INSTITUTE FOR PUBLIC POLICY
AND BUSINESS RESEARCH
TECHNICAL REPORT SERIES

# Population Projections for Barton County: *1995 to 2030*

Kansas Center for Community Economic Development
Institute for Public Policy and Business Research
University of Kansas

May 22, 1995

Technical Report No. 25

# Population Projections for Barton County:

## *1995 to 2030*


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# Population Projections for Barton County: 1995 to 2030

## Introduction

The Mid-Kansas Economic Development Commission contacted the Kansas Center for Community Economic Development (KCCED) at the University of Kansas in March 1995 to discuss the possibility of KCCED developing population projections for Barton County. The Commission was concerned that, given the recent job growth experienced in the county, the projections developed in 1992 by the Division of the Budget for the State of Kansas[1] overestimated future population loss for Barton County.

As illustrated by **Map 1**, over half of the counties in Kansas had estimated population losses from 1990 to 1994. Barton County's estimated population loss was 486. However, since 1988, Barton County has seen an increase in job growth (**Figure 1**). This increase in job growth may help to slow the amount of population loss in Barton County.

KCCED concurred with the Mid-Kansas Development Commission that projected out-migration may have been overestimated for Barton County and agreed to develop new projections for Barton County based on an established method that would include population trends, migration patterns, births and deaths. The following report discusses the results of KCCED's efforts, which includes the methodology employed, the projections, and a comparison with the State's projections.

## Methodology

The population projections developed by KCCED are cohort population projections, which project total population as well as age-sex structure. Age-sex structure is important information for a community to have in planning for the future. For example, a large number of females entering child-bearing age would have a significant impact on the number of births. This in turn impacts future planning for schools. The age structure of the population also influences housing needs for a community. And, age-sex structure is important information to have in projecting labor force supply. In general, age-sex structure projections are useful information to have for planning for public and private services and facilities.

The standard cohort survival method involves separate projections of mortality, fertility, and migration for each age-sex group. This is the same method used in developing the State's

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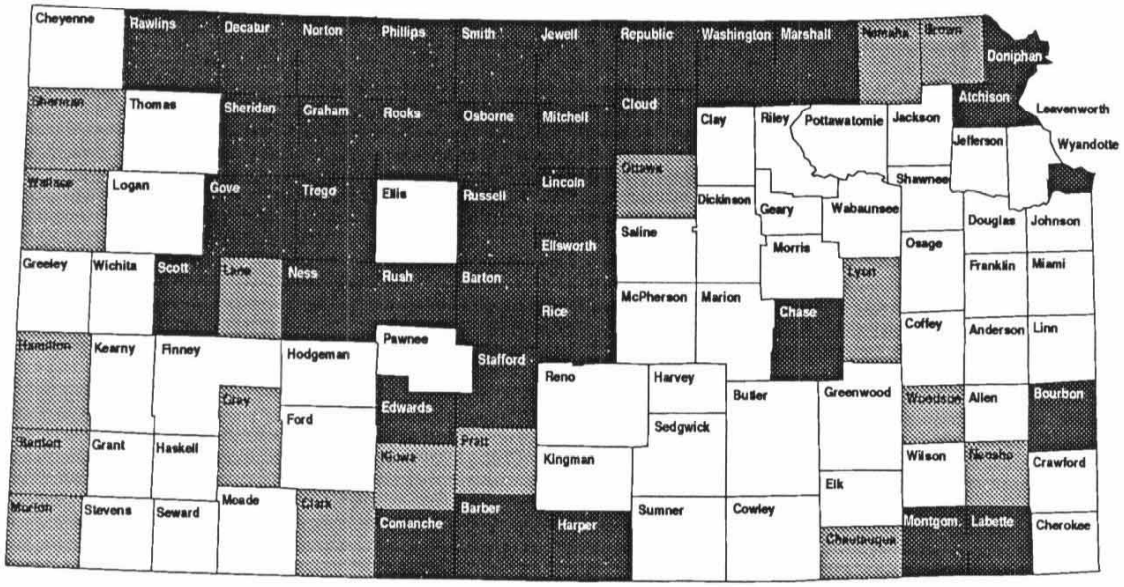
[1]Floerchinger, Teresa. D., *Kansas Population Projections 1995-2030*, Kansas Division of the Budget, September 1992.

1992 projections. Basically, KCCED replicated the State's 1992 projection process[2] with altered migration rates that factored in new average net migration figures not available in 1992.

