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NEW JERSEY
INTERIM
POPULATION PROJECTIONS
1980 - 2000

(For Review and Comment)

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New Jersey Department of Labor and Industry
Division of Planning and Research
Office of Demographic and Economic Analysis

June 1978

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AN EXPLANATION OF METHODS

INTRODUCTION

The numbers in this report represent interim population projections to the year 2000 for the State of New Jersey and its twenty-one counties. These projections supersede all other projections issued in the past by the Department of Labor and Industry.

The numbers are projections, not forecasts or predictions. A projection is the measurement of a future condition that would exist if the rules and assumptions of the method proved to be empirically valid in the future. Projections may assume continuations of past conditions, present conditions, or trended changes in historical conditions. They may also assume entirely new transition rates. Given the method and the assumptions, a projection is always correct if the operations of the projection method are carried out without error. The number of possible projections for any given population is therefore infinite. A forecast, on the other hand, is a projection that is also a judgmental statement concerning the expected measurement of future conditions; it is a prediction. All forecasts are projections, but not all projections are forecasts.¹ Again, these numbers are projections.

It should be stressed that the numbers in this report are interim. As interim projections, they represent a "first-cut" set of projections for the State and its counties. They were benchmarked to certain provisional input data, which are expected to be refined in the near future. Also, during the next few months, these projections will be subject to internal review and evaluation. It is hoped that this Department's own internal review will be supplemented simultaneously by review and comment from interested and knowledgeable individuals in the public and private sectors. At the end of this review period, a revised set of projections will be released.

There exists a large number of projection techniques and models for projecting the future levels of population, as well as changes in their internal composition.² These range from the naive - the simple extrapolation of past trends - to the more complex which strive to model the causal determinants of population change. On the one hand, naive approaches usually project the future without trying to understand any of the dynamic factors behind population change. On the other hand, over-complexity of the more rigorous techniques can create challenges to operationalization.

¹ Donald B. Pittenger, Projecting State and Local Populations (Cambridge, Mass.: Ballinger Publishing Company, 1976), pp.3-4.

² For example, see: U.S. Bureau of the Census, The Methods and Materials of Demography by Henry S. Shryock, Jacob S. Siegel and Associates (Washington, D.C.: U.S. Government Printing Office, 1976); Donald B. Pittenger, ibid; and, Richard Irwin, Guide for Local Area Projections, U.S. Bureau of the Census Technical Paper No.39 (Washington, D.C.: U.S. Government Printing Office, 1977).

Efforts to model interacting forces may be constrained by data limitations, which, in turn, can restrict the derivation of empirical linkages and inhibit the calibration of theoretically specified relationships.

These practical problems with projection models are essentially a function of the current state of the art. Nevertheless, there is a very present need for population projections, and an effort must be made to directly incorporate at least some factors which have been assumed to affect population change.

Four approaches for modeling projected populations of New Jersey and its twenty-one counties which range from the naive to somewhat complex, were chosen by the Department of Labor and Industry. Three are almost totally demographic - one is a simple, long-run linear-regression method (REG); two are based on recent, short-run crude-rate component methods (C65 and C70). The fourth approach is a demographic-economic linked model (ODEA). The ODEA model is a theoretical improvement on the naive techniques, and it is for this reason that the results of the ODEA model are recommended to the user. The results of the other techniques are primarily presented for comparison.

BASIC ASSUMPTIONS

All of the methods reflect several common denominators. At the most general level, it is assumed that no catastrophe, natural or man-made, will occur in the projection period; war, famine or other disaster will invalidate the results. In addition, a continuation of past and present economic and demographic trends have been assumed. The ODEA model in particular is based on a healthy national and State economy in the projection period. Because this Department has an ongoing program of preparing population estimates, the projections incorporate the most recently revised 1975 and 1976 estimates for New Jersey and its counties. Also, all four sets of projections take into account demographic and economic impacts of casino gambling in Atlantic County and on nearby counties. And, information from a survey of county planning boards has been used as additional input to the projections, particularly in the ODEA model. A very brief overview of the four methods follows.³

DEMOGRAPHIC-ECONOMIC LINKED PROJECTION MODEL (ODEA) - (Preferred Set of Projections)

This population projection model is conventionally labeled the cohort-component method, and is premised on the recognition that population change is a function of natural increase and migration. Simply put, a population is survived into the future, net migration is determined, and births are projected by applying fertility rates to female populations.

³ A technical manual is presently being prepared as well as additional tables and graphs which can be used for analytical purposes.

In this effort, three groups of populations were projected separately: the civilian population under 65 years of age; the civilian population 65 years of age and over; and the military. The difference between the projection of the under 65 years of age civilian population and of 65 years of age and over civilian population lies in the migration component. Migration of the population under 65 years of age is projected primarily on the basis of economic factors. Employment, unemployment rates, labor force participation rates, and commutation patterns all play a part. It is this linking of migration to economic variables that gives the model its name. Migration of the over 65 population is based on trends from recent rates. The future levels of the military is a function of federal policy; therefore, the 1976 military population was held constant to the year 2000.

