

Missouri Population Estimates in the Coming Decade

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Federal-State Cooperative Program for
Population Estimates

Session Topics

- Comparison of year 2000 population estimates and Census 2000 counts
- Plans for annual estimates this decade

Population Estimates Products

- National population estimates
 - Annual by age, sex, race, Hispanic origin
- State population estimates
 - Annual by age, sex, race, Hispanic origin
- County population estimates
 - Annual by age, sex, race, Hispanic origin
- Subcounty population estimates
 - Annual total population for 40,000+ functioning governmental units

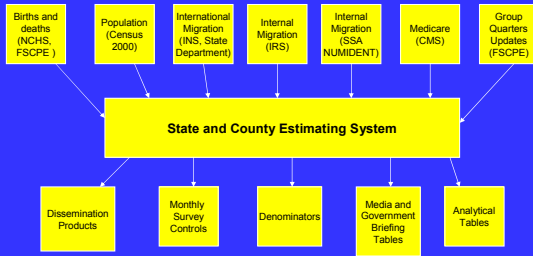
Uses of Population Estimates

- Allocation of \$200 billion in federal funds annually
- Controls for federal surveys
 - Current Population Survey
 - American Community Survey
- Denominators for statistical rates
 - Birth and death rates
 - Per capita income
- Planning locations of public and private services

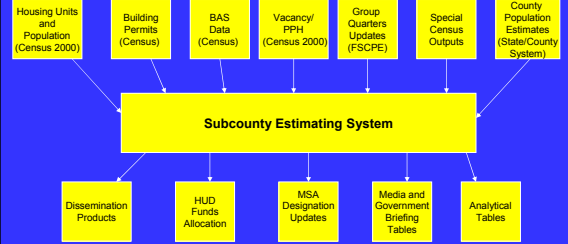
Population Estimates Methodology

- National, state and county levels
Component method:
 $P_2 = P_1 + B - D + NM$
- Subcounty level
Distributive housing unit method:
County populations distributed to subcounty parts based on updated estimates of housing units

State / County Method



Subcounty Distributive Housing Method



Evaluation of 2000 Population Estimates

- Differences from census
- Geographic and characteristic patterns
- Estimates vs. 1990 Census and other extrapolations

April 2000 Estimates

- Derived from vintage July 2000 estimate
- April estimate interpolated between July 1999 and July 2000 estimates

National Comparison

- Estimate: 274.6 Million
- Census: 281.4 Million
- Numeric Difference: 6.8 Million
- Percent Difference: 2.4 Percent

Missouri Comparison

- Estimate: 5,500,607
- Census: 5,595,211
- Numeric Difference: 94,604
- Percent Difference: 1.7 Percent

County Estimates Comparison

Measures of Error: MAPE

- Mean Absolute Percent Error
- Does not account for size of county or direction of error.

$$\text{MAPE} = 100\% * \frac{1}{n} \sum_{i=1}^n \frac{|E_i - A_i|}{A_i}$$

Measures of Error: MALPE

- Mean Algebraic Percent Error
- Shows direction of error

$$\text{MALPE} = 100\% * \frac{1}{n} \sum_{i=1}^n \frac{E_i - A_i}{A_i}$$

MAPE and MALPE, 2000 vs. 1990 (All U.S. counties)

	<u>2000</u>	<u>1990</u>
MAPE	3.3%	3.6%
MALPE	-1.6%	1.8%

U.S. Regional MAPEs

- West 4.4%
- South 3.8%
- Midwest 2.5%
- Northeast 2.3%

- U.S. 3.3%

Missouri County MAPE = 3.0%

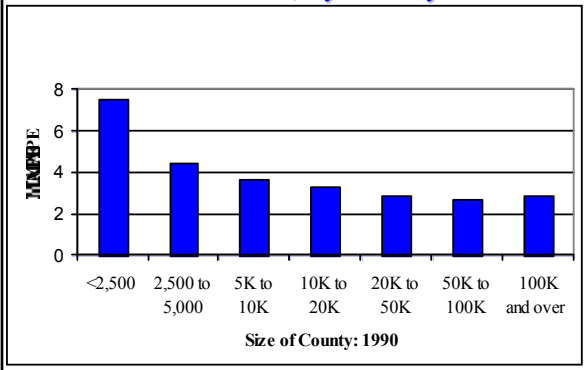
Smallest and Largest MAPEs

Smallest		Largest	
Ohio	1.6%	Hawaii	15.4%
Iowa	1.8%	Nevada	8.2%
Maryland	1.9%	Arizona	7.3%
Pennsylvania	2.0%	Colorado	5.8%
Illinois	2.0%	Florida	5.7%

