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An Evaluation of Population Estimates in Florida: April 1, 2010

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The Bureau of Economic and Business Research (BEBR) has made population estimates for all cities and counties in Florida each year since 1972. These estimates are used for a wide variety of purposes. Businesses use them to develop customer profiles, identify market clusters, and determine optimal site locations. Research analysts use them to study urban sprawl, environmental conditions, and social trends. State and local governments use them to monitor the impact of public policies and to estimate the need for schools, roads, parks, public transportation, fire protection, and other goods and services. Furthermore, they are used for allocating more than $2 billion each year to city and county governments through Florida's revenue-sharing programs.

Given their many uses, it is essential to evaluate the accuracy of these estimates. In this report, we describe the methodology used for making state and local population estimates in Florida and evaluate the accuracy of the 2010 estimates by comparing them with the results of the 2010 census. We also evaluate the accuracy of previous BEBR estimates and estimates produced by the U.S. Census Bureau. We close with several observations regarding the production of population estimates in Florida.

METHODOLOGY

BEBR population estimates are constructed using the housing unit (HU) method, in which estimates of population change are derived from estimates of changes in occupied housing units. This is the most commonly used method for making small-area population estimates in the United States because it is conceptually simple, can utilize a wide variety of data sources, can be applied at any level of geography, and produces reliable estimates (Siegel 2002). We use this method to construct population estimates for each county and subcounty area in Florida, with subcounty areas defined as incorporated cities and the unincorporated balance of each county. The state estimate is calculated as the sum of the county estimates. The estimates refer solely to permanent residents of Florida; they do not include seasonal or other types of temporary residents.

The foundation of the HU method is the fact that almost everyone lives in some type of housing structure, whether a traditional single family unit, an apartment, a mobile home, a college dormitory, or a state prison. The population of any geographic area can be calculated as the number of occupied housing units (households) times the average number of persons per household (PPH), plus the number of persons living in group quarters such as college dormitories, military barracks, nursing homes, and prisons:

$$P_t = (H_t \times PPH_t) + GQ_t$$

where P_t is the population at time t, H_t is the number of occupied housing units at time t, PPH_t is the average number of persons per household at time t, and GQ_t is the group quarters population at time t. Estimates of the group quarters population typically include persons without permanent living quarters (e.g., the homeless population).

This is an identity, not an estimate. If these three components were known exactly, the total population would also be known. The problem, of course, is that these components are almost never known exactly. Rather, they must be estimated from various data sources, using one or more of several possible techniques. In this section, we provide a brief description of the data and techniques used to estimate these three components for counties and subcounty areas. Other descriptions of the HU method can be found in Murdock and Ellis (1991), Smith (1986), and Siegel (2002).

Households

Census definitions require a person to be counted as an inhabitant of his/her usual place of residence, which is generally construed to mean the place where he/she lives and sleeps most of the time. This place is not necessarily the same as one's legal or voting residence. A household is the person or group of people occupying a housing unit; by definition, the number of occupied housing units is the same as the number of households. Households refer solely to permanent residents and a housing unit is classified as vacant even when it is continuously occupied, if all the occupants are temporary residents staying only for a few days, weeks, or months.

We use three different data sources to estimate the number of households in Florida. The first is residential building permits, as collected and distributed by the U.S. Department of Commerce. The housing inventory in 2010 for a city or county can be estimated by adding permits issued since 2000 to the units counted in the 2000 census and subtracting units lost to destruction, demolition, or conversion to other uses. The time lag between the issuance of a permit and the completion of a unit is assumed to be three months for single-family units and fifteen months for multifamily units. Building permits are not issued for mobile homes, but proxies can be derived from records of shipments to mobile home dealers. Creating a housing inventory for an entire county requires complete permit data for every permitting agency within the county. Although such data are not always available, coverage is sufficient in most Florida cities and counties to provide useful information.

