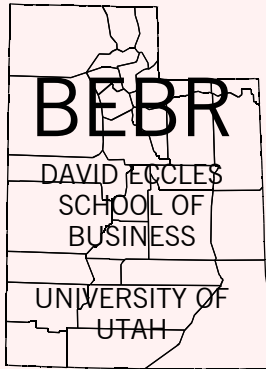


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## REVISED UTAH POPULATION ESTIMATES FOR THE 1990s

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### Overview

Every 10 years, the U.S. Bureau of the Census conducts a population count. In the intervening years the Utah Population Estimates Committee (UPEC) annually prepares total resident population estimates for each of the 29 counties in the state. These estimates are based on methods that utilize symptomatic data such as school enrollment, tax records, and other data. Because births and deaths are known, the real work of the Committee is to estimate the net in-migration for each county. The decennial Census provides an opportunity to evaluate the accuracy of the estimates for the preceding 10 years. The

Committee also revises these estimates so that they are consistent with this new Census enumeration.

The Utah Population Estimates Committee (UPEC) has revised county intercensal population estimates for the 1990s so that they are consistent with the April 1, 2000 Census counts.<sup>1</sup> These are presented in Table 1. As part of this revision process, the Committee evaluated the accuracy of its methods and also compared the UPEC work of the 1990s to that of earlier decades.

The April 1, 2000 Census count for Utah was 2,233,169. UPEC underestimated the state population by 81,213

persons, or 3.6 percent.<sup>2</sup> Based on Census counts, the total net in-migration to the state for the decade of the 1990s was about 212,000. This means that the Committee missed over a third (38 percent) of net in-migration to the state. Salt Lake County, which is home to 40 percent of the residents of the state, accounted for 58 percent of the error (47,069 persons). The combined estimation errors associated with Salt Lake, Weber, Washington, Utah, Tooele, Summit, and Cache counties account for 94 percent of the total underestimation error. The UPEC estimate for Davis County effectively matched the Census count.<sup>3</sup> The Committee overestimated

**Table 1**  
 Revised Intercensal Estimates for July 1  
 1990 - 2000

	Method	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Beaver	School	4,782	4,946	5,044	5,172	5,402	5,672	5,858	5,870	5,705	5,951	6,023
Box Elder	UPEC	36,509	37,197	37,669	38,314	38,760	39,260	39,907	40,735	41,507	42,399	42,860
Cache	IRS	70,560	72,586	75,441	77,361	79,530	82,095	83,834	85,974	88,326	89,874	91,897
Carbon	IRS	20,169	20,186	20,361	19,771	20,119	19,965	20,286	20,654	20,695	20,500	20,396
Daggett	IRS	706	732	739	734	767	794	787	786	783	884	933
Davis	UPEC	188,471	195,088	201,158	205,655	212,151	216,054	219,685	224,356	229,450	235,364	240,204
Duchesne	UPEC	12,600	12,825	12,895	13,131	13,414	13,501	13,973	14,332	14,177	14,293	14,397
Emery	School	10,329	10,262	10,298	10,661	10,620	10,683	11,056	11,089	11,059	11,095	10,782
Garfield	UPEC	3,970	4,092	4,117	4,227	4,244	4,361	4,451	4,603	4,570	4,650	4,763
Grand	IRS	6,591	6,789	7,186	7,582	7,776	7,822	8,146	8,170	8,197	8,329	8,537
Iron	IRS	20,910	21,715	22,410	23,965	25,296	27,506	28,858	30,254	31,687	32,879	34,079
Juab	School	5,831	6,060	6,191	6,204	6,860	7,236	7,496	7,735	7,898	8,021	8,310
Kane	UPEC	5,150	5,262	5,325	5,421	5,659	5,844	5,908	5,982	6,012	6,073	6,037
Millard	IRS	11,333	11,703	11,907	12,189	12,246	12,266	12,194	12,243	12,246	12,236	12,461
Morgan	IRS	5,561	5,629	5,805	6,043	6,271	6,416	6,633	6,705	6,889	6,973	7,181
Piute	IRS	1,267	1,295	1,312	1,386	1,360	1,331	1,371	1,328	1,372	1,433	1,436
Rich	School	1,728	1,721	1,765	1,869	1,902	1,840	1,897	1,882	1,889	1,978	1,955
Salt Lake	IRS	728,298	749,878	775,306	791,724	812,053	827,342	840,649	858,306	870,735	885,216	902,777
San Juan	LDS	12,448	12,668	12,963	13,056	13,730	13,796	14,008	14,392	14,779	14,573	14,360
Sanpete	School	16,355	16,840	17,804	18,594	19,291	19,990	20,898	21,825	22,445	22,513	22,846
Sevier	IRS	15,434	15,627	15,923	16,292	16,572	16,936	17,258	17,902	18,294	18,555	18,938
Summit	IRS	15,690	17,051	18,546	20,221	21,863	23,632	25,051	26,224	27,674	28,799	30,048
Tooele	LDS	26,581	27,121	27,930	28,423	29,840	30,179	31,433	33,457	35,476	38,294	41,549
Uintah	IRS	22,230	22,977	23,820	24,277	24,581	24,518	24,636	25,163	24,262	25,004	25,297
Utah	UPEC	265,766	272,167	279,635	292,351	300,447	310,334	321,072	334,658	344,820	358,463	371,894
Wasatch	School	10,134	10,825	10,890	11,300	11,955	12,576	13,075	13,307	14,132	14,560	15,433
Washington	IRS	48,988	53,693	57,195	61,497	67,753	72,910	78,023	82,078	84,579	88,105	91,104
Wayne	UPEC	2,163	2,183	2,124	2,182	2,286	2,275	2,361	2,406	2,421	2,492	2,515
Weber	IRS	158,673	161,752	166,390	169,791	173,973	178,094	182,089	186,993	189,553	193,508	197,541
<b>State</b>		<b>1,729,227</b>	<b>1,780,869</b>	<b>1,838,149</b>	<b>1,889,394</b>	<b>1,946,720</b>	<b>1,995,227</b>	<b>2,042,894</b>	<b>2,099,410</b>	<b>2,141,630</b>	<b>2,193,014</b>	<b>2,246,554</b>

(1) Daggett County added a correctional facility in 1999. The IRS method was modified to incorporate this.

the population in nine counties and underestimated it in the other 20. Estimates for 10 counties were within 2 percent of the Census enumeration.<sup>4</sup>

Among those methods tested by the Committee, the IRS Exemption Method produced much more accurate estimates than did the UPEC, School Enrollment, and LDS Membership methods. There was, however, some variation among counties. All methods underestimated the total state population. The relatively large underestimation errors of the School Enrollment and especially the LDS Membership methods suggest that the population structure of the counties has changed significantly and that the ratios of LDS membership, school enrollment, and tax exemptions to the total Utah

population have decreased. Another explanation could be that there have been changes in the various data collection practices.

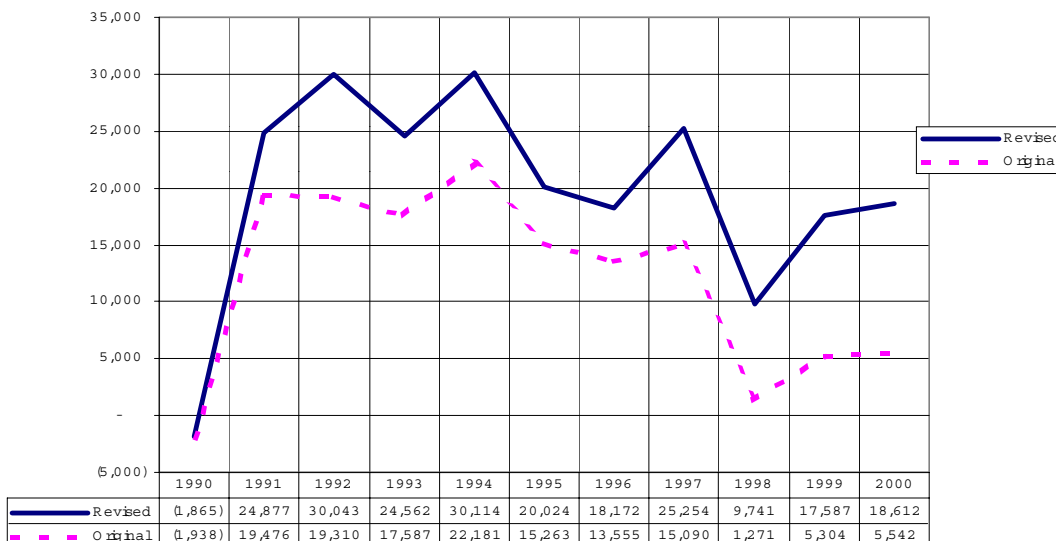
Since 1970, the U.S. Bureau of the Census has also produced county population estimates. At the state level these were 0.4 percent greater (about 9,000 persons) than the UPEC estimate for July 1, 1999. The intercensal estimates produced for the 1990s by the U.S. Bureau of the Census underestimated the population for all states, including Utah.<sup>5</sup> One possible explanation for this is that their methods have not captured structural changes in the population.<sup>6</sup> For example, recent international immigrants do not have the same demographic and economic characteristics as did

the 1990 population. Another possible explanation is that the U.S. Bureau of the Census may have increased the coverage of the 2000 enumeration as compared to that of 1990. If true, this effectively changed the base populations for comparative purposes.

The revised UPEC estimates (shown in Table 1) were produced in a two-step process. First, county estimates were generated using each of the four methods and the minimum error method was identified for each county. Next, these initial estimates were scaled to reach the April 1, 2000 Census population for each county. A slight modification of this approach was used in Daggett County, as is explained below. State net migration for the

Figure 1

State Net Migration: Original and Revised UPEC Series



original and revised UPEC series is shown in Figure 1.