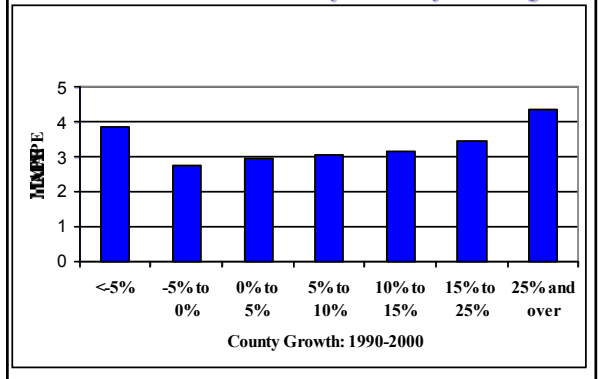
Direction of Differences

	Counties	Average Population
Estimate < Census	2,113	108,012
Estimate = Census	3	11,944
Estimate > Census	1,025	51,860

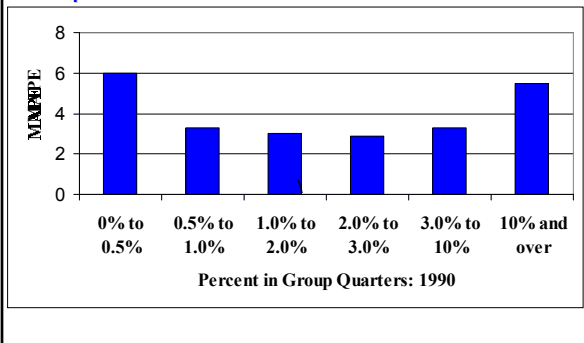
Estimates vs. Census, by County Size



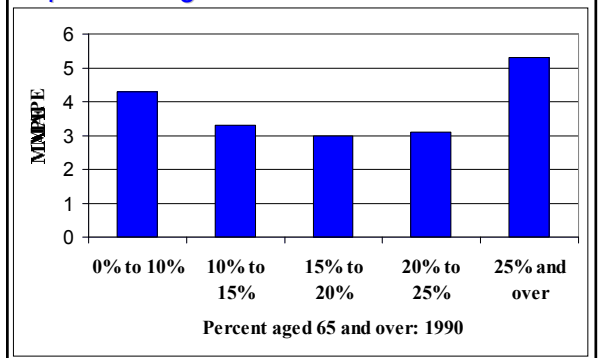
Estimates vs. Census, by County Change



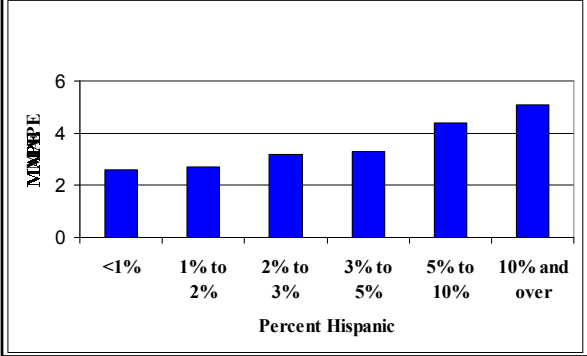
Estimates vs. Census, by Percent Group Quarters



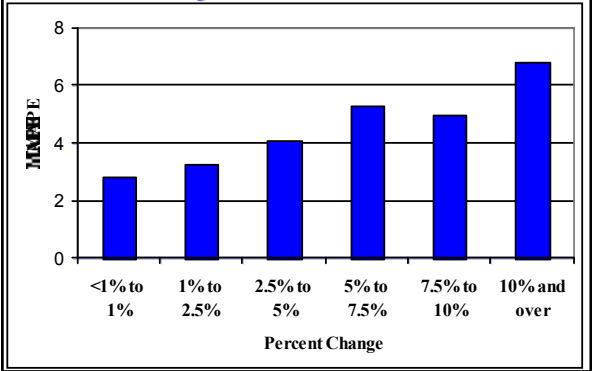
Estimates vs. Census, by Percent of Population Age 65 and Older



