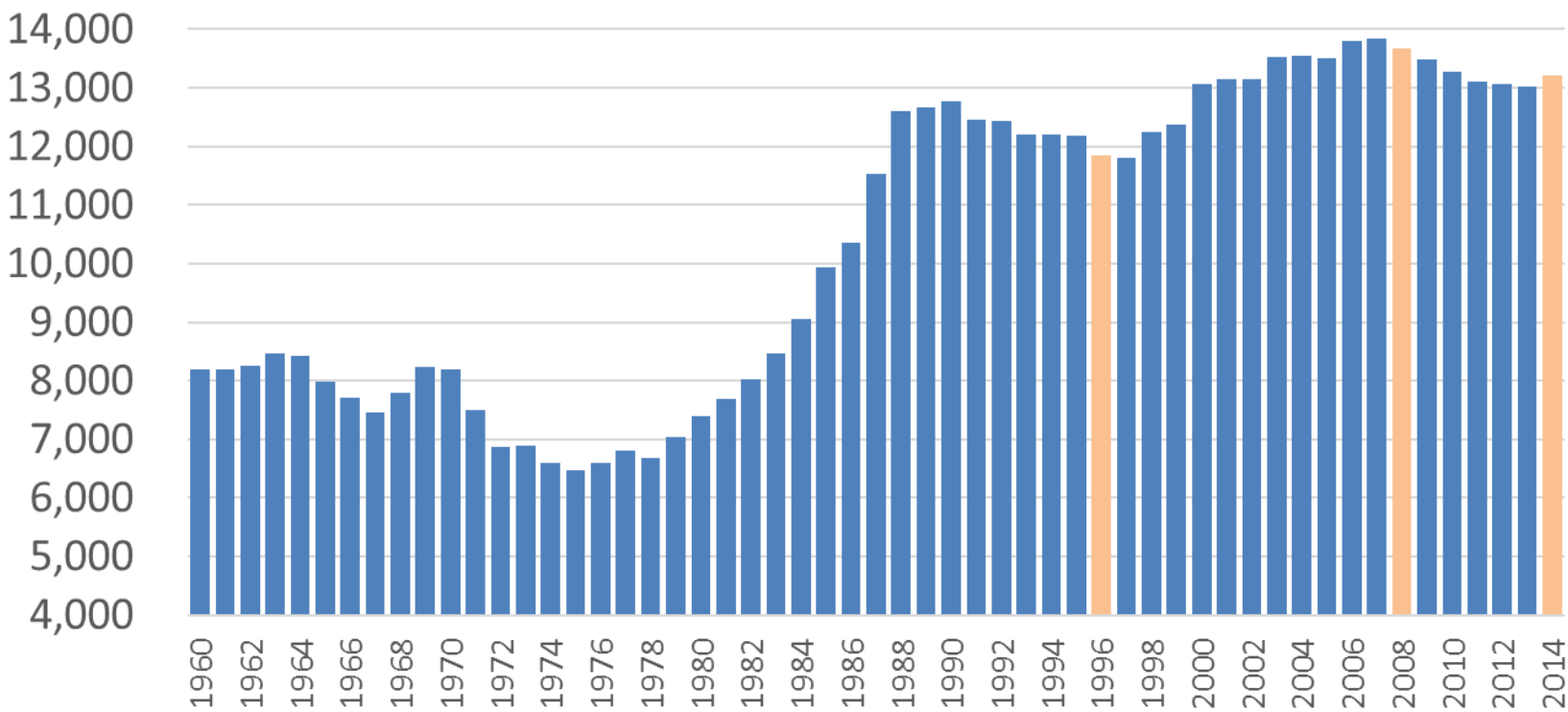
NATURAL INCREASE, Montgomery 2000-2014



Source: 2000-2014 Population Estimates Program, U.S. Census

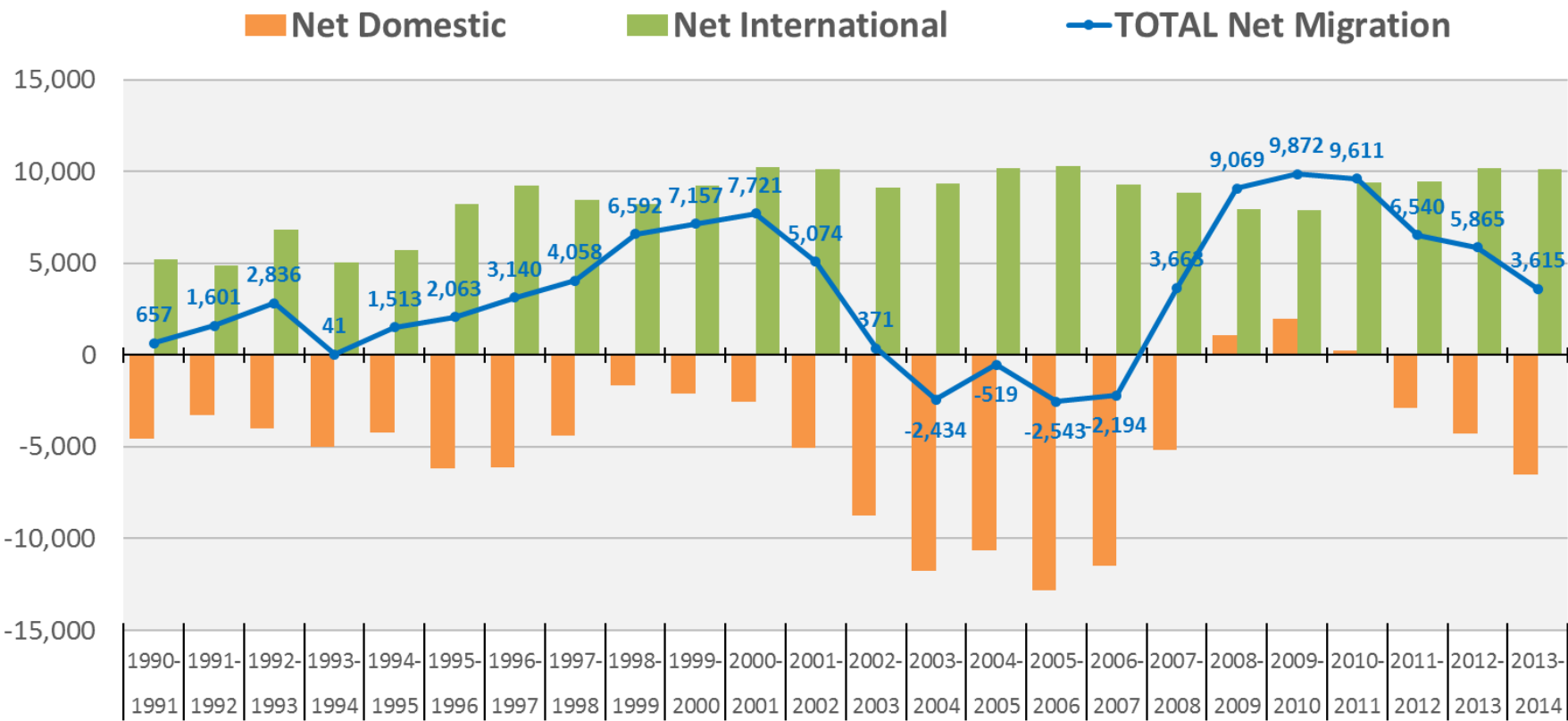
Historical Birth Trends in Montgomery County

NUMBER OF BIRTHS, Montgomery (1960-2014)