There are no readily available data sources providing comprehensive up-to-date information on occupancy rates. Accurate information can be obtained through special censuses or large sample surveys, but in most instances these methods are too expensive to be feasible. A common solution is to use the occupancy rates reported in the most recent census. This is the procedure we follow in most places, but in some places we make adjustments to account for factors reflecting changes in occupancy rates over time (e.g., changes in the seasonal population).

The product of the inventory figure and the occupancy rate (performed separately for each type of housing unit) provides an estimate of the number of households. There are several potential problems with this estimate. Time lags between the issuance of permits and the completion of units may vary from place to place and from year to year. The proportion of permits resulting in completed units is usually unknown. Data on demolitions and conversions are incomplete and data on mobile homes must be estimated indirectly. Reliable estimates of changes in occupancy rates are generally unavailable. Certificate-of-occupancy data can eliminate problems related to completion rates and time lags but not those related to occupancy rates, demolitions, and conversions. Although these problems limit the usefulness of the data in some places, building permit data often provide reasonably accurate estimates of households.

Our second data source is active residential electric customers. We collect these data from each of the state's 54 electric utility companies. Households can be estimated by constructing a ratio of households to active residential electric customers using data from the most recent census year (e.g., 2000) and multiplying that ratio times the number of active residential customers in some later year (e.g., 2010). This procedure assumes that no changes have occurred in electric company bookkeeping practices or in the proportion of customers who are permanent residents. Although changes do occur, they are generally fairly small. In some places we adjust the household/electric customer ratio to account for likely changes in the proportion of housing units occupied by permanent residents. Previous research on BEBR population estimates has shown that household estimates based on electric customer data are—on average—more accurate than those based on building permit data (Smith and Cody 1994, 2004).

We have recently begun using a third data source, the number of homestead exemptions reported by the Florida Department of Revenue. Households can be estimated by constructing a ratio of households to exemptions using data from the most recent census year (e.g., 2000) and multiplying that ratio times the number of exemptions in some later year (e.g., 2010). An important advantage of these data is that they cover only housing units occupied by permanent residents, thereby excluding the impact of seasonal and other non-permanent residents. The primary disadvantage is that the data do not include households occupied by renters or other non-homeowners. We currently use homestead exemption data only for estimates at the county level.

Electric customer data generally provide good household estimates but do not provide information on changes in the mix of housing units (single-family, multifamily, mobile home). Building permit data provide somewhat less accurate estimates of households, but provide information on changes in housing mix. Homestead exemption data refer solely to permanent residents but exclude non-homeowners. We use our professional judgment to decide which data source(s) to use in each county and subcounty area. In many instances, we use averages of estimates from two or even all three data sources. The benefits of combining estimates or projections are well-known (Armstrong 2001; Siegel 2002; Smith and Cody 2004).

Persons per Household

The second component of the housing unit method is the average number of persons per household (PPH). Florida's PPH dropped steadily from 3.22 in 1950 to 2.46 in 1990 but then leveled off, remaining constant between 1990 and 2000 before rising to 2.48 in 2010. There is a substantial amount of variation among local areas in Florida, with values in 2010 ranging from 2.1 to 3.1 for counties and from less than 1.5 to more than 4.0 for subcounty areas. PPH values have risen over time in some cities and counties and declined in others.

For each county and subcounty area, we base our PPH estimates on the local PPH value in the most recent census (e.g., 2000), the state-level change in PPH since that census (as measured by the American Community Survey), and the local change in the mix of single-family, multifamily, and mobile home units since that census. For counties, we also use a regression model in which changes in PPH are determined by changes in births, school enrollment, and Medicare enrollees. In some instances, we use indirect indicators of changes in PPH to adjust the estimates (e.g., changes in racial composition).