## Map 1
## Estimated Population Change
### State of Kansas: 1990-1994

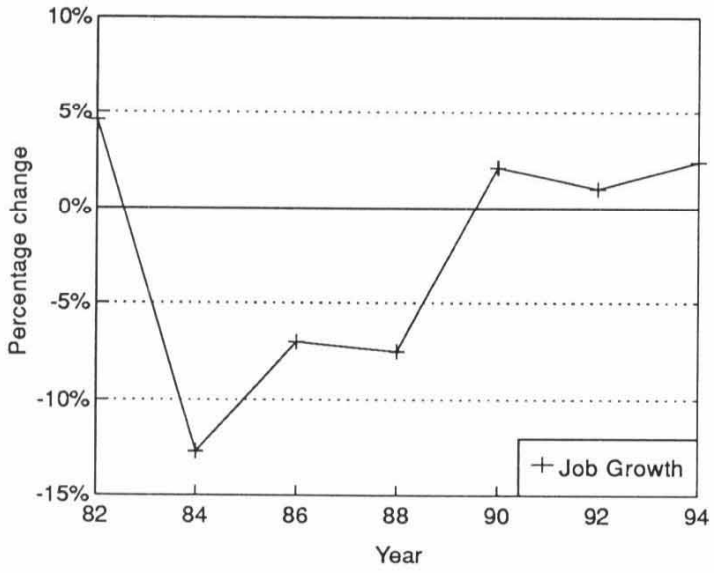



***Legend:*** White = estimated population growth
Gray = estimated population loss of less than 100
Black = estimated population loss of greater than 100

Source: Population Estimates Branch, U. S. Bureau of the Census, January 1995.

[2]For a complete description of the 1992 process, see pp. 2 - 4, *Kansas Population Projections 1995-2030.*

**Figure 1**
## Rate of Job Growth: 1982-1994
**Barton County**




*Note:* Employment data are based on an individual's place of residence.

Source: Kansas Labor Force Estimates Annual Average 1994, Kansas Department of Human Resources, KCCED's calculations.

The basic cohort survival method is:

$$P_1 = P_0 + B - D + NM$$

*Where:*

$P_1$ = Population at end of the time period
$P_0$ = Population at beginning of the period
B = Births during the period
D = Deaths during the period
NM = Net Migration during the period.

Births and deaths were calculated using fertility and survival rates found in *Kansas Population Projections 1995-2030*. Births were calculated by multiplying projected fertility rates by the number of women that are of child bearing age (10-49 years). Deaths were calculated in a similar fashion using survival rate data. The population at the beginning of the time period was multiplied by the survival rate in order to calculate the number of survivors for the subsequent period.

The amount of net migration which occurred during the period was the most difficult variable in the equation to calculate. The 1992 projections by the Division of the Budget assumed that the migration patterns which occurred between 1980 and 1990 would linearly approach 1 by the year 2030. From 1980 to 1990, Barton County had an out-migration rate of 13.9 percent. There is evidence, however, that migration out of the county is decreasing. The latest population estimations done by the Census show that the yearly population loss in Barton County has decreased from 196 persons per year in the 1980's to 121 persons per year between 1990 and 1994. By using the 1980 to 1990 time period to create out-migration patterns, the 1992 projections may have overestimated the migration out of Barton County. Therefore, KCCED developed new migration rates for Barton County that took into account the new average net migration figure not available in 1992.[3]

## RESULTS

Population projections for Barton County from 1995 to 2030 are given in **Table 1**, which breaks down the results by female, male and total. KCCED's total population projection for 1995 is 29,870, an increase of 488. The high increase in the 60-64 and 65-69 cohort between the years 1990 and 1995 is a reflection of the high in-migration rate used in the State's 1992 projection process.[4] The model does project a population decrease from 1995 to 2000 by 92 and then projects fairly stable population levels from 2010 to 2030 with population fluctuating

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[3]First, KCCED calculated the net migration figures by age and sex that the State used in creating its projections and then multiplied these numbers by the migration ratio. This migration ratio was created by taking the amount of net out-migration that occurred between 1980 and 1990 in Barton County and then annualizing that figure. Next, the amount of estimated out-migration which occurred between 1990 and 1994 was annualized. The annualized out-migration rate for 1990-1994 was then divided by the annualized out-migration rate for 1980-1994. The migration rates for each age group and sex group used in the State projections were multiplied by this migration ratio to create new migration rates that reflect the decrease in out-migration from Barton County that occurred between 1990 and 1994.