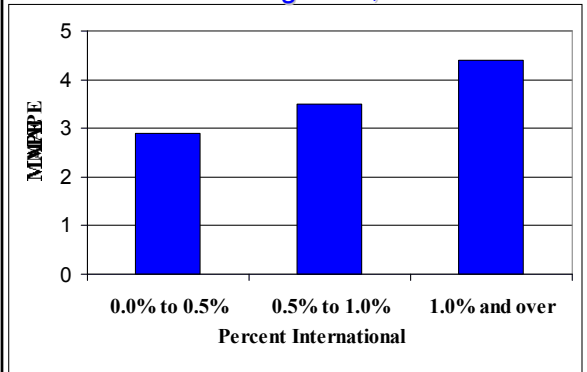
Estimates vs. Census, by Percent Hispanic



Estimates vs. Census, by Hispanic Percent Change



Estimates vs. Census, by % of Population from International Migration, Counties



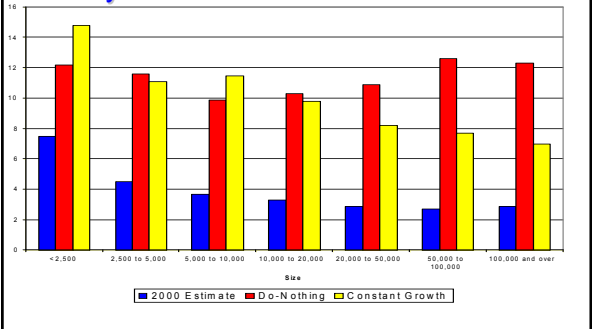
Alternate Methods

- Do nothing: Use 1990 Census number as 2000 estimate
- Constant growth: Assume growth rate between 1990 and 2000 is same as between 1980 and 1990 and apply that growth rate to 1990 census to obtain 2000 estimate

Overall MAPEs for All Methods

- 2000 estimates: 3.3%
- Do nothing: 11.1%
- Constant growth: 9.2%

MAPE of Different Methods, by County Size



Conclusions

- 1990s county estimates are slightly better than those from the 1980s.
- Typical patterns are exhibited for size and growth groups.
- "Real" estimate does better than simple substitutes.
- More research is needed into county characteristics and error.

Subcounty Estimates Comparison

Background

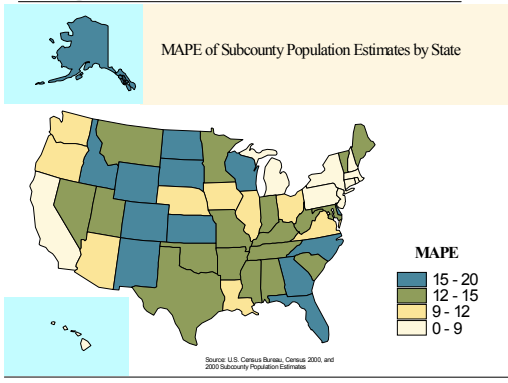
- Estimates produced for 40,630 cities, towns, villages, and township governments
- Estimates produced for years 1992, 1994, 1996, 1998, 1999
- Distributive housing unit method replaced administrative records method in 1996

Accuracy of 2000 Estimates

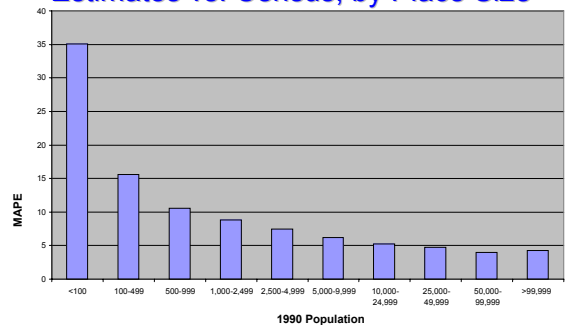
(All U.S. place and township governments)

- MAPE = 12.4% (2.8% points lower than 1980)
- 50% of errors were positive
- MALPE = 3.4%