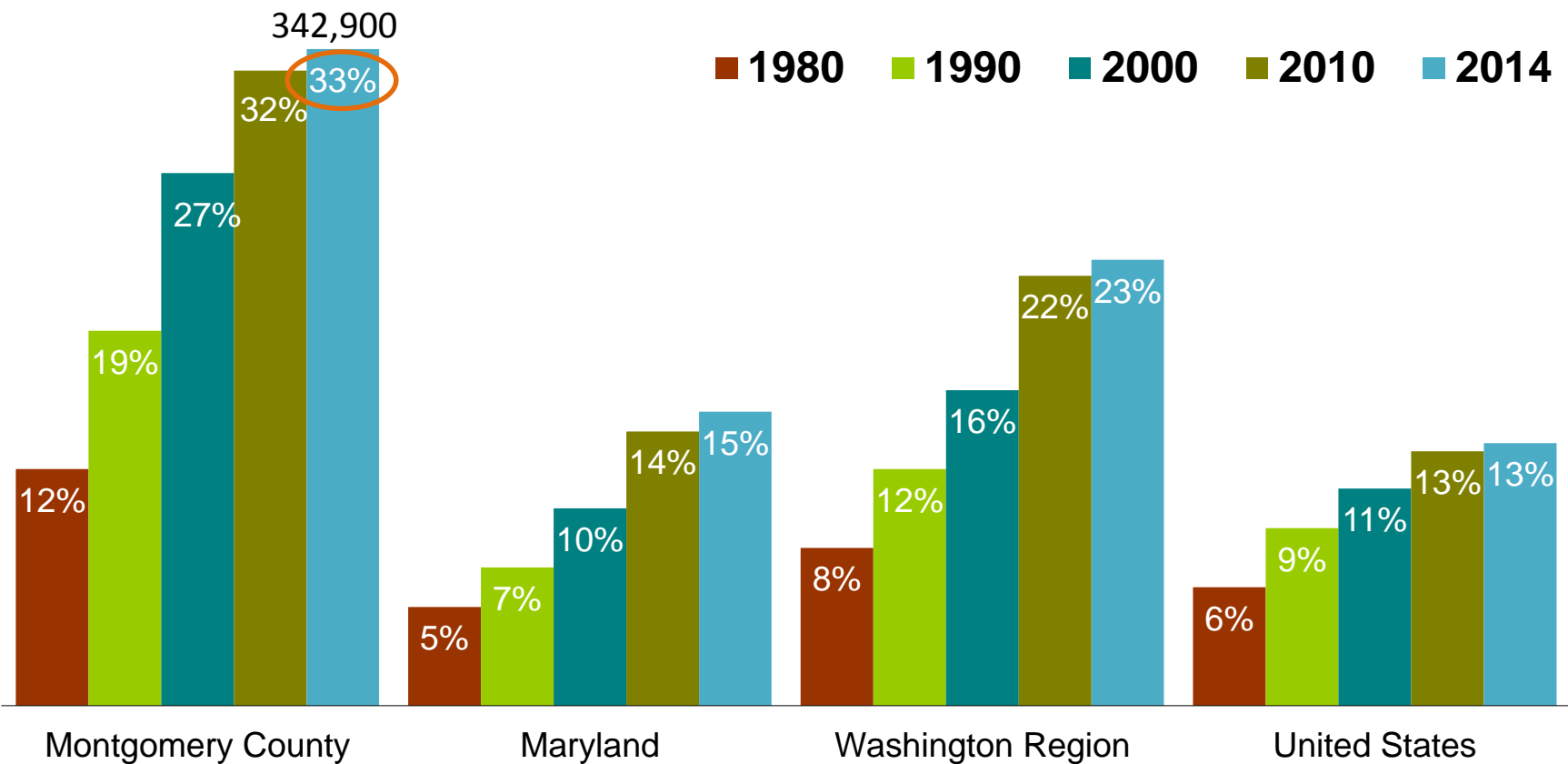
SOURCE: Vital Statistics Admin, MD Dept. of Health & Mental Hygiene

MONTGOMERY COUNTY POPULATION MIGRATION TRENDS 1990-2014



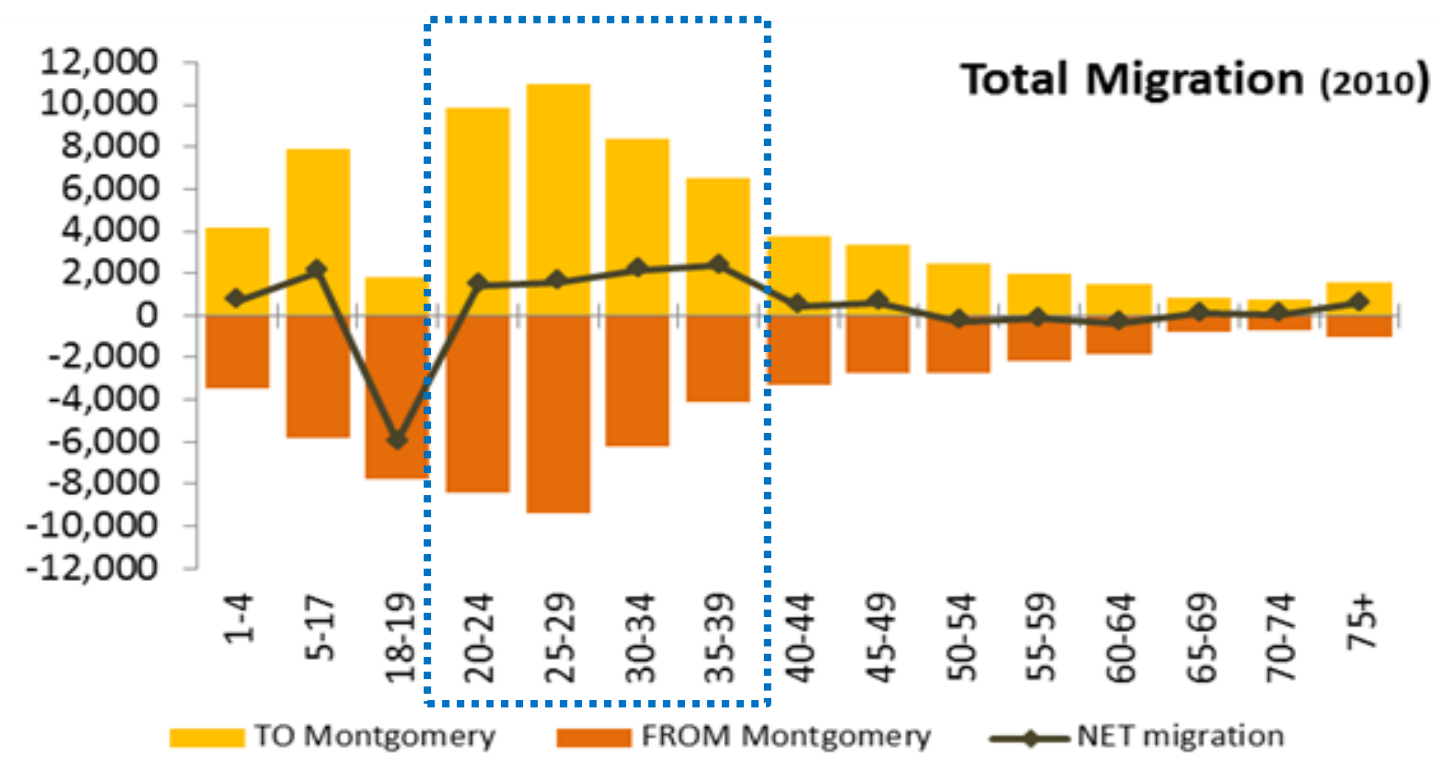
Source: U.S. Census Bureau Population Estimates Program, 1990-2014