Group Quarters Population

The household population is calculated as the product of households and PPH. To obtain an estimate of the total population, we must add an estimate of the group quarters population. In most places, we estimate the group quarters population by assuming that it accounts for the same proportion of total population in 2010 as it did in 2000. For example, if the group quarters population accounted for 2% of the total population in 2000, we assume that it accounted for 2% in 2010. In places where the group quarters population represents a substantial proportion of the total population, we collect data directly from the administrators of each group quarters facility. Inmates in state and federal institutions are accounted for separately in all local areas; these data are available from the federal government, the Florida Department of Corrections, and the Florida Department of Children and Families. The total population estimate is made by adding the estimate of the group quarters population to the estimate of the household population.

EVALUATING PRECISION AND BIAS

We constructed population estimates for April 1, 2010 for each incorporated city, each county, and the unincorporated balance of each county in Florida. We evaluated these estimates by comparing them with census counts for the same date. Although census counts contain errors, they are quite accurate in most places and provide a widely used standard for evaluating population estimates. We refer to differences between estimates and census counts as estimation errors, but they may have been caused partly by enumeration errors.

We use five accuracy measures. Mean absolute percent error (MAPE) is the average error when the direction of the error is ignored. The proportions of errors less than 5% and greater than 10% indicate the frequency of relatively small and large errors, respectively. These are measures of precision, or how close the estimates were to census counts, regardless of whether they were too high or too low. Mean algebraic percent error (MALPE) is the average error when the direction of error is included. This is a measure of bias: a positive error indicates a tendency for estimates to be too high and a negative error indicates a tendency for estimates to be too low. Since a few extreme errors in one direction can strongly influence the MALPE, the proportion of estimates above the census count (%POS) is used as another measure of bias.

State Estimates

BEBR's state population estimate for April 1, 2010 was 18,772,352, less than 0.2% below the census count of 18,801,310. This error is remarkably small for a state that grew by almost 18% during the decade; had large numbers of interstate migrants, seasonal residents, and foreign immigrants; was struck by several devastating hurricanes; and experienced a housing boom and bust and a severe economic recession.

Table 1. Errors in State Population Estimates, Florida,1980–2010

Year	Percent Error
1980	-2.7
1990	1.6
2000	-1.8
2010	-0.2

Table 1 shows errors for the state population estimates for each census year since 1980. Errors were below census counts in three years and above the count in one year (1990). Although there was not a perfectly monotonic relationship, errors have generally fallen over time.

County Estimates

Table 2 summarizes the errors for the 2010 county population estimates. The MAPE for all counties was 2.7%. Most counties had errors of less than 5% and only one had an error greater than 10%. The estimates displayed very little bias, as the MALPE was 0.5% and errors were about evenly split between those that were too high and those that were too low.

MAPEs were substantially larger for small counties than large counties, but there was no clear relationship between errors and population size for counties with more than 25,000 residents. Also, there was no clear relationship between population size and the tendency for estimates to be too high or too low.

There was little indication of any relationship between errors and population growth rates. MAPEs were largest in the first and third growth-rate categories, smallest in the second and fourth. MALPEs followed a similar pattern, but the proportion of positive errors showed a slight upward bias for the most slowly growing counties and a slight downward bias for the most rapidly growing

Table 2. Population Estimation Errors by Population Size and Growth Rate: Florida Counties, 2000

Size (2000) and Growth Rate (2000-2010)	N	MAPE	MALPE	%POS	Percent of absolute errors	
					<5%	>10%
< 25,000	17	3.6	-0.1	41.2	76.5	5.9
25,000 - 99,999	17	2.3	1.6	58.8	88.2	0.0
100,000 - 249,999	15	2.6	0.5	53.3	93.3	0.0
250,000 +	18	2.2	0.0	44.4	94.4	0.0
<10 %	15	3.3	2.9	80.0	73.3	0.0
10 - 19 %	28	1.9	0.8	50.0	96.4	0.0
20 - 39 %	17	3.8	-2.1	23.5	82.4	5.9
40 + %	7	1.8	0.2	42.9	100.0	0.0
Total	67	2.7	0.5	49.3	88.1	1.5

counties. The lack of a clear relationship between errors and growth rates is unusual; we return to this point in the next section.