Considering the county population estimates work of the Committee over the past five decades, the estimates of the 1950s, 1960s, and 1980s were more accurate than those of the 1970s and 1990s. The latter two decades were characterized by relatively rapid growth and change. The particular counties that have experienced relatively more rapid growth (or decline) have proven to be more difficult for the Committee to estimate. Most recently, Summit, Washington, and Tooele counties are examples. The Committee has also had less success estimating the population of those counties with economies based on natural resources which are prone to "boom and bust" cycles. For example, during various decades the populations of San Juan, Grand, Carbon, and Emery counties have not been accurately estimated. Finally, larger percentage estimation errors have often been associated with the counties with the smallest populations. In the 1990s, both Piute and Daggett county estimates were in error by a large proportion. There have also been some counties that have consistently been over- or underestimated. The populations of Washington and Uintah counties have been underestimated while the populations of Carbon, Morgan, and Sevier have been

overestimated by the Committee in all five of the past decades.

### Method Descriptions

Standard demographic accounting specifies that the resident population of a place at the end of a year is the sum of the total population at the beginning of the year plus the natural increase (births minus deaths) and net migration over the entire year. Vital records provide accurate, residence-adjusted birth and death data. The migration component is estimated by each method and is the residual not explained by natural increase. Because it is a residual measure, it includes people moving to and from the areas for work, school, prison, military duty, retirement, or for other reasons and also includes the error term for the estimate. Small percentage errors in a population estimate translate into much larger percentage errors in the estimate of net migration.

UPEC uses four methods to produce county population estimates: LDS Membership Method, School Enrollment Method, the IRS Exemption Method, and the UPEC Method. The state estimate is simply the sum of the county estimates.<sup>7</sup>

The LDS Membership Method is based on annual membership data provided by the Church of Jesus Christ of Latter-day Saints (also called

LDS or Mormon). The annual growth rate of county LDS membership is applied to the population base for the corresponding county to compute the population for the next year. The method assumes that church membership is a constant proportion of the population and that Church record-keeping practices are consistent over time.

The School Enrollment Method estimates total net migration by first estimating net student migration.<sup>8</sup> County school enrollment for grades 1 through 8 in the previous year are survived and aged. These are compared with the enrollments for grades 2 through 9 in the current year. The difference, which is student migration, is then multiplied by the population-to-student ratio from the previous year to calculate the current year net migration. This is added to the natural increase (derived from vital records) to compute the total population change. The method assumes a constant student-to-population ratio. This assumption also implies that the age structure of the population and share of school age persons enrolled in public schools (as opposed to private schools) are constant.

The annual growth rate in tax exemptions is applied to the population of the previous year to calculate the current year population in the IRS Tax Exemption Method. This

method is based on the assumption of a constant exemption-to-population ratio. The ratio could change over time if there is a change in the proportion of residents filing tax returns.

The UPEC Method is simply the series that was adopted by the Committee each year. In practice, the School Enrollment, LDS Membership, and IRS Exemption methods are combined judgmentally with additional data such as employment, building permits, utility hook-ups, and so forth to generate the estimates. The

intercensal revisions for the 1990s were generated as shown in Figure 2.

**Accuracy Analysis**

Overall, the IRS Exemption Method was the most accurate of the four estimates, as is shown in Table 2. This method was the least error method for 14 counties and, at the state level, only underestimated the population by 0.02 percent or 3,733 people. Further, in 21 counties the estimation error was 3.5 percent or less. The UPEC Method ranked second, producing the most accurate

estimates in seven counties and underestimating the state total by 3.6 percent. The School Enrollment Method performed the best in six counties and missed the state total by 4.1 percent. The estimation error was 3.5 percent or less in 14 of 29 counties for both the UPEC and School enrollment methods. The least reliable of the four methods was the LDS Membership Method, which underestimated the state total by 7.8 percent (174,968 people) and was the most accurate method in only two counties: San Juan and Tooele. The LDS Membership method produced

Figure 2  
Intercensal Revision Calculations

- A) The test series ( $Pop_{t,j,z}$  in the equation below) for the 1990s was produced for each of the methods using the 1990 Census as a base.
- B) The resulting estimates were compared according to the absolute percentage error. The minimum error method (IRS, School Enrollment, LDS Membership, or UPEC) was identified for each county.
- C) A new series was created that was composed of the least error method by county.
- D) For each series and county, a constant ( $Q_{j,z}$  in the equation below) was multiplied times each of the annual estimates such that the terminal point for the series was the Census 2000 count. The target April 1, 2000 estimate for each county was a linear interpolation between the July 1, 1999 and July 1, 2000 estimates. The constant ( $Q_{j,z}$ ) is simply the ratio of the Census count to the final estimate of the final year. For each method there is a new series:

$$UPEC_{t,j,z} = Q_{j,z} \times Pop_{t,j,z}$$

$$CENSUS_{4/2000,j} = UPEC_{7/1999,j} + .75 \times (UPEC_{7/2000,j,z} - UPEC_{7/1999,j,z})$$

$UPEC_{t,j,z}$  is the new July 1 series for the 1990s for given method z, for year t, and county j

$Q_{j,z}$  is the constant that is unique to the method z and county j

$Pop_{t,j,z}$  is the original 1990s test series for method z, time t, and county j

$CENSUS_{4/2000,j}$  is the April 1, 2000 Census enumeration for county j

- E) The April 1, 2000 estimates for each county from the resulting series, by definition, sum to the state Census count.
- F) A slight variation was used in the case of Daggett County because a correctional facility (group quarters) began operation in 1999. The least error method in Daggett County was the IRS method. In the initial IRS Exemption estimate series the exemptions were adjusted upward in 1999 to account for this change.

Table 2

## UPEC Estimate Methods Relative to the April 1, 2000 Census

	April 1, 2000 Census	April 1, 2000 Estimate				Percent Error				Least Percent Error	Best Method
		IRS	School	LDS	UPEC	IRS	School	LDS	UPEC		
Beaver	6,005	6,106	5,978	5,578	5,907	1.7%	-0.4%	-7.1%	-1.6%	-0.4%	School
Box Elder	42,745	41,907	43,585	41,184	42,023	-2.0%	2.0%	-3.7%	-1.7%	-1.7%	UPEC
Cache	91,391	89,341	86,798	84,641	88,834	-2.2%	-5.0%	-7.4%	-2.8%	-2.2%	IRS
Carbon	20,422	20,318	20,863	20,207	20,999	-0.5%	2.2%	-1.1%	2.8%	-0.5%	IRS
Daggett	921	753	704	662	742	-18.2%	-23.5%	-28.1%	-19.5%	-18.2%	IRS
Davis	238,994	238,419	235,035	236,717	238,922	-0.2%	-1.7%	-1.0%	-0.0%	-0.0%	UPEC
Duchesne	14,371	14,046	17,673	13,487	14,469	-2.3%	23.0%	-6.2%	0.7%	0.7%	UPEC
Emery	10,860	10,633	10,763	10,059	10,610	-2.1%	-0.9%	-7.4%	-2.3%	-0.9%	School
Garfield	4,735	4,608	5,004	4,446	4,625	-2.7%	5.7%	-6.1%	-2.3%	-2.3%	UPEC
Grand	8,485	8,613	8,624	7,735	8,927	1.5%	1.6%	-8.8%	5.2%	1.5%	IRS
Iron	33,779	33,873	34,303	29,663	32,410	0.3%	1.6%	-12.2%	-4.1%	0.3%	IRS
Juab	8,238	8,309	8,231	7,880	8,251	0.9%	-0.1%	-4.3%	0.2%	-0.1%	School
Kane	6,046	6,998	6,618	5,686	6,126	15.7%	9.5%	-5.9%	1.3%	1.3%	UPEC
Millard	12,405	12,319	12,524	11,728	11,961	-0.7%	1.0%	-5.5%	-3.6%	-0.7%	IRS
Morgan	7,129	7,079	8,668	6,887	7,407	-0.7%	21.6%	-3.4%	3.9%	-0.7%	IRS
Piute	1,435	1,456	2,981	1,383	1,672	1.5%	107.7%	-3.6%	16.5%	1.5%	IRS
Rich	1,961	1,857	1,930	1,733	1,826	-5.3%	-1.6%	-11.6%	-6.9%	-1.6%	School
Salt Lake	898,387	893,738	820,760	804,654	851,318	-0.5%	-8.6%	-10.4%	-5.2%	-0.5%	IRS
San Juan	14,413	13,644	15,588	14,089	13,438	-5.3%	8.2%	-2.2%	-6.8%	-2.2%	LDS
Sanpete	22,763	21,429	23,120	20,212	21,538	-5.9%	1.6%	-11.2%	-5.4%	1.6%	School
Sevier	18,842	18,860	22,912	17,714	19,116	0.1%	21.6%	-6.0%	1.5%	0.1%	IRS
Summit	29,736	28,693	28,276	21,537	27,150	-3.5%	-4.9%	-27.6%	-8.7%	-3.5%	IRS
Tooele	40,735	37,664	37,808	39,220	37,828	-7.5%	-7.2%	-3.7%	-7.1%	-3.7%	LDS
Uintah	25,224	25,080	21,431	25,587	24,954	-0.6%	-15.0%	1.4%	-1.1%	-0.6%	IRS
Utah	368,536	379,609	375,187	347,704	362,689	3.0%	1.8%	-5.7%	-1.6%	-1.6%	UPEC
Wasatch	15,215	14,314	15,318	13,278	14,164	-5.9%	0.7%	-12.7%	-6.9%	0.7%	School
Washington	90,354	93,982	78,468	82,015	83,124	4.0%	-13.2%	-9.2%	-8.0%	4.0%	IRS
Wayne	2,509	2,593	2,319	2,397	2,558	3.4%	-7.6%	-4.5%	2.0%	2.0%	UPEC
Weber	196,533	193,161	190,051	180,115	188,373	-1.7%	-3.3%	-8.4%	-4.2%	-1.7%	IRS
State	2,233,169	2,229,403	2,141,518	2,058,201	2,151,956	-0.2%	-4.1%	-7.8%	-3.6%	-0.2%	IRS

estimates within 3.5 percent of the Census count for only five counties. Using a population weighted error measurement, the ranking of the methods from most to least accurate is as follows: IRS Exemption, UPEC, School Enrollment, and LDS Membership.<sup>9</sup> Summary measures of the accuracy of each method are given in Table 3.

