

# **Evaluating the Impact of Differential Privacy on the County Population Projections for Texas: Potential Impacts on Fertility and Migration Projections**

Public Workshop on the Demographic and Housing Characteristics Files

June 22, 2022





# The Texas Demographic Center

---

- **State Demographer: Dr. Lloyd B. Potter**
- **Affiliated with the University of Texas at San Antonio**
- **Major functions**
  - ❖ Required by Texas law to produce annual population estimates and **biennial population projections**
- **Estimates and projections of the programs are used by more than 500 entities per year. Some of the public agency users include:**
  - ❖ Governor's Office (for numerous purposes)
  - ❖ Legislative Budget Board (for budget planning)
  - ❖ Legislative Council (for redistricting planning)
  - ❖ Comptroller's Office (as a basis for their estimates for regions)
  - ❖ Texas Department of Transportation (for facility, route and highway construction planning)
  - ❖ Texas Water Development Board
  - ❖ Texas National Guard (to guide their recruiting efforts and estimate future manpower needs)
  - ❖ Texas Department of State Health Services (to increase accuracy of their service projections)
  - ❖ Texas Economic Development Council
  - ❖ Numerous other state agencies and public organizations
  - ❖ Numerous County Judges and Other local officials (for redistricting and other purposes)



# The Texas Demographic Center Population Projections

---

- **TDC produces biennial projections of the population of the STATE and all the 254 COUNTIES in the state by**
  - ❖ Single year of age
  - ❖ Race/Ethnicity: NH White, NH Black, Hispanics, NH Asian (recently added), NH Other
  - ❖ Sex
  
- **Use the most recent Decennial Census as the base population and projected out for 40 years**
  
- **The Cohort Component Model**
  - ❖  $Population_{(t+k)} = Population_t + Natrual\ Increase_t (Births_t - Deaths_t) + Net\ Migrants_t (In-mig_t - Out-mig_t)$
  - ❖ *The components of population change (fertility, mortality, and net migration) are projected separately for each birth cohort (persons born in a given year)*