Foreign born percent of population



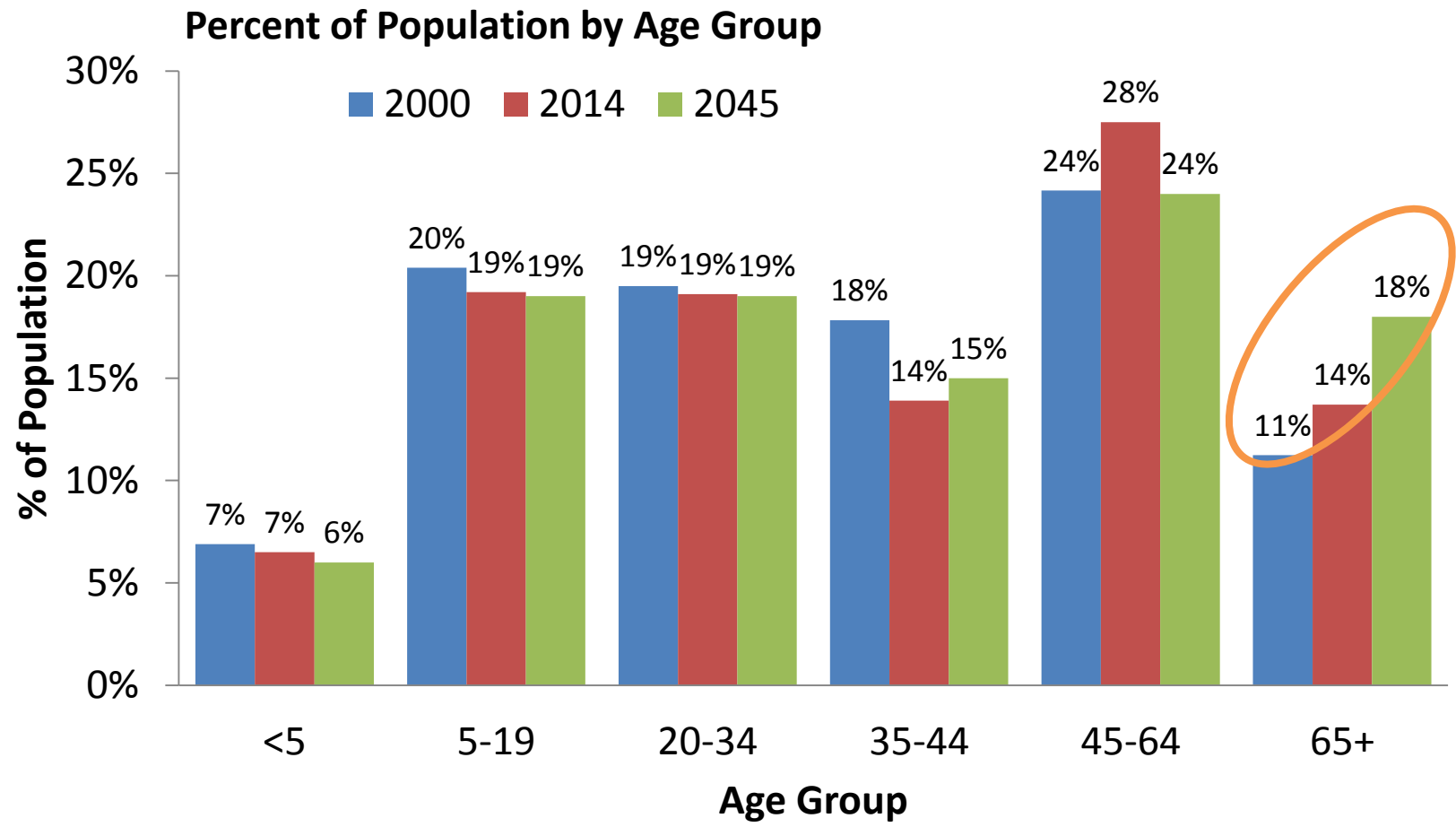
Source: 1980-2000 U.S. Census, 2010 & 2014 American Community Survey, 1 year estimate

Changing Mix of Residents More Dramatic than Growth



Source: 2006-2010 American Community Survey, County-to-County-Migration

Baby Boomers Drive Rise in Age 65+



Source: U.S. Census, 2000 Decennial Census; 2014 American Community Survey; draft Round 9.0 Forecast .

Draft Round 9.0 forecasts are subject to change.

HEADSHIP RATES by HOUSEHOLDER AGE 2015-2045

Households:

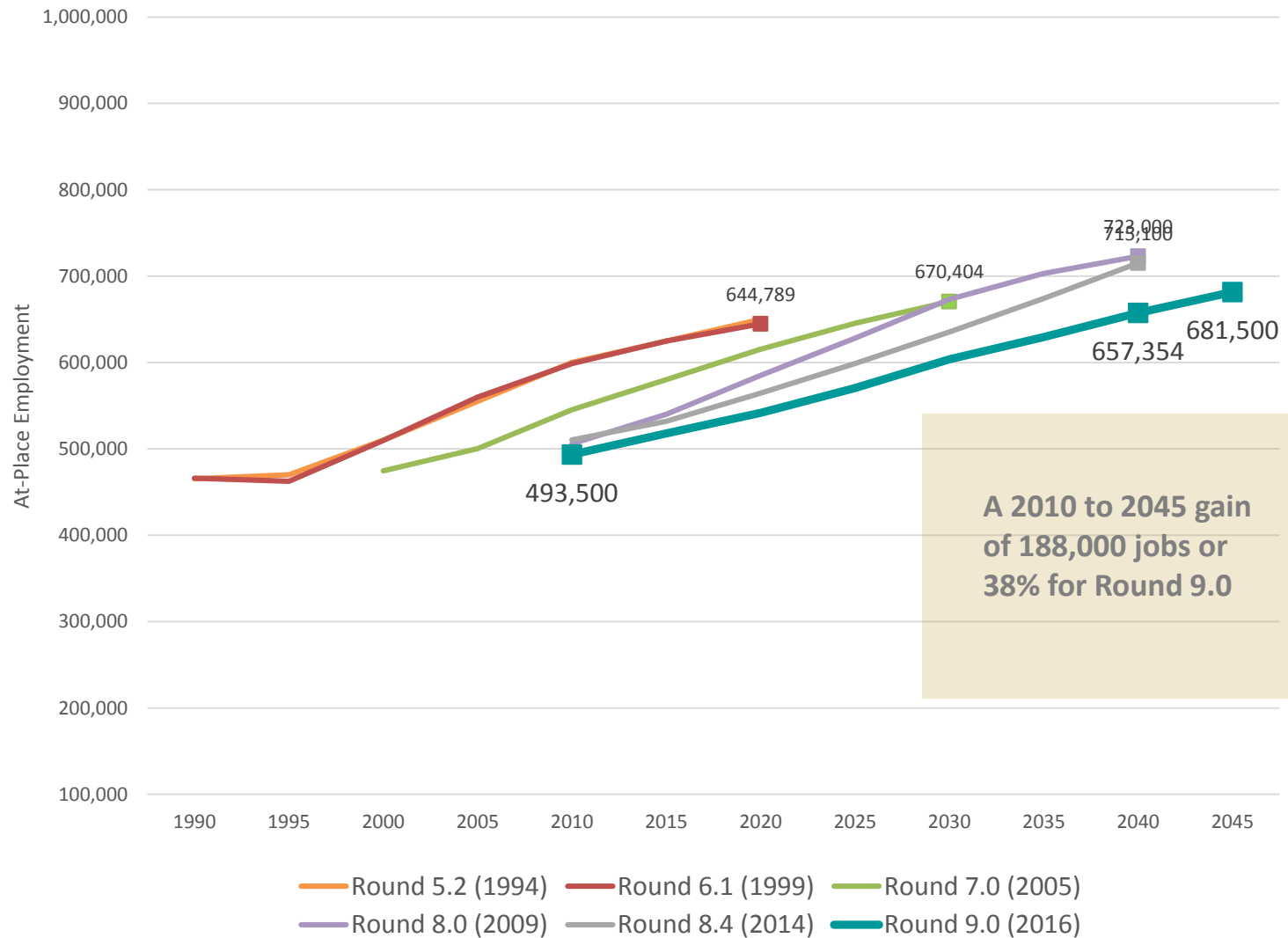
- Households are calculated by applying a “**headship rate**” to the household population by age. The “headship rate” is the percent of persons in an age group that are householders.
- The household forecast uses average headship rates from 2005 to 2014 from the U.S. Census Bureau’s American Community Survey.