The U.S. Bureau of the Census published county estimates for July 1, 1999 but not for July 1, 2000 so it is not possible to precisely measure the error of their estimates compared to the four UPEC measures and relative to the April 1, 2000 enumeration. The July 1, 1999 Census Bureau State estimate was 0.4 percent greater (about 9,000 persons) than the UPEC estimate. Based on this alone we can infer that, at the State

level, the U.S. Bureau of the Census method probably slightly outperformed the UPEC method and substantially outperformed the School Enrollment and LDS Membership methods. However the IRS Exemption Method was superior to that of the U.S. Bureau of the Census. Using the revised county estimates for July 1, 1999 (shown in Table 1) and calculating the same error measures as are shown in Table 3, the July 1, 1999 estimates of the U.S. Bureau of the Census were slightly more accurate than were the original UPEC series. Importantly, the difference in the error measurements of the two series is quite small. It is clear that for the 1990s the IRS Exemption Method is the superior method.

If we consider the actual official estimates generated by the Committee for the 1990s, the UPEC population estimate for Davis County for April 1, 2000 was the most accurate in terms of percent error. Eighteen counties were estimated within 4.2 percent of the Census count. Demographers generally expect that places with smaller populations will have larger percentage estimation errors. And, in fact, the two largest percentage errors were in the two smallest counties: Piute (which was overestimated by 16.5 percent) and Daggett (which was underestimated by 19.5 percent).<sup>10</sup> In all, four of the smallest counties in the state were among the 10 counties with the largest percentage estimation errors. However, among the 10 counties with

**Table 3**  
**Accuracy Measures of Four UPEC Methods**  
**Intercensal Estimates Evaluation for the 1990s**

	Methods			
	IRS	School	LDS	UPEC
<b>Measures</b>				
State Level Total Error	-0.2%	-4.1%	-7.8%	-3.6%
County Errors: Population Weighted	5.71	61.18	78.47	19.79
County Errors: MAPE	3.4%	10.4%	7.8%	4.6%
<b>Ranking</b>				
State Total Error	1	3	4	2
County Errors: Population Weighted	1	3	4	2
County Errors: MAPE	1	4	3	2
<b>Overall Ranking</b>	<b>1</b>	<b>3</b>	<b>4</b>	<b>2</b>

Notes: (1) All errors refer to the April 1, 2000 UPEC estimate and the April 1, 2000 Census count. (2) The Population Weighted County Error Measure is a population weighted Chi Square developed by Frank Hachman and documented in a memo from Pam Perlich of the Bureau of Economic and Business Research to Natalie Gochnour, UPEC Chair, February 13, 2001. A 10 percent error in Salt Lake County has a much larger weighting than does a 10 percent error in Piute County. (3) The MAPE is the Mean Absolute Percentage Error is the average of the absolute values of the percentage errors of all county estimates. A 10% error in the estimate for Salt Lake County has the same weight as a 10% error in Piute County.



the **smallest** percentage estimation errors were Wayne, Beaver, Kane, and Juab – all of which are among the 10 smallest counties in the state. Further, among the 10 counties with the largest percentage estimation errors were some of the largest in the state: Summit, Washington, Tooele, and Salt Lake. These four counties have just less than one half (47 percent) of the population of the state yet account for nearly three quarters of the underestimation error.

#### **Comparison of the Estimates of the 1990s to those of Earlier Decades**

Considering all 50 years of UPEC estimation work, the decade in which the state total was closest to the Census count in percentage terms was the 1980s, which overestimated the population of the state by 0.7 percent. In the 1960s the state total was overestimated by 2.0 percent, while in the 1950s the state total was overestimated by 2.3 percent. The state population was underestimated in the two decades in which there was the most rapid growth, the 1970s (underestimated by 3.5 percent) and the 1990s (underestimated by 3.6 percent).<sup>11</sup>

Using an overall error measurement that is adjusted for population size, county level estimates were the most accurate in the 1960s, followed by the 1950s, the 1980s, the

1970s, and finally the 1990s.<sup>12</sup> The two decades in which population growth was the most rapid proved to be the most elusive for estimating methods to capture. These results are given in Table 4.

Table 5 shows the county percent estimation errors by decade. Considering the estimates for the last 50 years, the populations of two counties have been underestimated each time: Washington and Uintah. Three counties have been overestimated in every decade: Carbon, Morgan, and Sevier. In the 1950s, 1960s, and 1980s the percent estimation errors for larger counties were generally less than for the smaller counties. This resulted in a more accurate state estimate. This was not necessarily the case in the 1970s and 1990s as estimation errors in Salt Lake County particularly contributed to fairly large estimation errors at the state level.

The Committee did not begin annually producing county estimates until the 1950s. As was explained in 1965:

"Post census estimates of county populations have been made by the Utah Population Work Committee since 1956 and have been found to be generally useful. However, these estimates for prior years become outdated after the decennial census enumeration is released. Apparently there is no recognized source for official estimates by county or smaller geographic unit for the intervening years between censuses...

Recognizing this need the Utah Population Work Committee asked Dr. Therel Black of Utah State University and Dr. Jewell J. Rasmussen of the University of Utah to prepare tentative estimates for the 1940 and 1950 decades respectively."<sup>13</sup>

Documentation of method for the 1940s has apparently been lost. Because of World War II, county estimates produced 15 to 20 years after the fact must have been most difficult to construct. These state level intercensal estimates for the 1940s were not revised to match those of U.S. Bureau of the Census.

The UPEC intercensal revisions for the 1950s and 1960s appear to have been produced using a similar methodology, although the computations and their sequence are not made explicit in published documents. A new set of UPEC county estimates were produced using the established methodology that had been used by the Committee in its annual estimates work. Natural increase data was used in combination with the School Enrollment Method, simple linear growth calculations, and labor force change. The series was forced to match the county Census counts and the State totals were scaled to match the intercensal revisions of the Census Bureau.<sup>14</sup>

A UPEC methodology study evaluated the LDS Membership, the School Enrollment, and an Averaging of Methods for the decade of the 1960s.<sup>15</sup> The LDS



**Table 4**  
**Accuracy Measures of UPEC Estimates by Decade**

	<b>Decades</b>				
	<b>1950s</b>	<b>1960s</b>	<b>1970s</b>	<b>1980s</b>	<b>1990s</b>
<b>Intercensal Estimates Compared to the Decennial Census</b>					
<b>Measures</b>					
State Level Total Error	2.3%	2.0%	-3.5%	0.7%	-3.6%
County Errors: Population Weighted	5.13	4.17	11.95	9.40	19.79
County Errors: MAPE	5.4%	4.5%	5.3%	4.7%	4.6%
<b>Ranking</b>					
State Total Error	3	2	4	1	5
County Errors: Population Weighted	2	1	4	3	5
County Errors: MAPE	5	1	4	3	2
<b>Overall Ranking</b>	3	1	4	2	5

Notes: (1) All errors refer to the April 1, 2000 UPEC estimate and the April 1, 2000 Census count. (2) The Population Weighted County Error Measure is a population weighted Chi Square developed by Frank Hachman and documented in a memo from Pam Perlich of the Bureau of Economic and Business Research to Natalie Gochnour, UPEC Chair, February 13, 2001. A 10 percent error in Salt Lake County has a much larger weighting than does a 10 percent error in Piute County. (3) The MAPE is the Mean Absolute Percentage Error is the average of the absolute values of the percentage errors of all county estimates. A 10% error in the estimate for Salt Lake County has the same weight as a 10% error in Piute County.

**Table 5**  
**Estimating Errors by Decade**  
**Percent Deviations from Decennial Census**

	<b>1950s</b>	<b>1960s</b>	<b>1970s</b>	<b>1980s</b>	<b>1990s</b>
Beaver	7.0%	2.6%	1.1%	0.9%	-1.6%
Box Elder	5.5%	-1.1%	2.0%	5.3%	-1.7%
Cache	4.1%	5.3%	0.4%	3.6%	-2.8%
Carbon	0.5%	4.3%	3.0%	5.2%	2.8%
Daggett	18.2%	0.0%	6.7%	-0.1%	-19.5%
Davis	0.8%	1.0%	-3.8%	0.6%	-0.0%
Duchesne	3.4%	-2.8%	0.4%	-0.3%	0.7%
Emery	2.7%	2.0%	-1.8%	7.7%	-2.3%
Garfield	1.4%	-3.2%	10.1%	1.7%	-2.3%
Grand	-8.1%	17.6%	-0.6%	-3.2%	5.2%
Iron	3.3%	-2.5%	0.9%	-4.6%	-4.1%
Juab	13.0%	2.2%	5.6%	-1.9%	0.2%
Kane	11.1%	4.2%	2.6%	-6.0%	1.3%
Millard	8.2%	10.0%	5.3%	15.0%	-3.6%
Morgan	9.1%	2.6%	10.4%	7.8%	3.9%
Piute	-3.4%	7.7%	20.0%	19.2%	16.5%
Rich	0.0%	-12.5%	-7.3%	6.5%	-6.9%
Salt Lake	1.8%	2.9%	-6.0%	-1.0%	-5.2%
San Juan	-15.4%	2.2%	23.5%	3.0%	-6.8%
Sanpete	5.9%	0.9%	5.3%	4.9%	-5.4%
Sevier	8.1%	1.0%	3.8%	3.8%	1.5%
Summit	0.0%	5.1%	-8.4%	-8.2%	-8.7%
Tooele	-1.9%	8.3%	-2.6%	5.1%	-7.1%
Uintah	-3.5%	-4.8%	-2.5%	-5.5%	-1.1%
Utah	4.0%	-3.4%	-5.9%	3.8%	-1.6%
Wasatch	1.9%	-1.7%	-2.5%	0.3%	-6.9%
Washington	-1.0%	-5.4%	-9.6%	-4.4%	-8.0%
Wayne	11.8%	6.7%	0.0%	-5.3%	2.0%
Weber	3.2%	5.2%	1.5%	1.1%	-4.2%
State	2.3%	2.0%	-3.5%	0.7%	-3.6%

Membership Method did extremely well in Salt Lake, Weber, Davis, and Utah counties while the School Enrollment Method was especially accurate in Salt Lake, Weber and Utah counties. One of the major findings of this work was that percentage estimation errors increased substantially in counties with smaller populations and that, in order to avoid this, multi-county regions should be constructed for population estimation purposes.