## Project Fertility

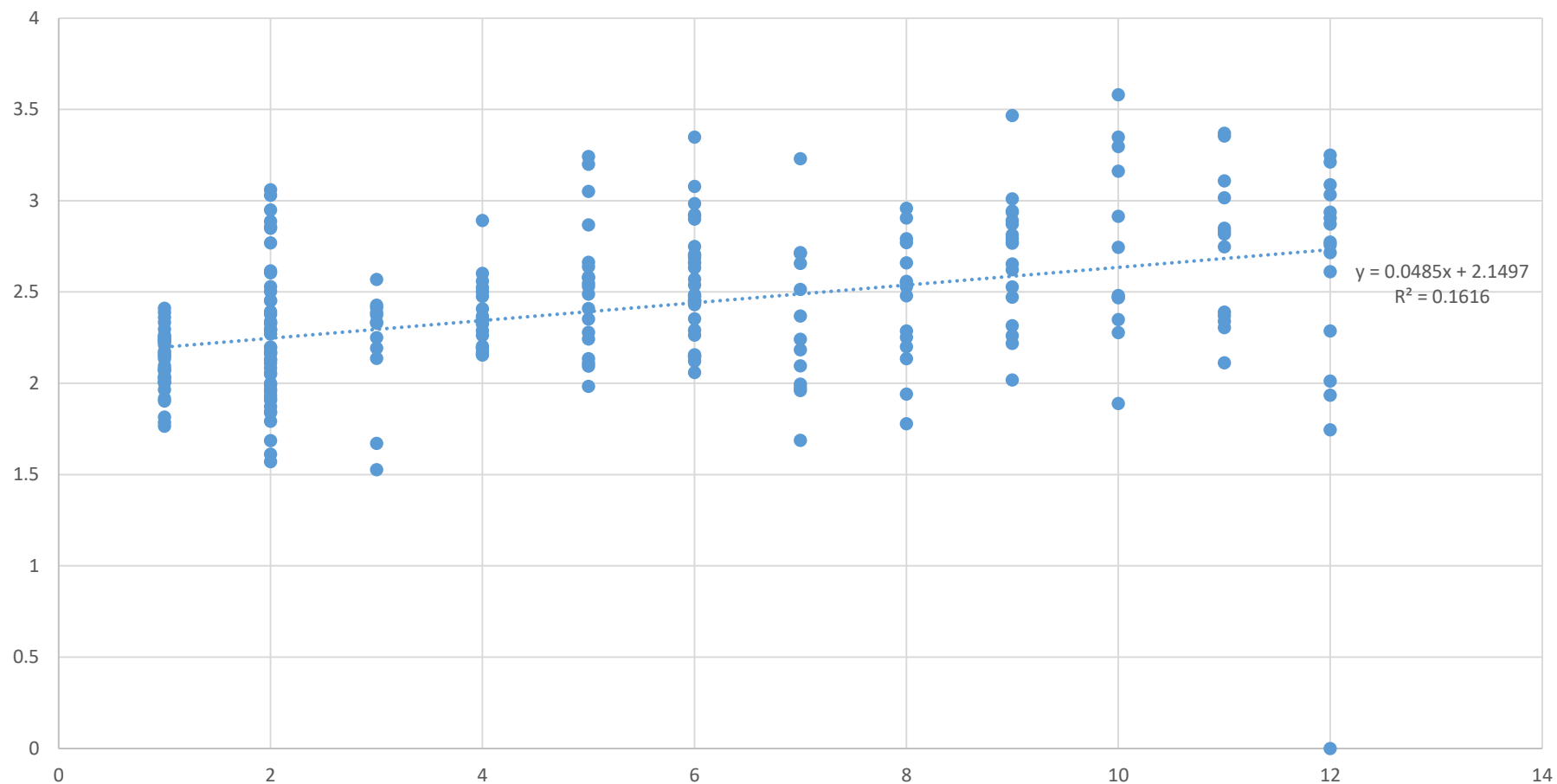
---

- Use the most recent Decennial Census as the base population and birth data from the Texas Department of State Health data to calculate ASFR for the 5 race/ethnic groups.
- Set a target Total Fertility Rate in the future and trend the fertility during the projection period toward the target.
- Group counties based on the size and the similarity. Our analyses suggested that TFRs and ASFRs differ by rurality and race/ethnicity