Average Headship Rate 2005-2014

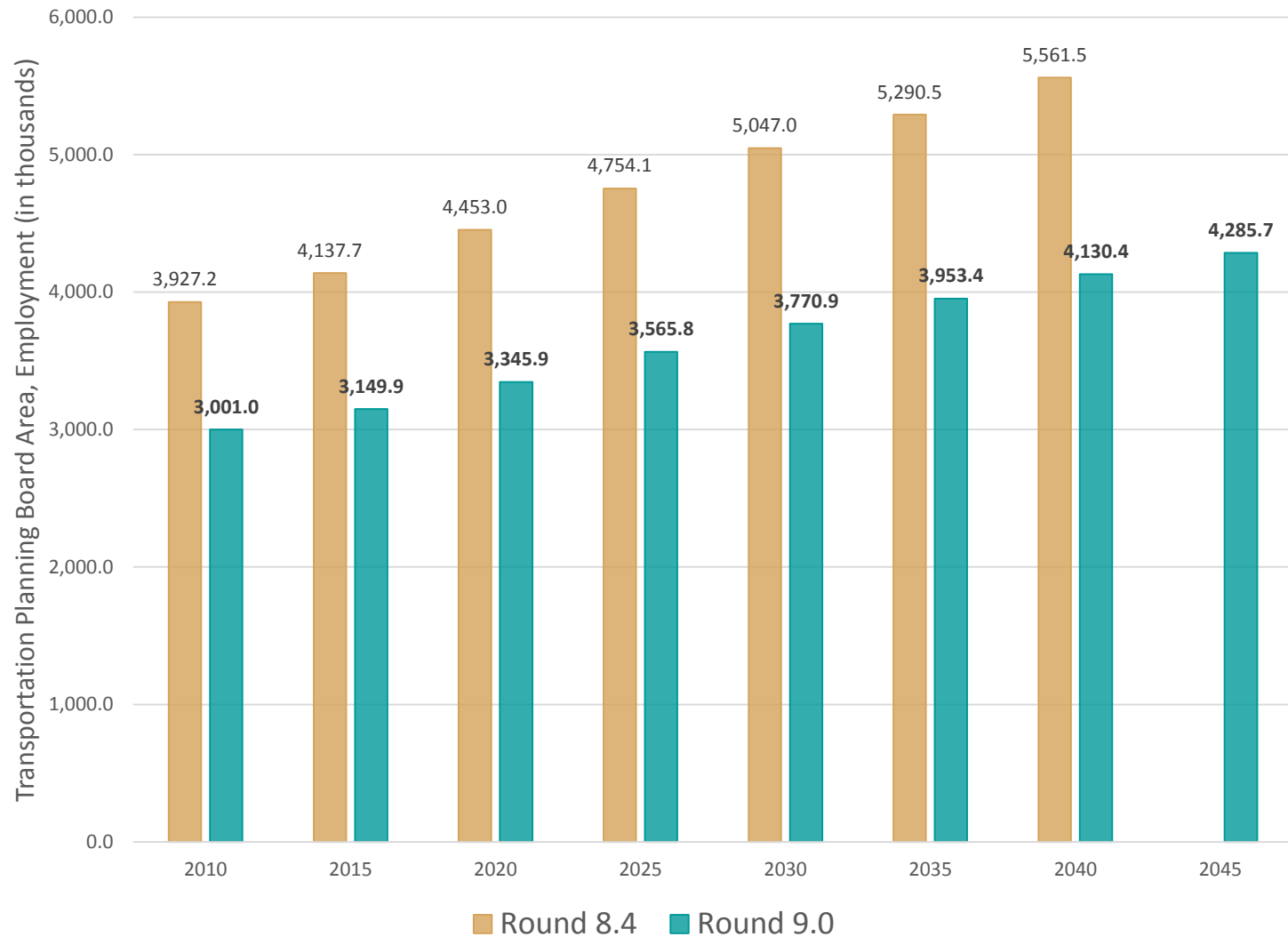
Age	Headship rate
15 to 24 years	0.068
25 to 34 years	0.405
35 to 44 years	0.507
45 to 54 years	0.557
55 to 64 years	0.567
65 to 74 years	0.581
75 and over	0.644