In a major departure from the intercensal revision approach used for the 1950s and 1960s, the intercensal revisions for the 1970s were apparently produced using a methodology that had not been used previously by UPEC. This was a completely new series developed by the Committee subsequent to the release of the 1970 Census in which the results were independent of the Committee's work of the 1970s in both method and results. Essentially, the ratios of symptomatic data as compared to the 1970 and 1980 Census populations were used to develop a multiple regression time series model. These results were scaled so that the state totals agreed with those of the U.S. Bureau of the Census intercensal estimates.<sup>16</sup>

In the 1980s, the intercensal revisions were based on the original series produced by the Committee.

The series was scaled such that the beginning and ending points for the county populations were consistent with the Census counts and the state totals matched that of the U.S. Bureau of the Census intercensal revisions. The precise calculations and their sequence are undocumented.<sup>17</sup>

Given the existing documentation, it is not possible to determine many of the details of the UPEC intercensal revision methodologies in the past. The revision methodology for the 1990s does seem, in principle, to be most similar to the methods used in the 1950s, 1960s and 1980s. In each of these cases the original series and/or the original methods of the Committee were scaled and modified so that the endpoints are calibrated to the decennial enumerations. In the 1950s, 1960s, 1970s, and 1980s the counties were further scaled to sum to the state total of the revised intercensal estimates produced by the U.S. Bureau of the Census. These have not yet been released for the 1990s, so these revisions will not match the State totals of the U.S. Bureau of the Census. Importantly, in no case were Census Bureau county populations substituted for an independent UPEC series.<sup>18</sup> The UPEC methods documentation for the 1960s and 1980s states that the average of more than one method yields more accurate

results than any single method. Unique to the 1990s is the fact that one method (IRS Exemption Method) so outperformed all the others.

### Conclusion

The UPEC population estimates of the 1990s have been revised such that they are consistent with the results of the 2000 Census. The essence of this revision work has been to distribute across time and geography the 80,000 net in-migrants that were not present in the original estimates. The new series was constructed using the least error method for each county and scaling these to match the decennial Census counts. This particular approach has apparently not been used in the past, but is in principle quite similar to the approaches used in the 1950s, 1960s and 1980s. Among the standard methods used by UPEC, the IRS Exemption Method outperformed the UPEC, School Enrollment and LDS Membership methods in the 1990s. The IRS Exemption Method produced estimates that were also much more accurate than the county estimates produced by the U.S. Bureau of the Census for the 1990s.

Generally, an average of the results of several methods yields more accurate population estimates than does a single method. However, this is clearly not the case in this work.

Certainly all estimation methodologies are based on the notion that the relationship between a particular symptomatic variable and the population will be stable over time.<sup>19</sup> This analysis suggests that during the 1990s there have been significant structural changes in the demographic characteristics and economic behavior of Utah residents. These structural changes have been fairly accurately captured by the IRS Exemption method, but not by the others. It is also generally expected that percentage estimating errors are larger in smaller counties. While this was the case in Utah in the relatively slow growth decades (1950s, 1960s, 1980s), it has not necessarily been true in the rapid growth decades (1970s, 1990s).

This research suggests four specific issues that the Committee may wish to consider for its estimates work for the next decade:

- If significant in-or out-migration occur, the LDS Membership and School Enrollment methods may be fairly inaccurate and the IRS Method may be more reliable. If the growth slows such that natural increase is the source of most, if not all the population increase, all three methods should be more accurate.

- It is fairly standard practice to combine a "top down" (state or regional) estimate with the existing

"bottom up" (county) approaches. Theories and models that are used to evaluate regional economies and populations are quite distinct from those that are used to study small areas. It would be possible to use one of these types of approaches to generate a State control total then reconcile this with the UPEC county estimates.

- Another quite standard estimating methodology is the Housing Method. The Committee could develop a housing method that accounts for group quarters, persons per household, changes in residential units and vacancy rates. At a minimum, explicit accounting of changes in group quarters populations would be a contribution to the work of the Committee.

- Finally, it could be worthwhile for the Committee to address its systematic estimating errors in those five counties that are affected and determine whether these patterns are a matter of bias, circumstance, data, methods or chance.

### Endnotes

<sup>1</sup> A UPEC work group developed these revisions. This subcommittee consisted of Peter Donner, Governor's Office of Planning and Budget; Ken Jensen, Utah Department of Workforce Services; Pam Perlich, University of Utah, Bureau of Economic and Business Research; and Tom Williams, Utah State Tax Commission.

<sup>2</sup> UPEC produces July 1 estimates. A linear interpolation was used to produce an April 1, 2000 estimate for comparison purposes with the Census enumeration.

<sup>3</sup> The UPEC estimate was 72 persons less than the Census count.

<sup>4</sup> These counties are Beaver, Box Elder, Davis, Duchesne, Juab, Kane, Sevier, Uintah, Utah, and Wayne.

<sup>5</sup> Steven Cochrane, "2000 Census," *Economy.com*, December 29, 2000.

<sup>6</sup> The U.S. Bureau of the Census uses a component change procedure that includes vital records, Medicare, tax records and INS data, among others.

<sup>7</sup> For a more extensive discussion of the methods used to generate recent UPEC estimates, see Natalie Gochnour and Robert Spendlove, "1999 Population Estimates for Utah," *Utah Economic and Business Review*, Volume 60, Numbers 1 and 2, January/February 2000.

<sup>8</sup> This is also called the Component Method II.

<sup>9</sup> This method is a per capita weighted Chi Square measure developed by Frank Hachman of the Bureau of Economic and Business Research and documented in an unpublished memorandum, "UPEC Error Estimation Method," from Pam Perlich, Bureau of Economic and Business Research, to Natalie Gochnour, UPEC Chair, February 13, 2001.

<sup>10</sup> A correctional facility was built in Daggett County and populated in 1999. The Committee was not aware of this and it most likely explains a significant portion of this error.

<sup>11</sup> In most cases the July 1 UPEC estimates for the year prior to the decennial Census were compared with those of the revised series for the same date.

<sup>12</sup> This is the population weighted Chi-Square referenced in footnote 9.

<sup>13</sup> The Population Work Committee was later renamed the Utah Population Estimates Committee. See Sherrill W. Neville and Jewell J. Rasmussen, "Population Estimates by County: 1950-1960," *Utah Economic and Business Review*, Volume 25, Number 4, pages 3 - 5, April 1965.

<sup>14</sup> See Osmond L. Harline, "The 1950's - Decade of Population Growth for Utah," *Utah Economic and Business Review*, Volume 20, Number 4, April 1, 1960; Sherrill W. Neville and Jewell J. Rasmussen, "Population Estimates by County: 1950 - 1960," *Utah Economic and Business Review*, Volume 25, Number 4, April 1965;

John Brockert and James Crismon, "'County Population Estimates for Utah, July 1, 1971," *Utah Economic and Business Review*, Volume 32, Number 1, January 1972; Jack Ockey, "County Population Estimates for Utah-1969," *Utah Economic and Business Review*, Vol. 29, No. 11, November, 1969.

<sup>15</sup> "Utah Population 1960 - 1970: A Comparison of Estimating Procedures and A Proposal for Change," by James E. Crismon, Utah Department of Employment Security, undated.

<sup>16</sup> "The Committee's estimates for individual counties will not in some instances agree with U.S. Bureau of the Census county estimates, but state totals are in close agreement." John Brockert, Stephen Kan, and Kenneth E.

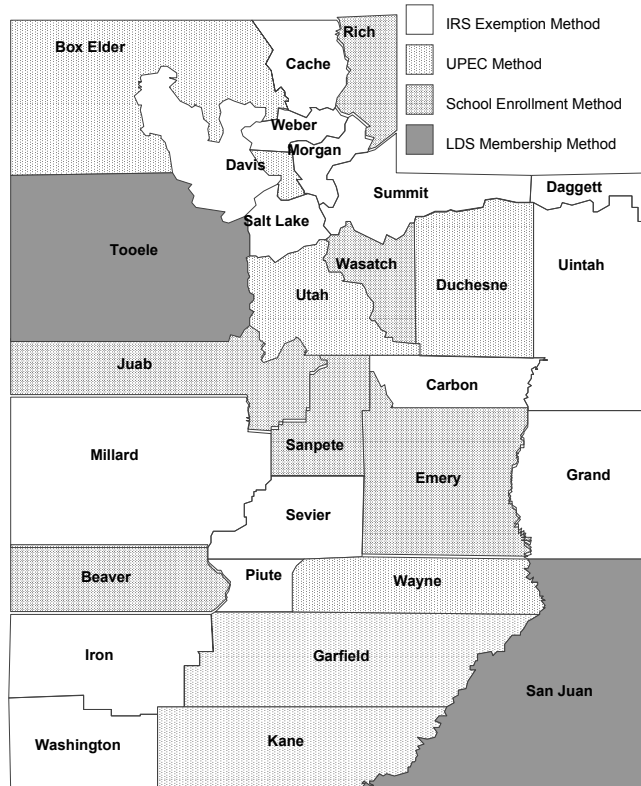
Jensen, "Utah Intercensal Population Estimates for the 1970s," *Utah Economic and Business Review*, Volume 41, Number 9, September, 1981. See also John E. Brockert, Gery E. Moore, and Kenneth E. Jensen, "1979 Population Estimates for Utah," *Utah Economic and Business Review*, Vol. 39, No 9-10, October 1979, page 3.