[4]This high rate is probably caused by the State creating 14 groups of counties with similar overall migration rates and then creating specific migration rates by sex and age. Barton County was probably placed in a group that had a county (or counties) with a nursing home that is serving the elderly population in that area and is thus experiencing net in-migration of elderly. This placement and subsequent migration assumption is of some concern because past data show that Barton County has been experiencing a net migration of "0" for this age group. Consequently, this large amount of in-migration of elderly projected by the model for Barton County is questionable. In other words, the 60-69 cohort projections should be used with caution in planning housing for the elderly in the county.

around the 29,500 level. The projected 2030 population for Barton County is 42 fewer people than 1990.

**Table 1**
**Population Projections: 1995 to 2030**
**Barton County**
**by Female, Male, and Total**

***Female Population:***

| Cohort | 1990 | 1995 | 2000 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|---|---|---|
| 0-4 | 1,087 | 1,037 | 972 | 874 | 856 | 889 | 988 | 914 | 891 |
| 5-9 | 1,180 | 1,063 | 1,071 | 956 | 862 | 847 | 883 | 984 | 913 |
| 10-14 | 1,022 | 1,217 | 1,091 | 1,039 | 973 | 874 | 855 | 886 | 983 |
| 15-19 | 908 | 971 | 1,164 | 1,052 | 1,009 | 951 | 860 | 847 | 885 |
| 20-24 | 802 | 644 | 729 | 922 | 877 | 882 | 871 | 823 | 846 |
| 25-29 | 1,056 | 871 | 692 | 773 | 967 | 908 | 903 | 880 | 821 |
| 30-34 | 1,216 | 967 | 808 | 650 | 736 | 931 | 885 | 890 | 878 |
| 35-39 | 1,106 | 1,152 | 923 | 777 | 629 | 718 | 915 | 875 | 887 |
| 40-44 | 851 | 1,146 | 1,184 | 944 | 790 | 637 | 722 | 915 | 971 |
| 40-49 | 731 | 889 | 1,189 | 1,220 | 966 | 802 | 641 | 722 | 908 |
| 50-54 | 709 | 660 | 806 | 1,104 | 1,147 | 919 | 773 | 625 | 712 |
| 55-59 | 788 | 837 | 761 | 905 | 1,208 | 1,222 | 952 | 778 | 611 |
| 60-64 | 765 | 581 | 645 | 612 | 758 | 1,050 | 1,100 | 887 | 750 |
| 65-69 | 786 | 1,061 | 770 | 815 | 735 | 862 | 1,127 | 1,111 | 840 |
| 70-74 | 701 | 584 | 818 | 614 | 671 | 623 | 753 | 1,011 | 1,023 |
| 75-79 | 605 | 779 | 632 | 860 | 626 | 662 | 594 | 692 | 896 |
| 80-84 | 486 | 468 | 613 | 505 | 695 | 509 | 543 | 491 | 575 |
| 85+ | 407 | 525 | 594 | 731 | 757 | 885 | 843 | 845 | 822 |
| Total | 15,206 | 15,452 | 15,407 | 15,355 | 15,262 | 15,171 | 15,207 | 15,178 | 15,111 |

**Table 1** (continued)
**Population Projections: 1995 to 2030**
**Barton County**
**by Female, Male, and Total**

***Male Population:***

| Cohort | 1990 | 1995 | 2000 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|---|---|---|
| 0-4 | 1,144 | 1,089 | 1,019 | 914 | 894 | 927 | 1,029 | 951 | 925 |
| 5-9 | 1,276 | 1,118 | 1,068 | 1,002 | 902 | 885 | 920 | 1,025 | 949 |
| 10-14 | 1,147 | 1,315 | 1,148 | 1,091 | 1,019 | 914 | 892 | 924 | 1,024 |
| 15-19 | 948 | 1,087 | 1,256 | 1,104 | 1,057 | 995 | 898 | 883 | 921 |
| 20-24 | 764 | 669 | 812 | 990 | 916 | 921 | 907 | 856 | 878 |
| 25-29 | 1,055 | 826 | 715 | 858 | 1,034 | 945 | 938 | 913 | 850 |
| 30-34 | 1,207 | 962 | 763 | 668 | 813 | 991 | 917 | 921 | 907 |
| 35-39 | 1,109 | 1,137 | 913 | 730 | 645 | 790 | 970 | 904 | 914 |
| 40-44 | 875 | 1,140 | 1,164 | 930 | 740 | 650 | 791 | 966 | 895 |
| 40-49 | 711 | 908 | 1,176 | 1.149 | 946 | 747 | 651 | 786 | 953 |
| 50-54 | 639 | 634 | 822 | 1,080 | 1,070 | 891 | 712 | 628 | 768 |
| 55-59 | 683 | 742 | 719 | 911 | 1,165 | 1,123 | 910 | 706 | 605 |
| 60-64 | 690 | 482 | 550 | 559 | 739 | 983 | 984 | 826 | 664 |
| 65-69 | 656 | 924 | 617 | 672 | 649 | 811 | 1,017 | 955 | 750 |
| 70-74 | 525 | 428 | 647 | 450 | 509 | 509 | 657 | 849 | 821 |
| 75-79 | 376 | 530 | 420 | 617 | 416 | 454 | 437 | 543 | 675 |
| 80-84 | 213 | 244 | 350 | 283 | 421 | 286 | 316 | 307 | 386 |
| 85+ | 158 | 183 | 213 | 285 | 290 | 366 | 334 | 339 | 343 |
| Total | 14,176 | 14,418 | 14,371 | 14,293 | 14,225 | 14,185 | 14,280 | 14,283 | 14,229 |