Subcounty Estimates

Table 3 shows errors for subcounty areas (i.e., incorporated cities and the unincorporated balance of each county). The MAPE for all subcounty areas was 9.2%, more than three times larger than the MAPE for counties. This is not surprising, given the large number of subcounty areas with very small populations. Almost half of the errors were less than 5%, but more than one-quarter were greater than 10%. There was a slight upward bias in the subcounty estimates, as indicated by a MALPE of 2.0% and 55% positive errors.

Differences in population size and growth rate had a much greater impact on estimation errors for subcounty areas than for counties. This occurred because the number of observations was much greater for subcounty areas and there was much more variation in population size and growth-rate characteristics. The MAPE was 37% for places with fewer than 250 residents and declined as population size increased, reaching 2.6% for places with 50,000-99,999 residents. Above 50,000, there was no clear relationship between MAPEs and population size. There was a slight tendency for estimates to be too low in small places and too high in large places, but this relationship was fairly weak.

In contrast to the results for counties, differences in population growth rates had a strong effect on errors for subcounty areas. There was a U-shaped relationship between MAPEs and growth rates. MAPEs were smallest in places with moderate positive growth rates but increased as growth rates deviated in either direction from those levels. MAPEs were less than 5% for places growing between 10% and 25% during the decade, but were 29% for places losing more than 10% of their residents and 31% for places whose populations at least doubled.

There was a strong tendency for estimates to be too high for places losing population and too low for rapidly growing places. Places losing more than 10% of their residents were overestimated by 29%, on average; estimates were too high in 98% of those places. At the other end of the spectrum, places more than doubling were underestimated by 30%, on average; estimates were too low in 94% of

Table 3. Population Estimation Errors by Population Size and Growth Rate: Florida Subcounty Areas, 2000

Size (2000) and Growth Rate (2000-2010)	N	MAPE	MALPE	%POS	Percent of absolute errors <5%	>10%
< 250	23	37.4	1.5	47.8	8.7	69.6
250 - 499	23	13.0	3.2	47.8	26.1	56.5
500 -999	46	11.3	1.8	47.8	37.0	39.1
1,000 - 2,499	62	13.5	2.9	61.3	24.2	53.2
2,500 - 4,999	49	9.8	4.1	59.2	38.8	30.6
5,000 - 9,999	60	7.6	2.3	43.3	45.0	25.0
10,000 - 14,999	49	5.5	2.2	69.4	55.1	14.3
15,000 - 24,999	34	4.6	1.4	55.9	70.6	2.9
25,000 -49,999	50	4.2	0.6	56.0	70.0	6.0
50,000 - 99,999	31	2.6	0.5	54.8	83.9	0.0
100,000 - 199,999	24	3.6	1.2	54.2	75.0	4.2
200,000 +	17	3.3	-0.3	58.8	82.4	0.0
< -10%	40	29.0	28.8	97.8	2.5	92.5
-10 - 0%	97	8.5	8.0	90.7	41.2	27.8
0 - 4.9%	53	5.9	1.1	56.6	64.2	11.3
5 - 9.9%	48	5.3	1.2	52.1	64.6	8.3
10 - 14.9%	49	4.1	-0.5	44.9	65.3	6.1
15 - 24.9%	57	4.2	-2.2	33.3	73.7	10.5
25 - 49.9%	81	7.3	-4.2	35.8	45.7	23.5
50 - 99.9%	27	8.3	-5.2	18.5	40.7	29.6
100 + %	16	30.9	-30.0	6.2	12.5	75.0
Total	468	9.2	2.0	55.1	49.1	26.1

those places. Places with low but positive growth rates displayed little bias, with small MALPEs and roughly half of the places overestimated and half underestimated.