<sup>17</sup> Brad T. Barber and Jeanine M. Taylor, "1991 Population Estimates for Utah and Its Counties," *Utah Economic and Business Review*, Volume 52, Number 1, January 1992.

<sup>18</sup> The U.S. Bureau of the Census did not begin producing county estimates until the 1970s.

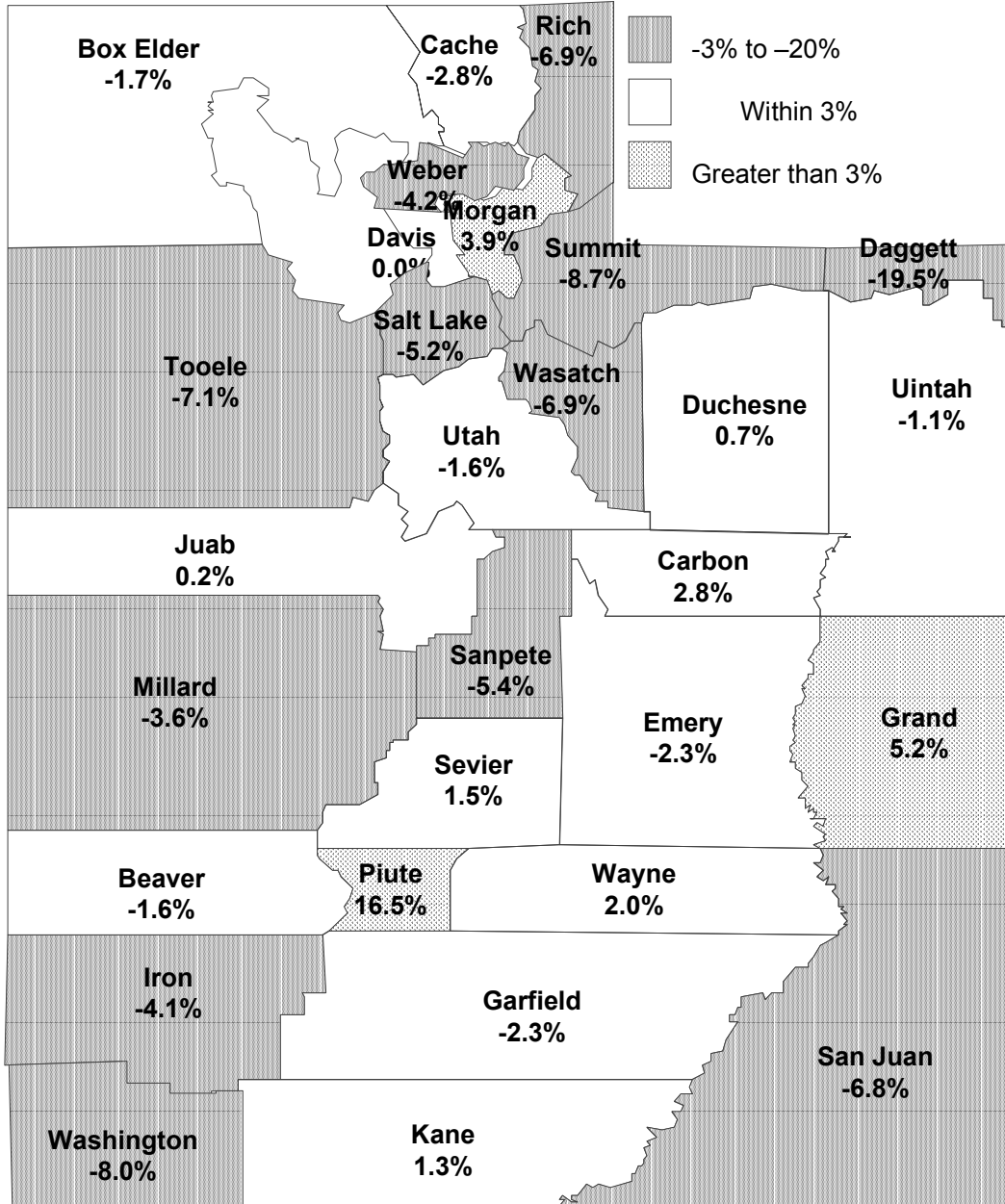
<sup>19</sup> The symptomatic variables could be related to the level of or change in the population.

Least Error Estimation Method for the 1990s



Source: Utah Population Estimates Committee

Percent Population Estimation Error: UPEC vs. Census 2000



Source: Utah Population Estimates Committee, U.S. Bureau of the Census

## Utah Business Statistics

UTAH DATA	March 2000	March 2001	% Change from Year Ago	12-Month Average Current Year	12-Month Average Last Year	12-Month Average % Change
Total Personal Income (seas. adj. at ann. rates, mil. of dol., qtlly.)	51,924	55,502	6.9	54,214.8	50,593	7.2
New Corporations (no.)	591	na	na	668.7	684	-2.2
New Car, Truck, and Motor Home Sales (no.)	7,578	na	na	7,314.1	7,046	3.8
<b>Agriculture</b>						
Average Prices Received by Farmers (dol.)						
Lambs (cwt.)	90.00	85.00	-5.6	83.2	79.19	5.0
Milk, All (cwt.) <sup>1</sup>	na	na	na	na	13.09	na
Barley (per bushel)	1.89	2.06	9.0	2.0	1.87	4.8
Alfalfa Hay, Baled (per ton) <sup>2</sup>	70.00	87.00	24.3	78.7	72.67	8.3
Commercial Red Meat Production (thous. of lbs.)	41,200	41,400	0.5	41,950.0	40,933	2.5
<b>Construction</b>						
Total Permit Construction (thous. of dol.)	345,235.2	354,980.5	2.8	334,762.2	337,788.3	-0.9
Residential	207,694.0	219,406.6	5.6	183,853.0	185,485.4	-0.9
Nonresidential	87,338.2	94,099.4	7.7	101,486.1	105,117.7	-3.5
Additions, Alterations, and Repairs	50,203.0	41,474.5	-17.4	49,422.3	47,185.2	4.7
New Dwelling Units (no.)	1,772	1,903.0	7.4	1,564.3	1,657.0	-5.6
<b>Employment<sup>3</sup></b>						
Civilian Labor Force (thous.)	1,088.9	1,118.3	2.7	1,120.0	1,095.4	2.2
Employed	1,057.1	1,076.5	1.8	1,083.7	1,057.8	2.5
Unemployed	31.8	41.8	31.4	36.3	37.7	-3.8
Percent of Labor Force	2.9	3.7	27.6	3.2	3.4	-6.3
Nonagricultural Jobs (thous.)	1,060.7	1,085.6	2.3	1,081.0	1,056.5	2.3
Mining	7.7	8.1	5.2	8.0	7.7	3.7
Contract Construction	71.4	67.0	-6.2	73.7	73.4	0.3
Manufacturing	132.6	130.6	-1.5	132.2	132.4	-0.1
Transportation, Communications, and Utilities	59.5	60.1	1.0	60.5	59.8	1.1
Wholesale Trade	51.2	52.1	1.8	52.2	51.0	2.4
Retail Trade	197.2	198.6	0.7	200.9	198.3	1.3
Finance, Insurance, and Real Estate	56.8	58.4	2.8	57.4	57.5	-0.1
Services <sup>4</sup>	298.1	318.7	6.9	310.0	296.2	4.7
Federal Government	32.1	33.8	5.3	33.0	31.4	4.9
State Government <sup>5</sup>	58.2	59.4	2.1	57.8	56.6	2.2
Local Government <sup>5</sup>	95.9	98.8	3.0	95.3	92.2	3.4
<b>Average Weekly Hours</b>						
Mining	43.3	43.2	-0.2	43.1	45.1	-4.5
Manufacturing	39.3	39.4	0.3	40.1	39.8	0.6
Wholesale Trade	38.2	40.9	7.1	38.9	39.1	-0.6
Retail Trade	27.3	27.2	-0.4	27.6	28.0	-1.4
Amount of Unemployment Compensation (thous. of dol.)	9,589.4	12,833.2	33.8	9,265.0	7,767.6	19.3
<b>Finance (qtlly.)</b>						
Total State and National Chartered In-State Banks	31	33	6.5	33.0	31	5.6
Total Assets (mil. of dol.)	30,739.6	28,114.5	-8.5	28,967.9	29,272.8	-1.0
Total Liabilities (mil. of dol.)	28,281.8	25,488.6	-9.9	26,450.9	26,906.8	-1.7
Total Equity Capital (mil. of dol.)	2,457.8	2,626.0	6.8	2,516.9	2,366.0	6.4
Capital to Assets <sup>6</sup>	8.80	10.48	19.0	9.5	8.9	6.2
Loan Loss Reserve Ratio	1.24	1.83	47.9	1.6	1.31	23.4
Loans to Assets	64.66	62.11	-3.9	65.3	63.35	3.1
Temporary Investment Ratio	11.20	11.49	2.6	8.6	11.67	-26.7
Return on Assets	1.16	1.49	28.2	0.8	1.15	-33.5
<b>Production</b>						
Crude Oil (thous. of bbls.)	1,347.0	1,322.1	-1.9	1,281.5	1,337.9	-4.2
Natural Gas (mil. of cu. ft.)	22,779.6	26,054.7	14.4	24,009.3	22,622.7	6.1
Coal (thous. short tons)	2,668	2,990	12.1	2,287.4	2,141	6.9
Crude Oil to Refineries, Barrels Received (thous. of bbls.)	3,636	3,814	4.9	4,060.2	4,169	-2.6
<b>Travel/Tourism</b>						
Air Passengers (total no. on and off, S.L. Int'l. Airport)	1,817,931	1,764,598	-2.9	1,656,707.1	1,625,877	1.9
Highway Traffic Count Across State Lines (both directions)	60,301	60,627	0.5	66,115.5	66,844	-1.1
Visits to State and National Parks and Monuments	746,146	572,503	-23.3	1,105,366.1	1,341,391	-17.6
<b>Utilities</b>						
Natural Gas Customers (residential and commercial)	685,826	705,456	2.9	690,272.9	672,745	2.6
Natural Gas Customers (industrial)	1,070	1,033	-3.5	1,047.6	1,076	-2.7
Telephone Lines in Service (Qwest, residential access)	780,919	734,810	-5.9	767,829.6	768,871	-0.1
Telephone Lines in Service (Qwest, business/public access)	685,826	426,582	-37.8	576,762.6	433,367	33.1