## TFR and ASFR differ by county rurality

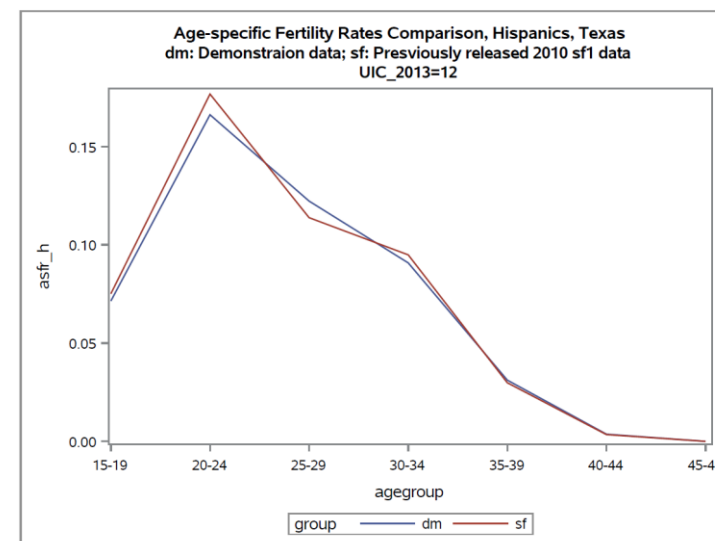
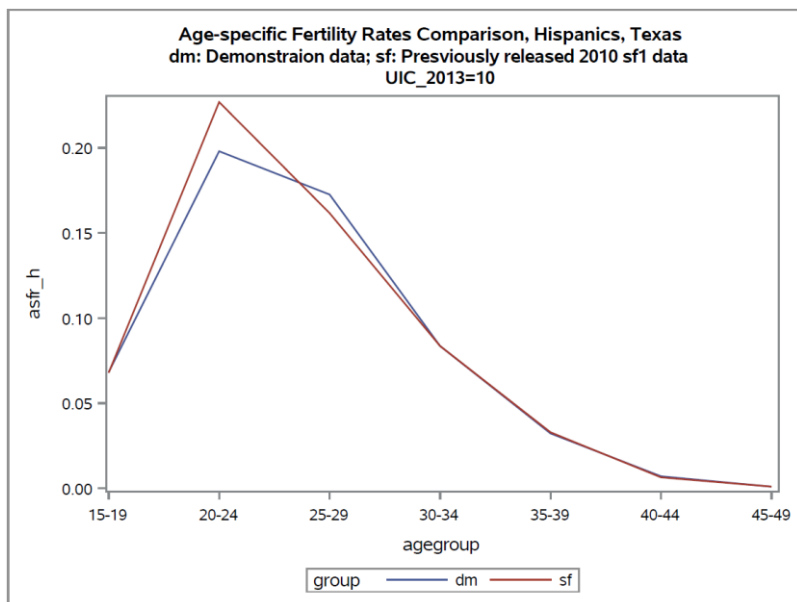
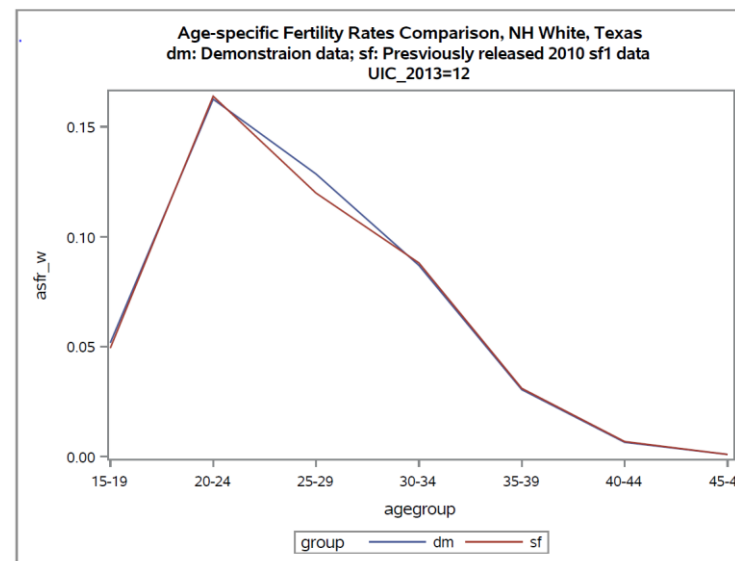
Total Fertility Rate by Urban\_Influence Code, Texas counties, 2010