Employment Forecast

Employment Forecasts in Context, Montgomery County

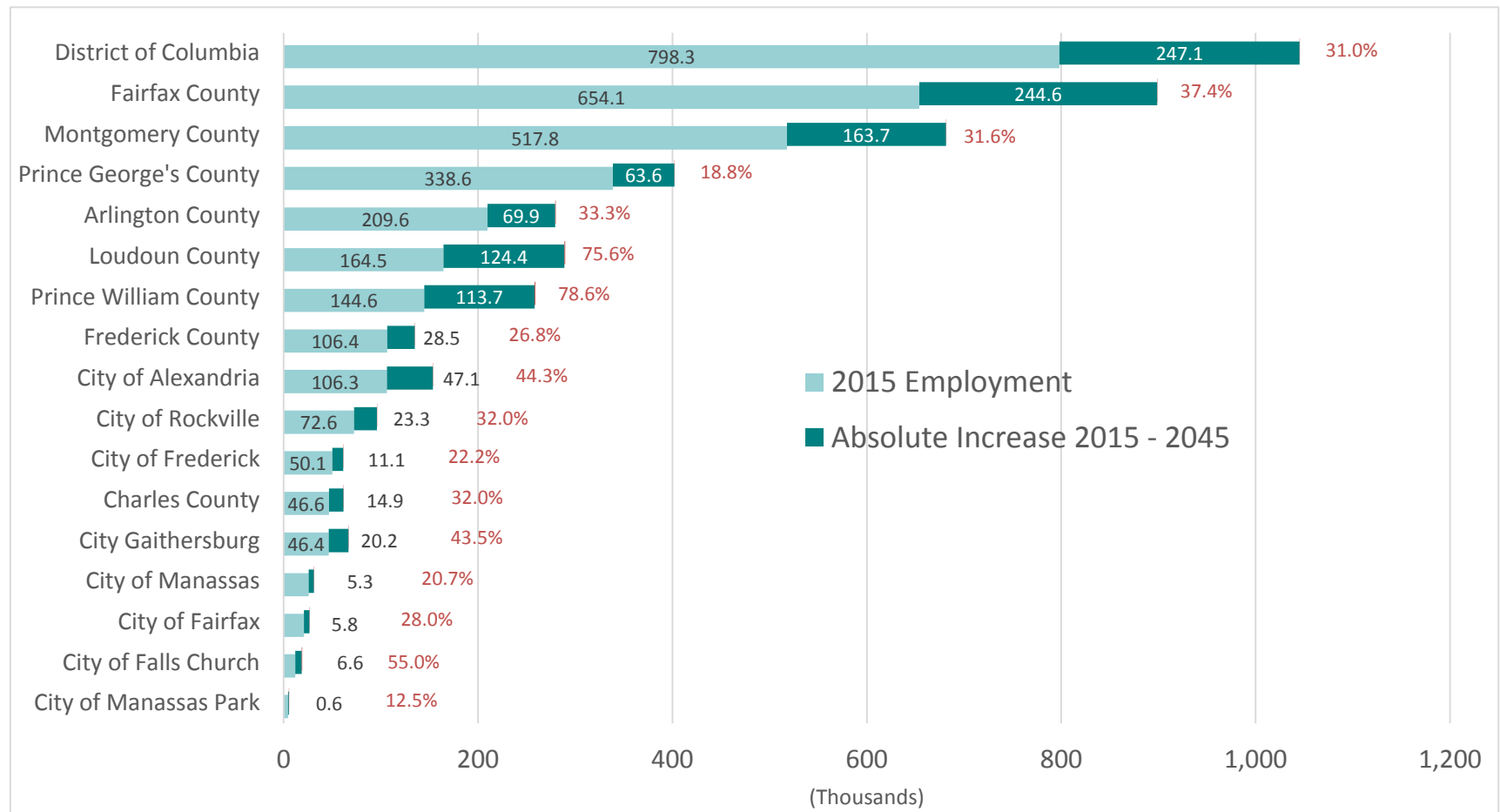


Employment Forecasts in Context, COG TPB Region



Round 9.0 Employment Forecasts by Jurisdiction

Employment 2015 - 2045

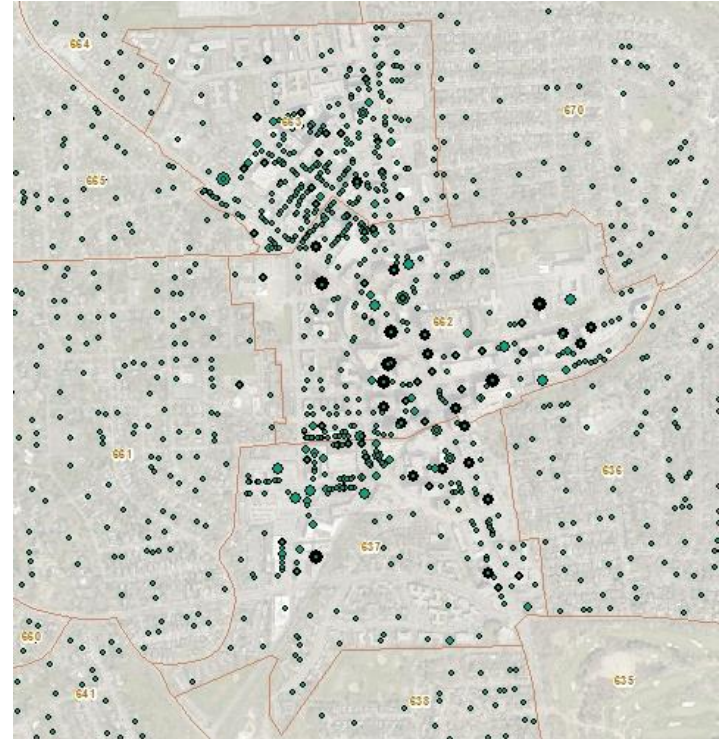


Source: MWCOG, "ROUND 9.0 COOPERATIVE FORECASTS OF FUTURE GROWTH", March 9, 2016.

Methodology, Montgomery County

Step 1: Calculate an employment “base” for 2010

- Quarterly Census of Employment and Wages (QCEW) at-place employment data from the US Bureau of Labor Statistics (BLS) and the Maryland Department of Labor, Licensing, and Regulation’s (DLLR) are used for a portion of the “2010” base.
- These jobs are covered by **Unemployment Insurance (UI)**.



Methodology, Montgomery County

Step 1: Calculate an employment “base” for 2010

Visualization of process to attain total employment:



*Note: This approach is tailored for jurisdictions where estimates from the Bureau of Labor Statistics (BLS) Quarterly Census of Employment and Wages (QCEW) are available. While the QCEW is published for independent cities in Virginia, **this data is not available for cities in Maryland**. These jurisdictions should work with their surrounding county and use other existing resources to develop baseline employment estimates.*

Methodology, Montgomery County

Step 1: Calculate an employment “base” for 2010

- Wage and salary jobs **not covered** by unemployment insurance:
 - a) Factor of 1.045 applied to “covered” employment to get total wage and salary jobs (covered + not covered employment).
 - b) 1.045 factor is unique to Montgomery County and was developed by MWCOG using BLS’ Current Employment Statistics (CES) and Quarterly Census of Employment and Wages (QCEW) data.
 - c) This category of workers includes persons employed by religious institutions, for example.
- The **Self-Employed**:
 - a) Factor of 1.06 applied to calculate the number of self-employed persons
 - b) 1.06 factor is unique to Montgomery County and was developed by MWCOG using the Census Bureau’s American Community Survey (ACS) Public Use Microdata Sample (PUMS) files.

Methodology, Montgomery County

Step 1: Calculate an employment “base” for 2010

- The **non-civilian military** employment :
 - a) Among sources, includes Department of Defense’s (DOD) “Base Structure Report: A Summary of the Real Property Inventory” reports that tabulates military personnel by base.