## Utah Business Statistics

UTAH DATA	March 2000	March 2001	% Change from Year Ago	12-Month Average Current Year	12-Month Average Last Year	12-Month Average % Change
<b>Davis County</b>						
Nonagricultural Employment (thous.)	82.2	84.7	3.0	85.5	83.1	2.9
Unemployment Rate (seasonally adjusted)	2.7	3.4	25.9	3.0	3.2	-7.0
Authorized Permit Construction (thous. of dol.)	27,396.4	27,254.6	-0.5	34,877.9	27,180.7	28.3
New Dwelling Units (no.)	173	174	0.6	196	178	9.9
New Car, Truck, and Motor Home Sales, Owner's County (no.)	743	na	na	769	745	3.2
Natural Gas Customers (residential and commercial)	74,187	76,594	3.2	75,121	72,916	3.0
Natural Gas Customers (industrial)	94	92	-2.1	94	96	-2.3
Telephone Lines in Service (Qwest, residential access)	93,852	95,289	1.5	94,726	92,396	2.5
Telephone Lines in Service (Qwest, business access)	28,604	31,415	9.8	29,769	27,193	9.5
<b>Salt Lake County</b>						
Nonagricultural Employment (thous.)	537.0	550.7	2.6	548.7	534.9	2.6
Unemployment Rate (seasonally adjusted)	2.6	3.4	30.8	3.0	3.2	-6.3
Authorized Permit Construction (thous. of dol.)	128,721.4	100,028.5	-22.3	125,890.2	116,441.5	8.1
New Dwelling Units (no.)	445	273	-38.7	398	410	-2.9
New Car, Truck, and Motor Home Sales, Owner's County (no.)	4,000	na	na	3,918	3,560	10.1
Natural Gas Customers (residential and commercial)	292,466	297,993	1.9	291,305	288,385	1.0
Natural Gas Customers (industrial)	482	462	-4.1	468	483	-3.3
Telephone Lines in Service (Qwest, residential access)	348,380	333,200	-4.4	341,744	345,518	-1.1
Telephone Lines in Service (Qwest, business access)	226,813	235,285	3.7	232,568	202,435	14.9
<b>Utah County</b>						
Nonagricultural Employment (thous.)	148.7	156.2	5.0	153.0	147.8	3.5
Unemployment Rate (seasonally adjusted)	2.3	2.9	26.1	2.7	2.9	-7.8
Authorized Permit Construction (thous. of dol.)	61,947.4	68,936.3	11.3	64,474.1	57,918.7	11.3
New Dwelling Units (no.)	363	304	-16.3	332	334	-0.6
New Car, Truck, and Motor Home Sales, Owner's County (no.)	971	na	na	945	748	26.3
Natural Gas Customers (residential and commercial)	98,211	102,883	4.8	100,579	96,069	4.7
Natural Gas Customers (industrial)	148	149	0.7	152	146	3.6
Telephone Lines in Service (Qwest, residential access)	112,267	109,343	-2.6	111,416	109,858	1.4
Telephone Lines in Service (Qwest, business access)	55,286	60,140	8.8	57,608	47,338	21.7
<b>Weber County</b>						
Nonagricultural Employment (thous.)	91.0	89.1	-2.1	88.7	88.4	0.3
Unemployment Rate (seasonally adjusted)	3.7	4.7	27.0	4.1	4.2	-1.8
Authorized Permit Construction (thous. of dol.)	38,799.8	16,136.9	-58.4	19,043.3	36,751.1	-48.2
New Dwelling Units (no.)	184	54	-70.7	107	151	-29.5
New Car, Truck, and Motor Home Sales, Owner's County (no.)	540	na	na	488	439	11.2
Natural Gas Customers (residential and commercial)	67,082	68,823	2.6	67,423	65,765	2.5
Natural Gas Customers (industrial)	102	98	-3.9	100	104	-3.9
Telephone Lines in Service (Qwest, residential access)	64,950	57,130	-12.0	61,231	64,360	-4.9
Telephone Lines in Service (Qwest, business access)	30,429	32,931	8.2	31,890	24,609	29.6

na Not Available

<sup>1</sup> Before deductions for hauling and government withholding; includes quality, quantity and other premiums. Excludes hauling subsidies. <sup>2</sup> Mid-month prices. <sup>3</sup> Some figures not strictly comparable due to reclassification. <sup>4</sup> Includes services by nonprofit and religious organizations. <sup>5</sup> Includes public schools and college institutions. <sup>6</sup> Includes allowance for loan losses.

Sources:

Personal Income	U.S. Department of Commerce, Bureau of Economic Analysis.
New Corporations	Utah Department of Commerce, Division of Corporations and Commercial Code.
New Car and Truck Sales	Utah State Tax Commission, Economic and Statistics Unit, <i>Utah Car and Truck Sales</i> .
Agriculture	U.S. Department of Agriculture, Utah Agricultural Statistics Service, <i>Utah Agriculture</i> .
Construction Data	Bureau of Economic and Business Research, University of Utah, <i>Utah Construction Report</i> .
Employment Data	Utah Department of Workforce Services, <i>Utah Labor Market Report</i> .
Finance Data	Utah Department of Financial Institutions.
Crude Oil Production	Utah Division of Oil, Gas and Mining, <i>Oil and Gas Production Report</i> , and Utah Office of Energy and Resource Planning.
Natural Gas Production	Utah Division of Oil, Gas and Mining, <i>Oil and Gas Production Report</i> .
Coal Production	U.S. Department of Energy, Energy Information Administration.
Air Passengers	SLC International Airport, Statistics Division, <i>Air Traffic Statistics and Activity Report</i> .
Highway Traffic Count	Utah Department of Transportation, <i>Automatic Traffic Recorder Data Report</i> .
Visits to State and National Parks and Monuments	U.S. Forest Service and Utah State Parks and Recreation Department.
Utilities Data	Cooperating Utility Companies.