Based on these results, we can say that precision generally increases as population size increases up to a certain point, but then levels off; that precision declines as growth rates deviate (in either direction) from moderate but positive levels; and that bias is largely unaffected by differences in population size but strongly affected by differences in population growth rates (negative growth rates are associated with a strong tendency to overestimate and high positive growth rates are associated with a strong tendency to underestimate). Similar results have been reported in many other studies (Harper, Devine, and Coleman 2001; Siegel 2002; Smith 1986; Smith and Cody 1994, 2004). We believe these patterns can be accepted as general characteristics of population estimates.

Errors by Component

Which component of the HU method can be estimated most accurately? Table 4 shows that errors were smallest for PPH and largest for the group quarters population (GQ). For counties, MAPEs were 2.0% for PPH, 2.6% for households, and 18.4% for GQ. There was a slight tendency for PPH estimates to be too high and household estimates to be too low. For subcounty areas, MAPEs were 4.0%, 7.8%, and 110.1%, respectively. There was a slight tendency for both PPH and household esti-

Table 4. Estimation Errors by Component: Florida Counties and Subcounty Areas, 2000

	Component	MAPE	MALPE	%POS	Percent of absolute errors <5%	Percent of absolute errors >10%
Counties	Households	2.6	-1.0	40.3	95.5	0.0
	PPH	2.0	1.1	71.6	97.0	0.0
	GQ	18.4	13.6	80.6	20.9	52.2
Subcounty Areas	Households	7.8	1.6	50.2	75.9	12.4
	PPH	4.0	0.4	57.1	75.4	6.2
	GQ	110.1	86.4	42.3	42.0	52.4

mates to be too high. Although numeric errors for the GQ population were generally quite small, percent errors were very large because in many places they were based on very small numbers of people.

A number of studies have found errors for households to be greater than errors for PPH (Lowe, Myers, and Weisser 1984; Smith and Cody 1994, 2004; Starsinic and Zitter 1968). This most likely reflects the fact that growth rates are generally higher and more variable for households than for PPH. Whereas PPH changed by less than 5% between 2000 and 2010 for most counties and subcounty areas in Florida, households often changed by 20%, 30%, 40%, or more. There is simply more potential for error in estimates of households than in estimates of PPH.

For both counties and subcounty areas, errors for GQ were much larger than errors for households and PPH. Does this mean that GQ errors contributed the most to overall estimation error? One way to answer this question is to construct synthetic population estimates using a combination of estimated values and census counts. We made estimates for counties and subcounty areas under three scenarios. The first used estimates of households and census counts for PPH and GQ; the second used estimates of PPH and census counts for households and GQ; and the third used estimates of GQ and census counts for households and PPH. For each scenario, then, errors in the population estimates were due solely to errors in the single estimated component. The results are shown in Table 5.

It is clear that errors in GQ estimates did not contribute the most to overall estimation errors; in fact, they contributed the least. For both counties and subcounty areas, Scenario 1 had the largest MAPE, the most large errors, and the fewest small errors. Even with perfect estimates of PPH and GQ, errors in household estimates would have led to population estimation errors averaging 2.4% for counties and 7.6% for subcounty areas (ignoring the direction of error). With perfect estimates of households and GQ, errors in PPH estimates would have created population estimation errors averaging 1.9% for counties and 3.9% for subcounty areas (ignoring the direction of errors). With perfect estimates of households and PPH, errors in GQ estimates would have created population estimation errors of only 0.7% for counties and 1.4% for subcounty areas (again, ignoring the direction of errors). Although errors were much larger for GQ estimates than for household or PPH estimates, those errors contributed relatively little to overall estimation errors because the GQ population generally accounts for a very small proportion of total population. Similar results were found in an evaluation of the 2000 estimates in Florida (Smith and Cody 2004).