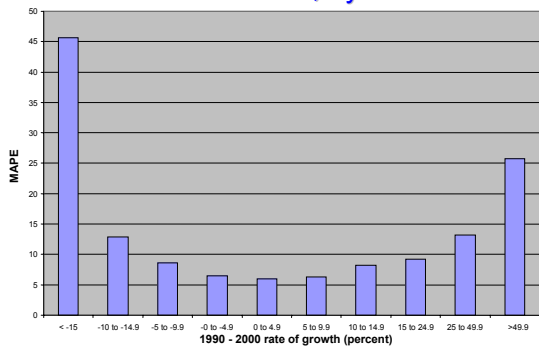
Geographic Differences



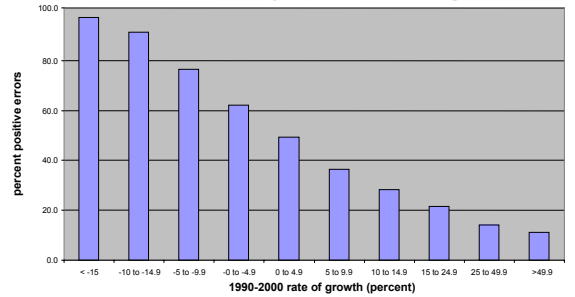
Estimates vs. Census, by Place Size



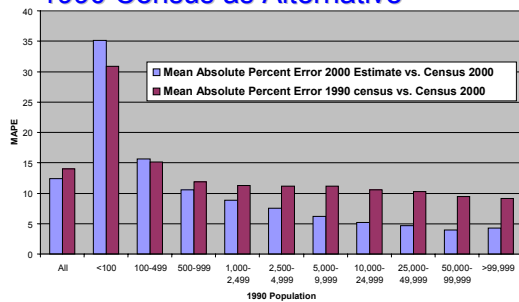
Estimates vs. Census, by Place Growth



Positive Error, by Place Change



Accuracy of 2000 Estimate Versus 1990 Census as Alternative



Conclusions

- Estimates accuracy improved since the 1980 estimates
- Accuracy increases for larger and more stable places
- MAPE for 1990 census results for places under 1,000 is lower than estimates

Issues in 2001

- No methodological changes
- Use Census 2000 as base
- Adjusted or unadjusted? (October 15 decision)
- Rework distribution of international migration to subnational areas

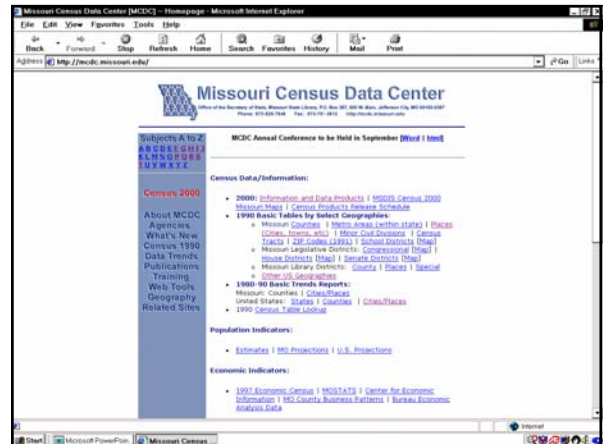
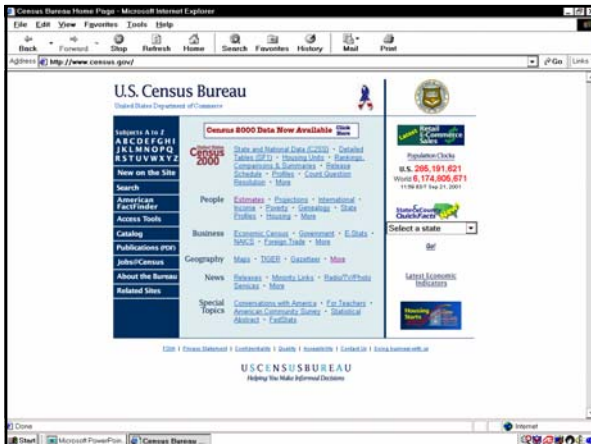
Estimates Enhancements in the 2000s

- Improve estimates of international migration
- Improve age, sex, race, Hispanic origin estimates
- Improve boundary change processing
- Adapt to new OMB race guidelines
- Integrate ACS and special censuses
- Improve dissemination of estimates
 - Improve web products for data viewers and data crunchers
 - Expand analytical reports

Population Estimates Release Schedule July 1, 2001 Vintage Population Estimates

Estimate	Release
State and national totals	December 2001
County and state, with change components	March 2002
County and state by age-sex-race/Hispanic	July 2002
Subcounty (place/township)	July 2002

Sources



A special thanks to Population Estimates Branch staff for charts and data used in this presentation: Lisa Blumerman, Melissa Therrien, Jason Devine, and Josie Baker.