## Utah Business Statistics

	April 2000	April 2001	% Change from Year Ago	12-Month Average Current Year	12-Month Average Last Year	12-Month Average % Change
<b>UTAH DATA</b>						
Total Personal Income (seas. adj. at ann. rates, mil. of dol., qnty.)	na	na	na	54,215	50,593	7.2
New Corporations (no.)	591	na	na	678	664	2.2
New Car, Truck, and Motor Home Sales (no.)	7,016	na	na	7,351	7,063	4.1
<b>Agriculture</b>						
Average Prices Received by Farmers (dol.)						
Lambs (cwt.)	90.00	89.00	-1.1	83.08	80.61	3.1
Milk, All (cwt.) <sup>1</sup>	na	na	na	na	13.25	na
Barley (per bushel)	2.02	2.09	3.5	1.96	1.88	4.5
Alfalfa Hay, Baled (per ton) <sup>2</sup>	71.00	90.00	26.8	80.25	73.25	9.6
Commercial Red Meat Production (thous. of lbs.)	35,200	39,800	13.1	42,333	40,650	4.1
<b>Construction</b>						
Total Permit Construction (thous. of dol.)	342,844.7	348,966.5	1.8	335,272.4	336,507.0	-0.4
Residential	199,208.4	215,617.7	8.2	185,220.4	184,982.3	0.1
Nonresidential	86,911.4	74,789.1	-13.9	100,475.9	102,489.1	-2.0
Additions, Alterations, and Repairs	56,724.9	58,559.7	3.2	49,575.2	49,035.6	1.1
New Dwelling Units (no.)	1,582	1,743.0	10.2	1,578	1,637	-3.6
<b>Employment<sup>3</sup></b>						
Civilian Labor Force (thous.)	1,078.8	1,118.8	3.7	1,123.3	1,096.7	2.4
Employed	1,047.2	1,079.3	3.1	1,086.4	1,059.8	2.5
Unemployed	31.6	39.5	25.0	36.9	37.0	-0.2
Percent of Labor Force	2.9	3.5	20.7	3.3	3.4	-2.7
Nonagricultural Jobs (thous.)	1,070.0	1,091.6	2.0	1,082.8	1,058.7	2.3
Mining	8.0	8.3	3.8	8.0	7.7	3.7
Contract Construction	70.0	68.2	-2.6	73.5	73.5	0.0
Manufacturing	130.4	130.2	-0.2	132.2	132.2	-0.1
Transportation, Communications, and Utilities	60.0	60.2	0.3	60.5	59.9	1.0
Wholesale Trade	51.7	52.4	1.4	52.3	51.1	2.3
Retail Trade	196.2	199.6	1.7	201.2	198.5	1.4
Finance, Insurance, and Real Estate	56.7	58.3	2.8	57.6	57.5	0.1
Services <sup>4</sup>	307.4	321.0	4.4	311.1	297.5	4.6
Federal Government	34.1	34.2	0.3	33.0	31.6	4.4
State Government <sup>5</sup>	58.6	59.8	2.0	57.9	56.7	2.1
Local Government <sup>5</sup>	96.9	99.4	2.6	95.5	92.4	3.4
<b>Average Weekly Hours</b>						
Mining	43.2	43.0	-0.5	43.1	45.4	-5.1
Manufacturing	39.9	39.0	-2.3	40.0	39.8	0.6
Wholesale Trade	39.9	41.6	4.3	39.0	39.1	-0.3
Retail Trade	27.7	27.6	-0.4	27.6	28.0	-1.4
Amount of Unemployment Compensation (thous. of dol.)	8,424.3	15,014.3	78.2	9,814.2	7,868.5	24.7
<b>Finance (qnty.)</b>						
Total State and National Chartered In-State Banks	na	na	na	33	31	5.6
Total Assets (mil. of dol.)	na	na	na	28,967.9	29,272.8	-1.0
Total Liabilities (mil. of dol.)	na	na	na	26,450.9	26,906.8	-1.7
Total Equity Capital (mil. of dol.)	na	na	na	2,516.9	2,366.0	6.4
Capital to Assets <sup>6</sup>	na	na	na	9.47	8.92	6.2
Loan Loss Reserve Ratio	na	na	na	1.62	1.31	23.4
Loans to Assets	na	na	na	65.32	63.35	3.1
Temporary Investment Ratio	na	na	na	8.55	11.67	-26.7
Return on Assets	na	na	na	0.76	1.15	-33.5
<b>Production</b>						
Crude Oil (thous. of bbls.)	1,285.8	1,295.2	0.7	1,282.3	1,329.7	-3.6
Natural Gas (mil. of cu. ft.)	22,591.7	25,388.3	12.4	24,242.3	22,557.9	7.5
Coal (thous. short tons)	2,109	2,601	23.3	2,328	2,084	11.7
Crude Oil to Refineries, Barrels Received (thous. of bbls.)	4,016	3,883	-3.3	4,049	4,160	-2.7
<b>Travel/Tourism</b>						
Air Passengers (total no. on and off, S.L. Int'l. Airport)	1,574,946	1,537,750	-2.4	1,653,607	1,624,231	1.8
Highway Traffic Count Across State Lines (both directions)	69,025	62,431	-9.6	65,516	67,026	-2.3
Visits to State and National Parks and Monuments	1,218,666	1,093,686	-10.3	1,094,951	1,355,053	-19.2
<b>Utilities</b>						
Natural Gas Customers (residential and commercial)	688,610	705,757	2.5	691,702	674,575	2.5
Natural Gas Customers (industrial)	1,063	1,033	-2.8	1,045	1,077	-2.9
Telephone Lines in Service (Qwest, residential access)	780,729	731,580	-6.3	763,734	770,727	-0.9
Telephone Lines in Service (Qwest, business/public access)	688,610	429,135	-37.7	555,140	461,746	20.2

## Utah Business Statistics

UTAH DATA	April 2000	April 2001	% Change from Year Ago	12-Month Average Current Year	12-Month Average Last Year	12-Month Average % Change
<b>Davis County</b>						
Nonagricultural Employment (thous.)	83.1	85.5	2.9	85.7	83.3	2.9
Unemployment Rate (seasonally adjusted)	2.9	3.5	20.7	3.0	3.1	-3.5
Authorized Permit Construction (thous. of dol.)	31,986.3	34,146.2	6.8	35,057.9	26,928.1	30.2
New Dwelling Units (no.)	185	204	10.3	198	174	13.3
New Car, Truck, and Motor Home Sales, Owner's County (no.)	698	na	na	783	740	5.8
Natural Gas Customers (residential and commercial)	74,546	76,241	2.3	75,262	73,128	2.9
Natural Gas Customers (industrial)	93	92	-1.1	94	95	-1.9
Telephone Lines in Service (Qwest, residential access)	94,060	95,162	1.2	94,818	92,666	2.3
Telephone Lines in Service (Qwest, business access)	28,824	31,130	8.0	29,961	27,392	9.4
<b>Salt Lake County</b>						
Nonagricultural Employment (thous.)	541.1	553.2	2.2	549.7	535.9	2.6
Unemployment Rate (seasonally adjusted)	3.0	3.6	20.0	3.0	3.1	-3.2
Authorized Permit Construction (thous. of dol.)	127,897.3	112,010.1	-12.4	124,566.2	115,868.6	7.5
New Dwelling Units (no.)	356	408	14.6	402	397	1.2
New Car, Truck, and Motor Home Sales, Owner's County (no.)	3,648	na	na	3,972	3,611	10.0
Natural Gas Customers (residential and commercial)	296,668	297,212	0.2	291,350	289,206	0.7
Natural Gas Customers (industrial)	474	464	-2.1	467	483	-3.4
Telephone Lines in Service (Qwest, residential access)	347,814	331,189	-4.8	340,358	345,892	-1.6
Telephone Lines in Service (Qwest, business access)	227,122	236,295	4.0	233,332	205,169	13.7
<b>Utah County</b>						
Nonagricultural Employment (thous.)	151.9	156.6	3.1	153.4	148.3	3.4
Unemployment Rate (seasonally adjusted)	2.6	3.1	19.2	2.7	2.8	-3.9
Authorized Permit Construction (thous. of dol.)	59,091.6	85,067.2	44.0	66,638.7	58,547.2	13.8
New Dwelling Units (no.)	365	439	20.3	338	341	-0.9
New Car, Truck, and Motor Home Sales, Owner's County (no.)	869	na	na	960	770	24.7
Natural Gas Customers (residential and commercial)	99,741	104,108	4.4	100,943	96,459	4.6
Natural Gas Customers (industrial)	148	148	0.0	152	147	3.2
Telephone Lines in Service (Qwest, residential access)	112,236	108,938	-2.9	111,142	110,222	0.8
Telephone Lines in Service (Qwest, business access)	55,731	61,409	10.2	58,081	48,298	20.3
<b>Weber County</b>						
Nonagricultural Employment (thous.)	91.0	89.8	-1.3	88.6	88.6	-0.0
Unemployment Rate (seasonally adjusted)	3.5	4.8	37.1	4.2	4.1	3.3
Authorized Permit Construction (thous. of dol.)	25,858.8	23,346.6	-9.7	18,833.9	37,525.9	-49.8
New Dwelling Units (no.)	115	134	16.5	108	153	-29.1
New Car, Truck, and Motor Home Sales, Owner's County (no.)	475	na	na	491	450	9.0
Natural Gas Customers (residential and commercial)	67,161	68,894	2.6	67,568	65,926	2.5
Natural Gas Customers (industrial)	101	98	-3.0	100	104	-3.8
Telephone Lines in Service (Qwest, residential access)	65,028	56,569	-13.0	60,526	64,477	-6.1
Telephone Lines in Service (Qwest, business access)	31,018	33,717	8.7	32,115	25,301	26.9

na Not Available

<sup>1</sup> Before deductions for hauling and government withholding; includes quality, quantity and other premiums. Excludes hauling subsidies. <sup>2</sup> Mid-month prices. <sup>3</sup> Some figures not strictly comparable due to reclassification. <sup>4</sup> Includes services by nonprofit and religious organizations. <sup>5</sup> Includes public schools and college institutions. <sup>6</sup> Includes allowance for loan losses.

Sources:

Personal Income	U.S. Department of Commerce, Bureau of Economic Analysis.
New Corporations	Utah Department of Commerce, Division of Corporations and Commercial Code.
New Car and Truck Sales	Utah State Tax Commission, Economic and Statistics Unit, <i>Utah Car and Truck Sales</i> .
Agriculture	U.S. Department of Agriculture, Utah Agricultural Statistics Service, <i>Utah Agriculture</i> .
Construction Data	Bureau of Economic and Business Research, University of Utah, <i>Utah Construction Report</i> .
Employment Data	Utah Department of Workforce Services, <i>Utah Labor Market Report</i> .
Finance Data	Utah Department of Financial Institutions.
Crude Oil Production	Utah Division of Oil, Gas and Mining, <i>Oil and Gas Production Report</i> , and Utah Office of Energy and Resource Planning.
Natural Gas Production	Utah Division of Oil, Gas and Mining, <i>Oil and Gas Production Report</i> .
Coal Production	U.S. Department of Energy, Energy Information Administration.
Air Passengers	SLC International Airport, Statistics Division, <i>Air Traffic Statistics and Activity Report</i> .
Highway Traffic Count	Utah Department of Transportation, <i>Automatic Traffic Recorder Data Report</i> .
Visits to State and National Parks and Monuments	U.S. Forest Service and Utah State Parks and Recreation Department.
Utilities Data	Cooperating Utility Companies.