DISCUSSION

Comparison with Previous BEBR Estimates

The BEBR estimate for the state of Florida was 2.7% below the census count in 1980, 1.6% above the count in 1990, 1.8% below the count in 2000,

Table 5. Florida Population Estimation Errors Under Alternate Scenarios

	Scenario	MAPE	MALPE	%POS	Percent of absolute errors <5%	>10%
Counties	1	2.4	0.7	40.3	91.0	1.5
	2	1.9	0.3	68.7	98.5	0.0
	3	0.7	0.2	80.6	100.0	0.0
Subcounty Areas	1	7.6	1.6	50.2	59.4	19.2
	2	3.9	0.3	57.1	76.1	5.8
	3	1.4	0.3	72.9	95.9	1.9

and 0.2% below the count in 2010. The change in errors from negative in 1980 to positive in 1990 and back to negative in 2000 was most likely caused—at least in part—by changes in census undercount. Nationally, census undercount declined between 1970 and 1980, rose between 1980 and 1990, and declined again between 1990 and 2000. Because each set of estimates is based on the most recent census, errors in census counts are built into subsequent estimates and changes in undercount from one census to another influence the size and direction of estimation errors. Data on the undercount (or overcount) for the 2010 census are not yet available.

Table 6 compares errors for 2010 with errors for 1980, 1990, and 2000 for counties and subcounty areas in Florida. With respect to precision, the 2010 estimates were more accurate than those produced in any previous year. For both counties and subcounty areas, MAPEs and the proportion of large errors were smaller than ever before and the proportion of small errors was larger. Improvements in precision were particularly notable for the county estimates.

MALPEs in 2010 were closer to zero than in any previous year and the proportion of positive errors was relatively close to a 50/50 split, especially for counties. Whereas the 1980 estimates had a tendency to be too low and the 1990 estimates had a tendency to be too high, the 2000 and 2010 estimates displayed very little bias. Viewed as a whole, these results suggest that the methodology employed by BEBR has no systematic bias toward either overestimation or underestimation.

Why were the 2010 estimates so accurate? There are several possible explanations. Population sizes were generally larger and population growth rates slower than in previous decades; both of these factors lead to greater accuracy, on average. The insights gained through an additional ten years of studying estimation methods, sources of data, and the dynamics of population growth in Florida most likely contributed to better estimates as well. Perhaps luck played a role. Whatever the causes, the 2010 estimates were the most accurate ever produced by BEBR.

Comparison with Other Estimates

How do BEBR estimates stack up against those produced by other agencies? The only other agency making independent population estimates for all cities and counties in Florida is the U.S. Census Bureau. Although several private data companies produce small-area population estimates for Florida, they base them on estimates produced by the Census Bureau or by state demographic agencies such as BEBR. Some local governments make estimates for places in their own jurisdictions, but not for other places throughout the state.

The Census Bureau provides a good standard for comparison because it is the nation's premier demographic agency. It has been producing state and local population estimates for many years and has

Table 6. Errors in County and Subcounty Estimates, 1980 – 2010

	Year	MAPE	MALPE	%POS	Percent of absolute errors <5%	Percent of absolute errors >10%
Counties	1980	5.4	-2.9	34.3	53.7	10.4
	1990	5.4	3.3	74.6	58.2	16.4
	2000	4.2	0.8	50.7	73.1	10.4
	2010	2.7	0.5	49.3	88.1	1.5
Subcounty Areas	1980	14.4	3.5	46.7	33.6	42.4
	1990	11.9	6.0	68.4	36.5	40.5
	2000	10.4	2.3	51.2	46.6	32.3
	2010	9.2	2.0	55.1	49.1	26.1

pioneered in the development of several estimation techniques and data sources. At the county level, the Census Bureau uses an administrative records (AR) method in which population estimates are based on births, deaths, Medicare enrollees, residents in group quarters facilities, foreign immigrants, and estimates of internal migration derived from return addresses on federal income tax returns (U.S. Census Bureau 2010a). County estimates are controlled to add to the Census Bureau's national population estimate and state estimates are calculated as the sum of each state's county estimates. Subcounty estimates are developed using a HU method that relies primarily on building permit data; these estimates are controlled to add to the Census Bureau's county estimates (U.S. Census Bureau 2010b).