Methodology, Montgomery County

Step 2: Forecast Wage and Salary Jobs Covered by UI

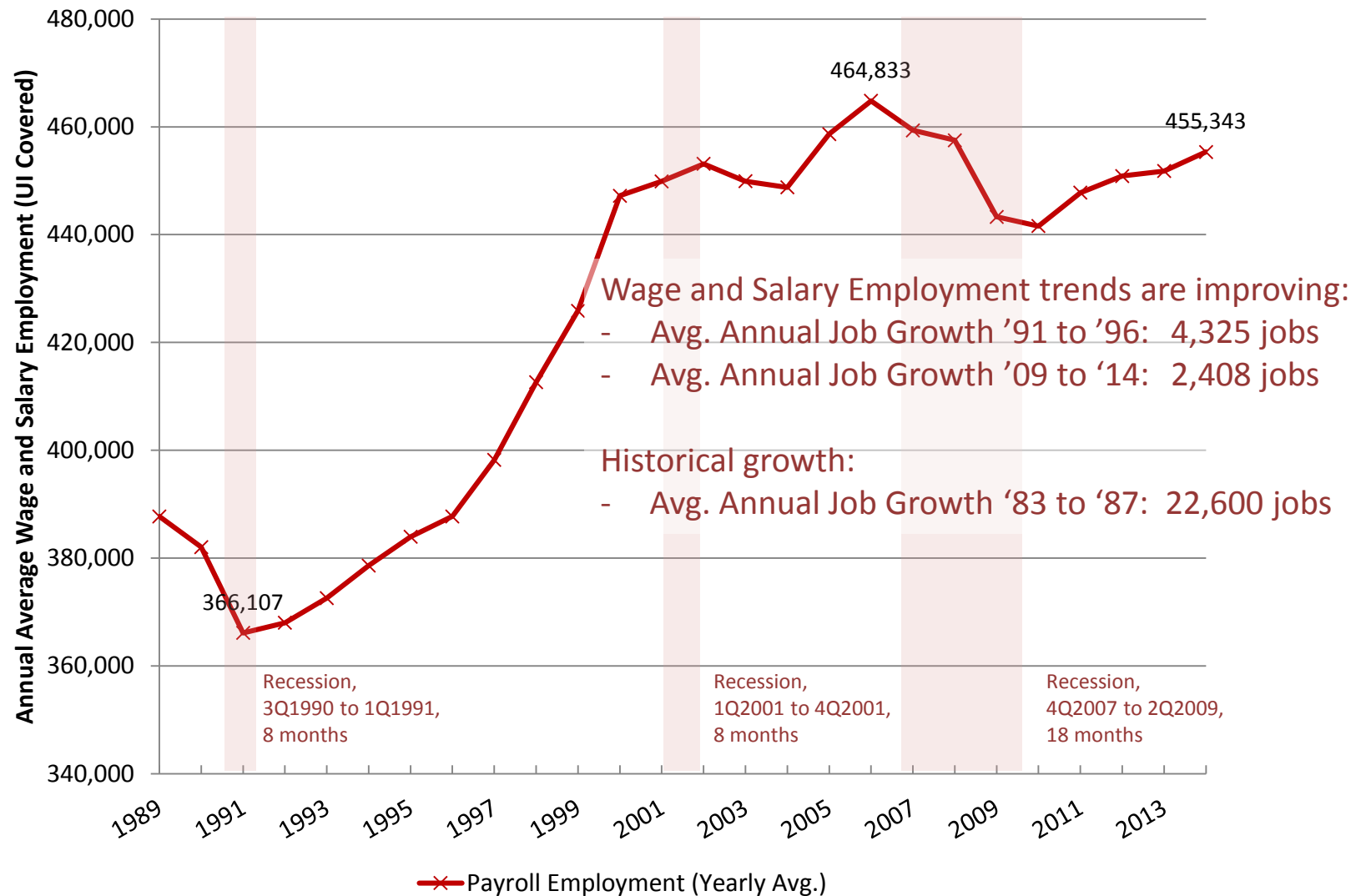
- The forecast of future wage and salary jobs covered by unemployment insurance (UI) is calculated using **shift-share analysis**
 - a) What is shift-share method:
 - i. The shift-share method assumes that a local employment industry's growth is affected by its own local industry trends, as well as by that industry's historical and expected regional or national dynamics.
 - ii. The shift-share method includes a "shift-term" that *"account[s] for [the] differences between local and reference region growth rates that cause an industry's employment to shift into or out of a region"* (Klosterman, "Community Analysis and Planning Techniques", 1990).

Methodology, Montgomery County

Step 2: Forecast Wage and Salary Jobs Covered by UI

- b) What assumptions and inputs were used in the **shift-share analysis**
 - i. Key assumption is that in the thirty-five year forecast horizon we will have cyclical booms and busts, but that none of these will be as exceptionally prolonged and as deep as the 2007 to 2009 recession.
 - ii. Inputs include employment estimates change by industry at the Montgomery County-level and Transportation Planning Board (TPB) regional-level from 1991 to 2000.
 - i. More recent employment data by industry that included the lead up to, and actual, 2007 to 2009 “great recession” were not used since this recession was assessed to be an anomaly.
 - ii. Inputs also include TPB regional industry forecasts from IHS Global Insight

Methodology, Montgomery County

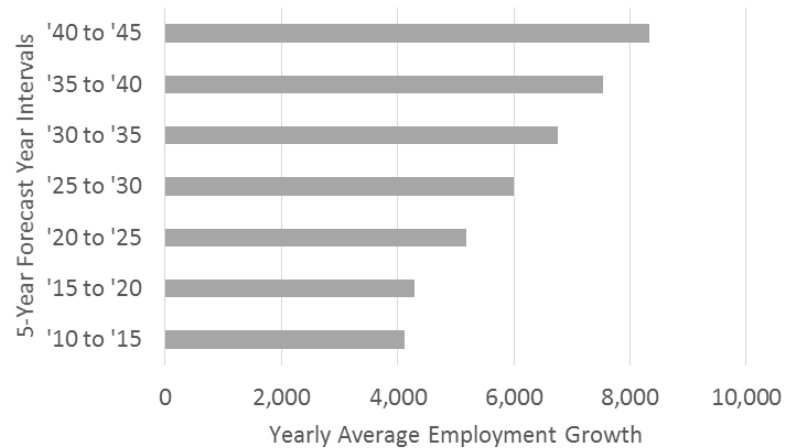


Source: Maryland Department of Labor, Licensing & Regulation. Tabulated by MNCPPC, Montgomery County Planning Department, Research & Special Projects Division.

Methodology, Montgomery County

Step 2: Forecast Wage and Salary Jobs Covered by UI

c) Wage and salary jobs **covered** by unemployment outputs:

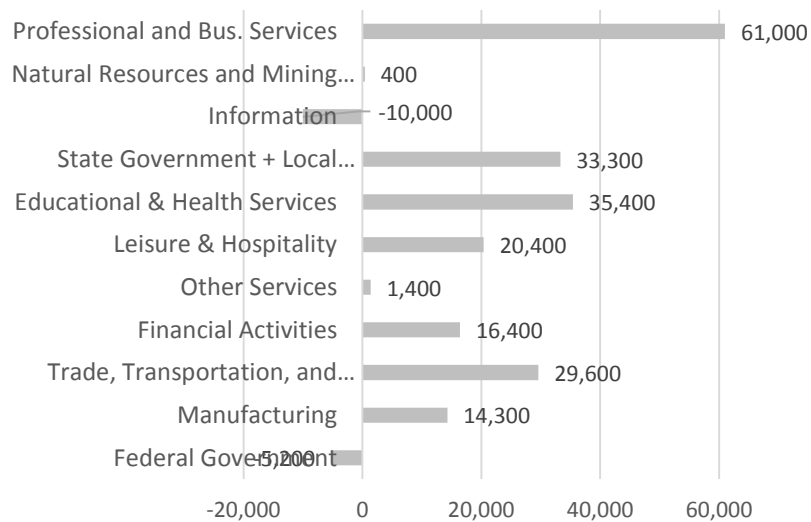


Methodology, Montgomery County

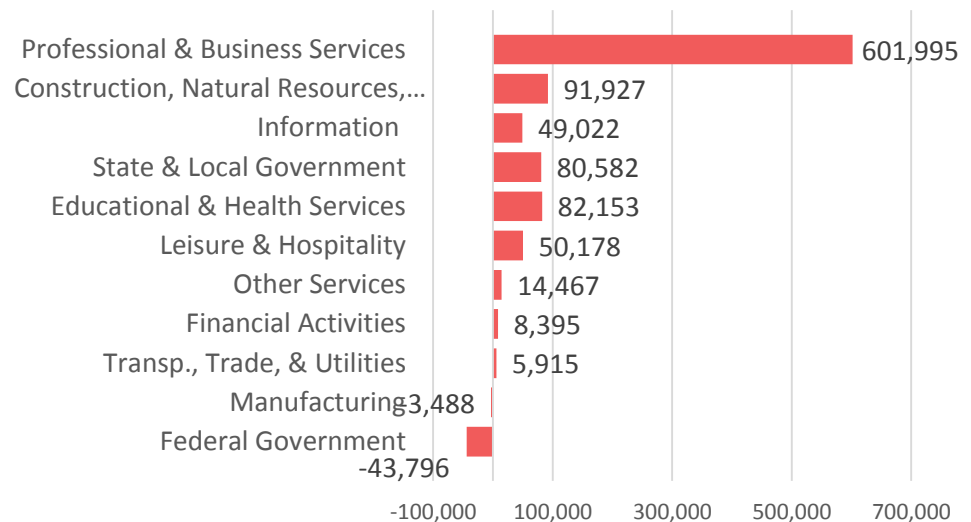
Step 2: Forecast Wage and Salary Jobs Covered by UI

c) Wage and salary jobs **covered** by unemployment outputs:

Employment Change by Sector 2015 – 2045,
Montgomery County



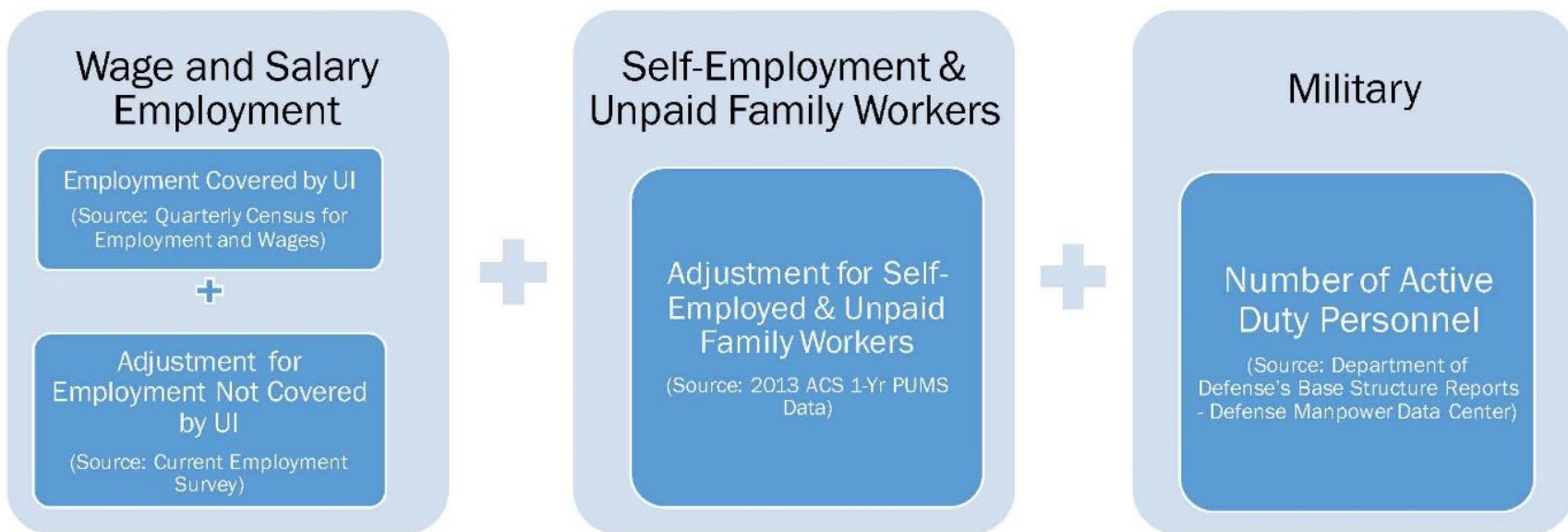
Employment Change by Sector 2015 – 2045,
COG / TPB Planning Area



Methodology, Montgomery County

Step 3: Calculate Non UI, Self-Employed, and Military for Future Years

Visualization of process to attain total employment:

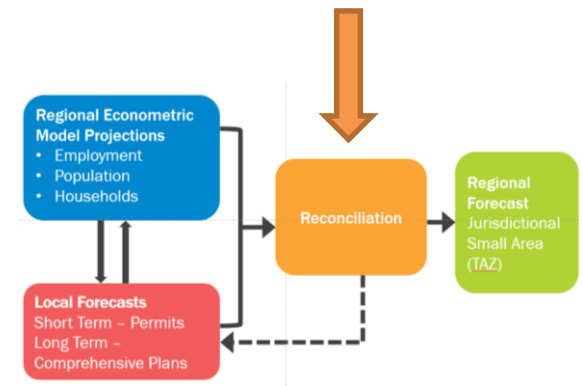
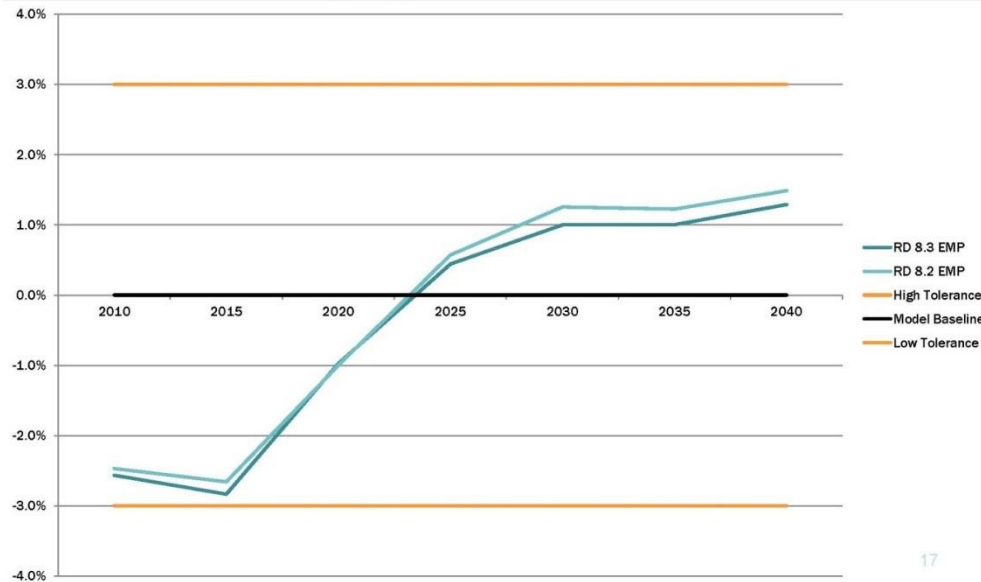


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Methodology, Montgomery County