# ASFR Comparisons between SF and Demonstration data Base

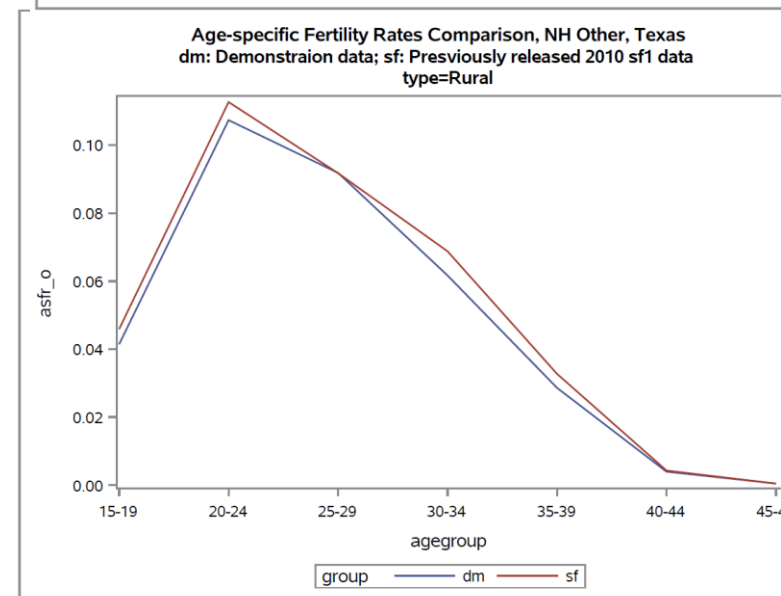
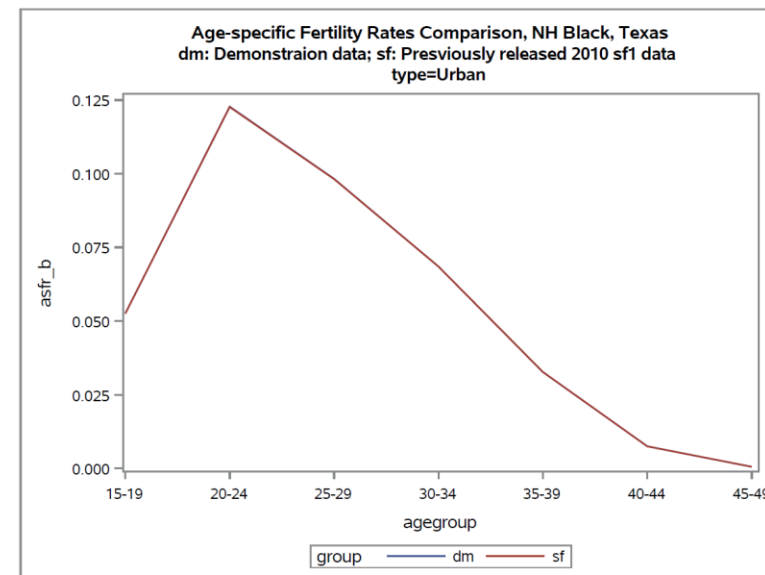
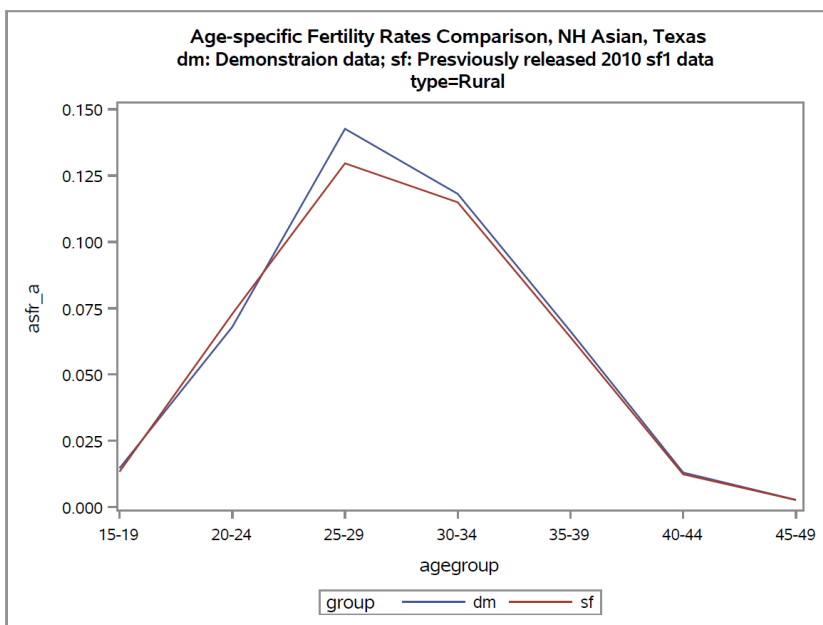
Counties are grouped by the 12 groups based on the Urban Influence Code (UIC\_2013) to calculate Age-specific fertility rates for NH White and Hispanics