The Census Bureau estimate for Florida on April 1, 2010 was 18,636,368, which was 164,942 below the census count of 18,801,310. This was a very accurate estimate by most standards, but the error was almost six times larger than BEBR's error of 28,958.

Table 7 provides a summary of BEBR and Census Bureau estimation errors from 1980 to 2010. At the state level, BEBR estimates were more accurate in three of the four years; the greater accuracy of the BEBR estimates was particularly notable in 1980 and 2000. At the county level, BEBR estimates were more precise and less biased than Census Bureau estimates in every year except 1990. The Census Bureau did not release data on subcounty estimates in 1990 and has not yet released subcounty estimates for 2010, but BEBR estimates had smaller MAPEs in 1980 and 2000 and a smaller MALPE in 2000, the only year for which comparable data were available.

Why were BEBR estimates more accurate than those produced by the Census Bureau? Again, there are several possible explanations. First, the Census Bureau's state and local estimates are controlled to its national population estimate; as a result, errors at the national level carry over to state and local levels. Second, the AR method used by the Census Bureau for county estimates may not be as accurate as the HU method (at least, in Florida); several studies have reported smaller errors for estimates based on the HU method than for estimates based on the AR method (Smith 1986; Smith & Mandell 1984). Third, the Census Bureau's application of the HU method relies solely on building permit data, whereas BEBR's relies primarily on electric customer data. Several studies have found that electric customer data generally provide more accurate estimates of households than do building permit data (Smith and Cody 1994, 2004). Fourth, the Census Bureau is restricted to using data sources that are available everywhere because it makes population estimates for all cities and counties in the United States. BEBR, on the other hand, makes estimates only for Florida and can use any type of data it chooses. This greater flexibility allows BEBR to draw on a greater variety of data sources than the Census Bureau. Finally, the appli-

Table 7. Comparison of Population Estimation Errors, BEBR and U.S. Census Bureau, 1980 – 2000

	Percent Error	
State	BEBR	USCB
1980	-2.7	-5.6
1990	1.6	0.3
2000	-1.8	-4.4
2010	-0.2	-0.9

	MAPE		MALPE	
County	BEBR	USCB	BEBR	USCB
1980	5.4	5.7	-2.9	-5.1
1990	5.4	4.9	3.3	2.7
2000	4.2	5.5	0.8	-5.1
2010	2.7	3.2	0.5	-1.8

	MAPE		MALPE	
Subcounty	BEBR	USCB	BEBR	USCB
1980	14.4	15.7	3.5	–
1990	11.9	–	6.0	–
2000	10.4	16.1	2.3	4.2
2010	9.2	–	2.0	–

cation of professional judgment based on BEBR's knowledge of local population dynamics and data idiosyncrasies may have improved the accuracy of its estimates. Any (or all) of these factors may have played a role in the greater accuracy of the BEBR estimates.

CONCLUSIONS

Florida is a challenging state in which to produce population estimates. Many places are very small, are growing rapidly, have large numbers of seasonal residents, or are undergoing rapid changes in demographic composition. All these factors make it difficult to produce accurate estimates. Yet BEBR's population estimates have performed very well over the years. Although errors for particular places (especially small places) are sometimes large, the overall performance of the estimates has been quite good, especially in 2010.

Further improvements can be made, of course. We continue to evaluate the performance of our previous estimates and to explore the use of alternative data sources and new estimation techniques. We believe BEBR's population estimates have provided a sound basis for planning, budgeting, and analysis in Florida for many years. We are committed to making those estimates even better in the years to come.

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