Step 4: Reconciliation with MWCOG's Econometric Model

Comparison with Econometric Model Employment Forecasts

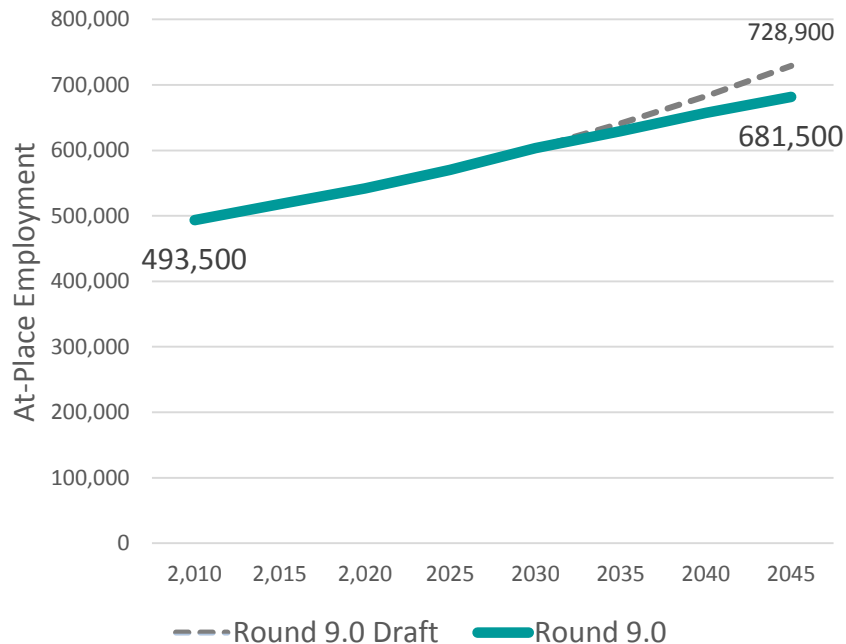


Source: MWCOG Department of Community Planning & Services, "Round 8.3 Cooperative Forecasts: Process and Review" presentation, January 17, 2014.

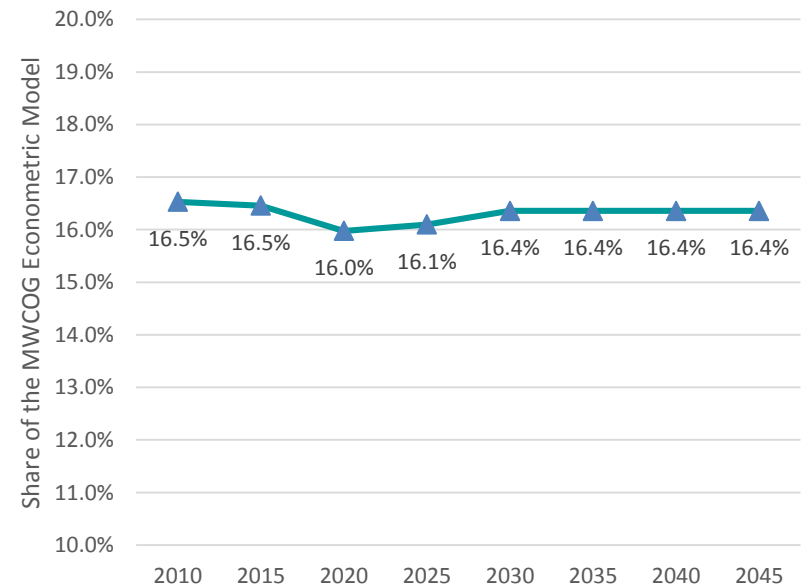
Methodology, Montgomery County

Step 4: Reconciliation with MWCOC's Econometric Model

Draft and submitted forecast



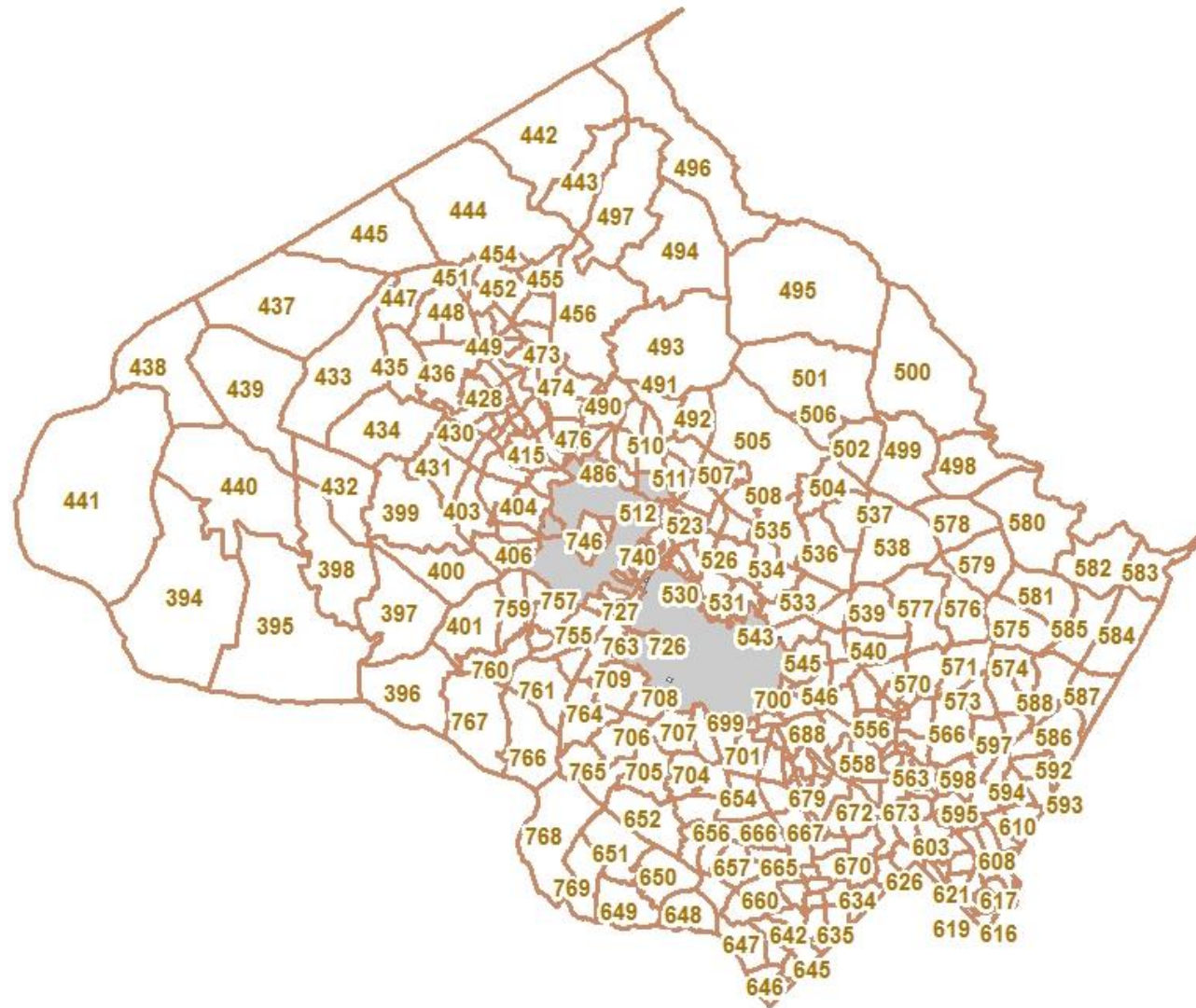
Montgomery County's share of Econometric Model



Allocation

Forecast Allocation of Households, Population, and Employment

- Allocation of Households, Population, and Employment are done at the Transportation Analysis Zone (TAZ) level.
- Planning performs allocations for 321 TAZs
- Rockville and Gaithersburg perform their own allocations



Forecast Allocation of Households, Population, and Employment

Key Assumptions and Elements Considered

Households and Population:

- Assumptions are made on the percent of housing units that are occupied and vacant.
- Likewise, assumptions are made on the average number of persons per occupied units.
- All new households are allocated to new housing

Employment:

- Assumptions are made on the percent of office, retail, and industrial space that is occupied and vacant.
- Not all office jobs allocated to new construction. Some jobs also allocated to existing vacant space.
- The self-employed are distributed among residential TAZs

Q & A