# ASFR Comparisons between SF and Demonstration data Base

Counties are grouped into **Rural (219)** and **Urban (35)** to calculate Age-specific fertility rates for NH Black, NH Asian and NH Other





## Another concern: the relationship variable

We matched mother and child in the PUMS data and use these distributions to reallocate race/ethnicity to the newborn based on the mother's race/ethnicity

- **Child's (under 17) Race by Mother's Race, 2000 IPUMS**

Mom/Child	ChdWhite	ChdBlack	ChdHispanic	ChdAsian	ChdOther
White	92.8%	0.6%	4.8%	0.3%	1.6%
Black	0.3%	97.8%	0.9%	0.0%	1.0%
Hispanic	2.3%	0.3%	97.3%	0.0%	0.1%
Asian	2.4%	1.6%	3.2%	83.6%	9.2%
Other	29.5%	0.8%	15.2%	1.9%	52.6%

- **Child's (under 17) Race by Mother's Race, 2010 IPUMS**

Mom/Child	ChdWhite	ChdBlack	ChdHispanic	ChdAsian	ChdOther
White	87.6%	0.9%	8.4%	0.3%	2.9%
Black	0.2%	96.3%	1.7%	0.0%	1.7%
Hispanic	2.2%	0.4%	97.1%	0.0%	0.3%
Asian	1.7%	0.2%	1.9%	87.4%	8.8%
Other	12.5%	7.3%	14.2%	1.9%	64.2%





# Difference of Demonstration Data from SF as a Percentage of Net Migrants 2000-2010, by County and 5-year Age Group

Category	All Race	NHW Male	NHB Male	Hispanic Male	Other Male	NHW Female	NHB Female	Hispanic Female	NH Other Female
Change Direction	4%	4%	11%	10%	19%	5%	12%	11%	19%
Abs% > =100%	3%	5%	18%	12%	17%	5%	19%	12%	18%
Abs% >= 50%	6%	8%	12%	13%	20%	7%	13%	13%	18%
Abs%>=5%	46%	38%	24%	23%	17%	38%	22%	22%	17%
Abs%<5%	41%	44%	34%	42%	27%	45%	34%	42%	28%
Total	4,549	4,499	3,728	4,384	3,914	4,497	3,623	4,361	3,947

SOURCE: Texas Department of State Health Services, Births and Deaths 2000-2010; Census Bureau, 2010 Decennial Census Summary File 1; U.S Census Bureau, Demonstration Data for the 2020 Census Demographic and Housing Characteristics File, 2022-03-22