## Utah Business Statistics

NATIONAL DATA	March	March	% Change from Year Ago	12-Month	12-Month	12-Month Average % Change
	2000	2001		Average Current Year	Average Last Year	
U.S. Gross Domestic Product (seas. adj. at ann. rates, bil., qrtly.)	9,707.0	10,229.4	5.4	10,082.2	9,135.1	10.4
Total Personal Income (seas. adj. at ann. rates, bil. of dol.)	8,154.8	8,598.4	5.4	8,393.8	7,810.8	7.5
Industrial Production Index (seasonally adjusted, 1992=100)	142.4	145.1	1.9	147.0	137.9	6.6
Capacity Utilization Rate (seasonally adjusted, percent)	81.7	78.8	-3.5	81.3	80.9	0.6
Net Exports of Goods & Services (millions of dollars; seasonally adj.)	-31,467.0	-33,076.0	5.1	-31,952.8	-24,691.0	29.4
Exports of Goods & Services (millions of dollars; seasonally adj.)	86,838.0	88,716.0	2.2	89,812.0	81,941.0	9.6
Imports of Goods & Services (millions of dollars; seasonally adj.)	118,305.0	121,792.0	2.9	121,765.1	106,631.8	14.2
Composite Index of 11 Leading Indicators (1992=100)	106.1	108.7	2.5	108.8	107.0	1.6
Price Indexes						
Consumer Price Indexes (not seasonally adjusted, 1982-84=100)						
CPI-U (All Urban Consumers) All Items	171.2	176.2	2.9	173.6	167.9	3.4
CPI-U (All Urban Consumers) Food and Beverages	167.1	172.2	3.1	169.6	165.4	2.6
CPI-U (All Urban Consumers) Housing	167.8	175.4	4.5	171.5	164.9	4.0
CPI-U (All Urban Consumers) Transportation	153.4	153.9	0.3	154.3	146.9	5.0
CPI-U (All Urban Consumers) Medical Care	258.1	270.0	4.6	263.7	253.0	4.2
CPI-U (All Urban Consumers) Energy	122.2	129.5	6.0	128.2	111.0	15.5
Producer Price Index (not seasonally adjusted, 1982=100)						
Producer Price Index, All Finished Goods	137.0	141.0	2.9	139.2	134.2	3.7
GDP Implicit Price Deflator (seasonally adjusted, 1992=100, qrtly.)	106.0	108.5	2.4	107.5	107.3	0.2
Corporate Profits (seas. adj. at ann. rates, bil., qrtly.)						
Profits Before Taxes	920.7	866.2	-5.9	912.0	878.7	3.8
Profits-Tax Liability	286.3	259.0	-9.5	277.3	266.8	4.0
Profits After Taxes	634.4	607.2	-4.3	634.6	588.2	7.9
Civilian Employment (seasonally adjusted)						
Labor Force (mil.)	140.9	141.9	0.7	141.1	139.8	0.9
Employment (mil.)	135.2	135.4	0.1	135.4	134.0	1.0
Unemployment Rate	4.1	4.3	4.9	4.1	4.2	-2.8
Value of New Construction Put In Place						
Total Construction (seas. adj. at ann. rates, bil. of dol.)	833.0	876.1	5.2	837.6	784.3	6.8
Private Const.: Residential (seas. adj. at ann. rates, bil. of dol.) <sup>b</sup>	386.9	395.1	2.1	374.6	364.2	2.9
New Housing Units (seas. adj. at ann. rates, bil. of dol.)	274.3	273.9	-0.1	265.4	257.8	3.0
Private Const.: Nonresidential (seas. adj. at ann. rates, bil. of dol.)	205.5	225.9	9.9	215.2	194.9	10.4
Interest Rates						
Federal Funds Rate	5.85	5.31	-9.2	6.22	5.22	19.2
Discount Rate on New 91-Day Treasury Bills	5.72	4.81	-15.9	5.73	4.94	15.9
Yield on Long-Term Treasury Bonds	6.05	5.34	-11.7	5.73	6.10	-6.1
Average Prime Rate Charged by Banks	8.83	8.32	-5.8	9.22	8.23	12.0
Mortgage Rate (conventional 1st mortgage, new home, U.S. avg.)	8.24	6.95	-15.6	7.75	7.72	0.3

na Not Available

<sup>b</sup> Includes residential improvements, not shown separately.

## Sources:

U.S. Gross Domestic Product

U.S. Department of Commerce, *Survey of Current Business*.

Total Personal Income

U.S. Department of Commerce, *Survey of Current Business*.

Industrial Production Index

Board of Governors of the Federal Reserve System, *Federal Reserve Bulletin*.

Capacity Utilization Rate

Board of Governors of the Federal Reserve System, *Federal Reserve Bulletin*.

Export/Import Data

U.S. Department of Commerce, *Survey of Current Business*.

Composite Index of 11 Leading Indicators

The Conference Board, Inc.

Consumer Price Indexes

U.S. Department of Labor, Bureau of Labor Statistics, *Monthly Labor Review*.

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U.S. Department of Labor, Bureau of Labor Statistics, *Monthly Labor Review*.

National Construction Data

U.S. Department of Commerce, Bureau of the Census, *Value of New Construction Put in Place*.

Interest Rates

Board of Governors of the Federal Reserve System, *Federal Reserve Bulletin*.

## Utah Business Statistics

	April 2000	April 2001	% Change from Year Ago	12-Month Average Current Year	12-Month Average Last Year	12-Month Average % Change
<b>NATIONAL DATA</b>						
U.S. Gross Domestic Product (seas. adj. at ann. rates, bil., qrtly.)	na	na	na	10,082.2	9,135.1	10.4
Total Personal Income (seas. adj. at ann. rates, bil. of dol.)	8,202.5	8,622.6	5.1	8,428.8	7,876.6	7.0
Industrial Production Index (seasonally adjusted, 1992=100)	143.5	144.2	0.5	147.0	138.7	6.0
Capacity Utilization Rate (seasonally adjusted, percent)	82.1	78.2	-4.8	81.0	81.0	0.0
Net Exports of Goods & Services (millions of dollars; seasonally adj.)	-29,442.0	-32,174.0	9.3	-32,180.5	-25,585.3	25.8
Exports of Goods & Services (millions of dollars; seasonally adj.)	87,991.0	86,917.0	-1.2	89,722.5	82,775.0	8.4
Imports of Goods & Services (millions of dollars; seasonally adj.)	117,433.0	119,091.0	1.4	121,903.3	108,360.0	12.5
Composite Index of 11 Leading Indicators (1992=100)	106.1	108.8	2.5	109.0	106.9	1.9
<b>Price Indexes</b>						
Consumer Price Indexes (not seasonally adjusted, 1982-84=100)						
CPI-U (All Urban Consumers) All Items	171.3	176.9	3.3	174.1	168.3	3.4
CPI-U (All Urban Consumers) Food and Beverages	167.2	172.4	3.1	170.0	165.6	2.7
CPI-U (All Urban Consumers) Housing	167.9	175.4	4.5	172.1	165.3	4.1
CPI-U (All Urban Consumers) Transportation	152.9	156.1	2.1	154.6	147.6	4.7
CPI-U (All Urban Consumers) Medical Care	258.8	270.8	4.6	264.7	253.8	4.3
CPI-U (All Urban Consumers) Energy	120.7	133.1	10.3	129.2	112.3	15.1
Producer Price Index (not seasonally adjusted, 1982=100)						
Producer Price Index, All Finished Goods	137.0	141.7	3.4	139.6	134.7	3.7
GDP Implicit Price Deflator (seasonally adjusted, 1992=100, qrtly.)	na	na	na	107.5	107.3	0.2
Corporate Profits (seas. adj. at ann. rates, bil., qrtly.)						
Profits Before Taxes	na	na	na	912.0	878.7	3.8
Profits-Tax Liability	na	na	na	277.3	266.8	4.0
Profits After Taxes	na	na	na	634.6	588.2	7.9
Civilian Employment (seasonally adjusted)						
Labor Force (mil.)	141.2	141.8	0.4	141.2	140.0	0.8
Employment (mil.)	135.7	135.4	-0.3	135.3	134.2	0.8
Unemployment Rate	3.9	4.5	15.4	4.1	4.1	-0.8
Value of New Construction Put In Place						
Total Construction (seas. adj. at ann. rates, bil. of dol.)	817.7	879.2	7.5	842.8	788.6	6.9
Private Const.: Residential (seas. adj. at ann. rates, bil. of dol.) <sup>b</sup>	381.1	395.1	3.7	375.8	367.0	2.4
New Housing Units (seas. adj. at ann. rates, bil. of dol.)	272.5	275.1	0.9	265.6	259.7	2.3
Private Const.: Nonresidential (seas. adj. at ann. rates, bil. of dol.)	205.2	217.4	5.9	216.2	195.7	10.5
Interest Rates						
Federal Funds Rate	6.02	4.80	-20.3	6.11	5.32	14.9
Discount Rate on New 91-Day Treasury Bills	5.67	4.28	-24.5	5.61	5.06	11.0
Yield on Long-Term Treasury Bonds	5.85	5.65	-3.4	5.71	6.12	-6.7
Average Prime Rate Charged by Banks	9.00	7.80	-13.3	9.12	8.33	9.4
Mortgage Rate (conventional 1st mortgage, new home, U.S. avg.)	8.15	7.08	-13.2	7.66	7.83	-2.1

na Not Available

<sup>b</sup> Includes residential improvements, not shown separately.

## Sources:

U.S. Gross Domestic Product

U.S. Department of Commerce, *Survey of Current Business*.

Total Personal Income

U.S. Department of Commerce, *Survey of Current Business*.

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Board of Governors of the Federal Reserve System, *Federal Reserve Bulletin*.

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Interest Rates

Board of Governors of the Federal Reserve System, *Federal Reserve Bulletin*.

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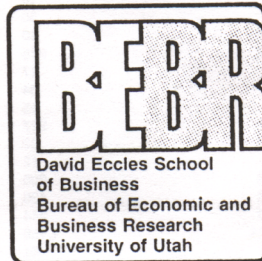
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