**Table 1** (continued)
**Population Projections: 1995 to 2030**
**Barton County**
**by Female, Male, and Total**

***Total Population:***

| Cohort | 1990 | 1995 | 2000 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|---|---|---|
| 0-4 | 2,231 | 2,125 | 1,991 | 1,788 | 1,750 | 1,816 | 2,017 | 1,865 | 1,815 |
| 5-9 | 2,456 | 2,181 | 2,085 | 1,958 | 1,765 | 1,732 | 1,803 | 2,009 | 1,862 |
| 10-14 | 2,169 | 2,532 | 2,239 | 2,130 | 1,992 | 1,787 | 1,747 | 1,810 | 2,007 |
| 15-19 | 1,856 | 2,058 | 2,421 | 2,156 | 2,066 | 1,947 | 1,758 | 1,731 | 1,806 |
| 20-24 | 1,566 | 1,313 | 1,541 | 1,913 | 1,763 | 1,803 | 1,778 | 1,679 | 1,724 |
| 25-29 | 2,111 | 1.696 | 1,406 | 1,631 | 2,000 | 1,852 | 1,840 | 1,793 | 1,671 |
| 30-34 | 2,423 | 1,929 | 1,570 | 1,318 | 1,548 | 1,922 | 1,801 | 1,811 | 1,785 |
| 35-39 | 2,215 | 2,289 | 1,837 | 1,507 | 1,274 | 1,507 | 1,885 | 1,779 | 1,801 |
| 40-44 | 1,726 | 2,286 | 2,348 | 1,874 | 1,530 | 1,286 | 1,513 | 1,882 | 1,766 |
| 40-49 | 1,442 | 1,798 | 2,365 | 2,369 | 1,912 | 1,549 | 1,292 | 1,508 | 1,861 |
| 50-54 | 1,348 | 1,294 | 1,628 | 2,183 | 2,216 | 1,810 | 1,485 | 1,253 | 1,480 |
| 55-59 | 1,471 | 1,578 | 1,480 | 1,816 | 2,374 | 2,345 | 1,862 | 1,484 | 1,216 |
| 60-64 | 1,455 | 1,063 | 1,195 | 1,171 | 1,497 | 2,033 | 2,084 | 1,714 | 1,414 |
| 65-69 | 1,442 | 1,985 | 1,387 | 1,487 | 1,384 | 1,673 | 2,144 | 2,066 | 1,590 |
| 70-74 | 1,226 | 1,012 | 1,465 | 1,064 | 1,181 | 1,132 | 1,410 | 1,860 | 1,845 |
| 75-79 | 981 | 1,308 | 1,052 | 1,476 | 1,042 | 1,116 | 1,031 | 1,235 | 1,570 |
| 80-84 | 699 | 712 | 963 | 788 | 1,116 | 796 | 859 | 798 | 961 |
| 85+ | 565 | 708 | 807 | 1,016 | 1,047 | 1,249 | 1,177 | 1,185 | 1,166 |
| Total | 29,382 | 29,870 | 29,778 | 29,648 | 29,487 | 29,357 | 29,487 | 29,461 | 29,340 |

Source: Kansas Center for Community Economic Development, Institute for Public Policy and Business Research, University of Kansas, May 1995.