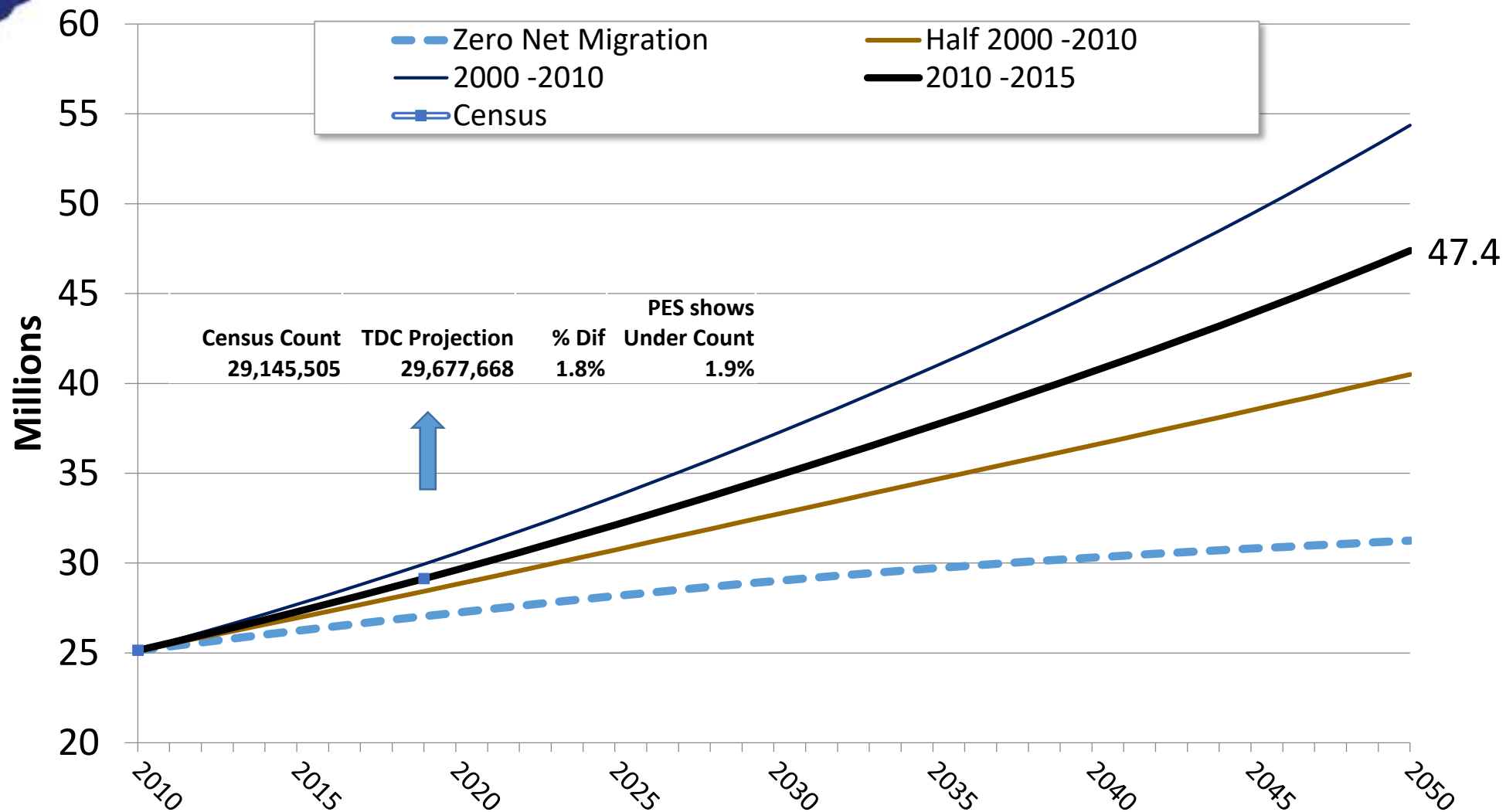
# Difference of Demonstration Data from SF as a Percentage of Net Migrants 2000-2010, by County and Three Big Age Groups (<20, 20-64, 65+)

Category	All Race	NH		Hispanic	Other	NH		Hispanic	Other
		Male	Female			Male	Female		
<b>Change Direction</b>	0%	3%	11%	6%	16%	3%	9%	7%	16%
<b>Abs% &gt;=100%</b>	1%	3%	12%	6%	13%	4%	12%	8%	12%
<b>Abs% &gt;= 50%</b>	2%	6%	14%	8%	17%	6%	13%	9%	16%
<b>Abs%&gt;=5%</b>	68%	46%	23%	35%	16%	47%	21%	32%	16%
<b>Abs%&lt;5%</b>	30%	42%	39%	44%	37%	41%	44%	45%	40%
<b>Number of County*Age Group</b>	759	761	699	750	729	760	706	748	728

SOURCE: Texas Department of State Health Services, Births and Deaths 2000-2010; Census Bureau, 2010 Decennial Census Summary File 1; U.S Census Bureau, Demonstration Data for the 2020 Census Demographic and Housing Characteristics File, 2022-03-22



## Projected Population Growth in Texas, 2010-2050





---

Helen You, Ph.D.



(210) 458-6530



TDC@UTSA.edu



Demographics.Texas.gov



@TexasDemography

---

TEXAS   
DEMOGRAPHIC CENTER