## COMPARISON WITH THE STATE'S 1992 PROJECTIONS

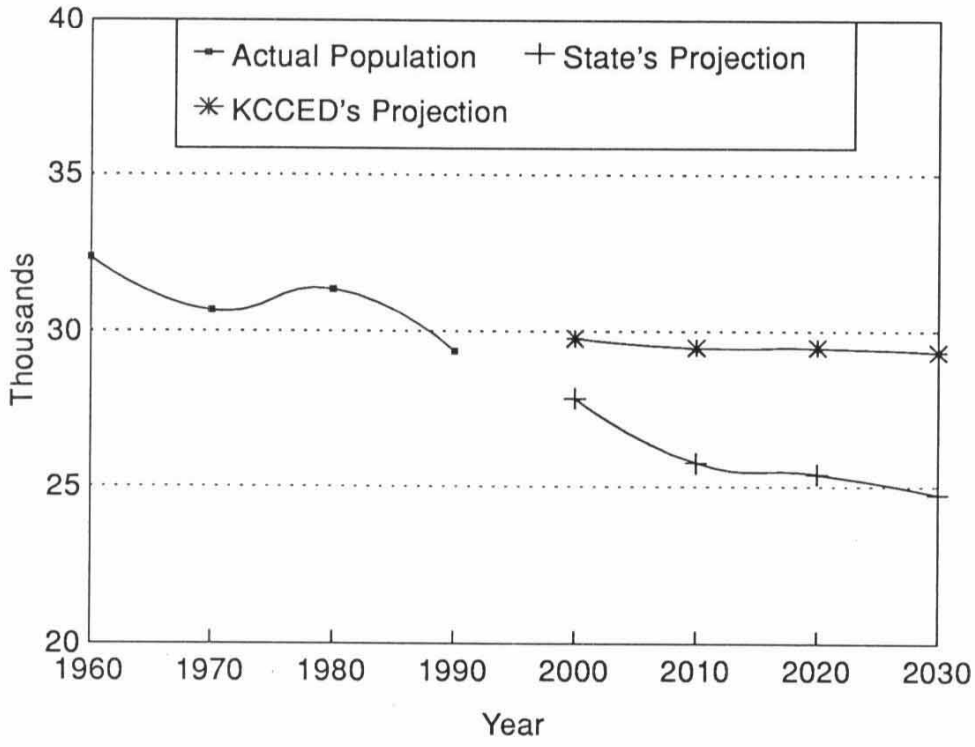
A comparison of KCCED's 1995 projections and the State's 1992 projections is illustrated in **Table 2** and **Figure 2**. The difference between the results is due to the difference migration rates used in applying the same formula. KCCED averaged in total migration rates obtained from population estimates to 1994. This data was not used for the 1992 projections. KCCED projects a more stable population for Barton County than was projected by the State in 1992.

**Table 2**
**Comparison of State's 1992 Projections with KCCED's 1995 Projections for Barton County**

| Year | KCCED's Projection | State's Projection | Differential |
|---|---|---|---|
| 1995 | 29,870 | 29,616 | 254 |
| 2000 | 29,778 | 27,857 | 1,921 |
| 2005 | 29,648 | 27,161 | 2,487 |
| 2010 | 29,487 | 26,281 | 3,206 |
| 2015 | 29,357 | 25,772 | 3,585 |
| 2020 | 29,487 | 25,414 | 4,073 |
| 2025 | 29,461 | 25,093 | 4,368 |
| 2030 | 29,304 | 24,751 | 4,553 |

Source: KCCED/IPPBR, Population Projections for Barton County, 1995 and *Kansas Population Projections 1995-2030*, Kansas Division of the Budget, September 1992.

**Figure 2**
## Actual and Projected Population
**Barton County: 1960-2030**




Source: KCCED/IPPBR, Population Projections for Barton County, 1995; *Kansas Population Projections 1995-2030*, Kansas Division of the Budget, September 1992; and, *Kansas Statistical Abstract 1992-93*, IPPBR, Census data.

## CONCLUSION

The current trend for many rural Kansas counties is continued population loss. Those counties that either surround or neighbor a metropolitan area, such as Topeka, Kansas City or Wichita, are experiencing an increased population. However, since 1988, Barton County has experienced some job growth which may reduce net out-migration. The 1994 population estimates for Barton County show population losses less than projected by the 1992 population projections. KCCED's 1995 population projection for Barton County takes this new net migration data into consideration when calculating migration rates for the various age-sex structures. KCCED employs the same cohort-component model as the State of Kansas' 1992 projections but uses an adjusted migration rate input.

The cohort-component methodology used by KCCED to develop these population projections depends on births, deaths, and migration. KCCED has used the best available information on births, deaths, and migration to make assumptions about these variables. KCCED's population projections project a birth rate for the 1990-1993 period which is consistent with the latest birth data available. With regards to migration, Barton County has experienced great fluctuations in migration and this makes the projection of migration rates for Barton County very difficult. The projections developed for the 60-69 age group is inconsistent with past migration patterns. With these cautions in mind, KCCED projects Barton County's population to increase slightly by 2000 and then gradually decline to the 1990 population level by the year 2030.