The Survived Population

The civilian populations⁴ were survived by employing age-sex-race-specific survival rates. The survival rates used for the projections are the most recent national rates.⁵ These reflect a significant decline in mortality from major cardiovascular diseases among older adults. A continuation or acceleration of this decline or a major medical breakthrough, - such as a cure for cancer, which has not been assumed, could have a marked effect on these rates and consequently on the results of the model.

Migration

The projection of net migration for the civilian population under 65 years of age is derived primarily from projections of resident labor demand. The major assumption is that economic opportunity in a county stimulates the movement of people under the age of 65. The question of a direct causal relationship between economic opportunity and migration is left unanswered. However, previous empirical studies have indicated that the two phenomena are correlated and that there is an interaction between migration and the demand for labor.⁶ The procedure in the ODEA model was to project net migration of New Jersey counties on the basis of projections of resident labor demand and labor force supply, which incorporated such factors as employment activity, unemployment rates, labor force participation rates, and commutation patterns.

Operationally, resident labor force demand for each projection period was compared to the survived labor force supply. The residual of these two independent projections was assumed to represent labor force

⁴The base population for the initial sequence of the model represents the corrected 1970 Census data by age, race, and sex.

⁵See: U.S. Bureau of the Census, Current Population Reports, Series P-25, No. 704, "Projections of the Population of the United States: 1977 to 2050," U.S. Government Printing Office, Washington, D.C. 1977.

⁶Ira S. Lowry, Migration and Metropolitan Growth; Two Analytical Models (San Francisco, Calif.: Chandler, 1966), pp.40-44.

migration - i.e., the supply and demand sectors interact to generate population movements - which in turn was pyramided to total civilian population migration under 65 years of age.⁷

The migration of the elderly population (65 years of age and over) was calculated by a separate submodel. The basic approach was to survive the elderly population by race and sex, and find the difference between the survived population and the estimated 1975 population.⁸ Five year sex-race-specific net migration rates were then derived for the period 1970 to 1975. These rates were reduced each five-year period.

Under 5 Years of Age Population

To determine the under five years of age cohorts, general fertility rates were applied separately to the survived (closed) and net migrant cohorts of women of childbearing age (15 to 44 years of age). The county-specific general fertility rates were calculated and projected in line with the national Series II projections based on the historical relationship of the county to national rates.⁹

Series II assumes the ultimate level of completed cohort fertility will be 2.1 births per woman. This figure is reasonable but significant deviation from it in either direction is possible in the projection period. Additionally, shifts in the timing of births (for example, an acceleration in the trend toward postponing the birth of the first child until the late twenties) will affect these rates and with them the validity of the projections.

⁷ Similar approaches are reported in: Maryland Department of State Planning, Division of Research Programs, Maryland Projection Series, Population and Employment 1975-1990 (Baltimore, MD: 1975); Pennsylvania Governor's Office of State Planning and Development, Pennsylvania Projection Series: Population and Labor Force, Report No. 73 (Harrisburg, Pa.: Commonwealth of Pennsylvania 1973); Joe W. Lee and William B.D. Hong, "Regional Demographic Projections: 1960-1985" 1972 Regional Economic Projection Series, Report No. 72-R-1 (Washington, D.C.: National Planning Association, 1972).

⁸ Medicare enrollment data was used to estimate the 1970 and 1975 elderly population, along with data from the 1970 Census of Population.

⁹ The county general fertility rates were derived from data obtained from the New Jersey Department of Health. The projected national general fertility rates were secured from: U.S. Bureau of the Census, Current Population Reports, Series P-25, No. 704, "Projections of the Population of the United States: 1977 to 2050," Series II, U.S. Government Printing Office, Washington, D.C. 1977.

Total Open Population

The total open population for each year is the sum of the survived population, net migrants under 65 years of age, net migrants over 65 years of age, births during the five-year period, and 1976 military strength for some counties. Additionally, Atlantic County's and other nearby counties' populations incorporate growth induced by casino gambling. For 1975, the results of the model were controlled to the official State 1975 estimates. For 1980, the projections were controlled to numbers developed from the Department's estimates for the post-1970 Census period.

1970 TO 1975 CRUDE COMPONENT PROJECTIONS (C70)

The purpose of this series is to demonstrate the effect of maintaining the birth and death patterns of the middle 1970's and the migration of the first half of the 1970's throughout the rest of the century. In addition, the series includes population increases in Atlantic and nearby counties due to the projected economic impact of casino gambling in Atlantic City.

The series projects the three components of population change independently for each of the counties and the State. Births, deaths and net migration are computed for each projection interval. These figures together with the population at the start of each interval yield the population at the end. The process starts with the 1976 estimates of population for the counties and the State. Births and deaths in the four-year interval from 1976 to 1980 are computed based on the 1975 crude birth and death rates applied to the 1976 estimates. Net migration is similarly computed using rates based on net migration for the years 1970 to 1975 as reported in the U.S. Census Bureau's Current Population Reports, Series P-26, No. 75-30. These figures together with the 1976 estimates yield the 1980 projected populations of the counties and the State. The process is repeated for all the subsequent five-year intervals to the year 2000. The figures for each component as well as the projected populations are controlled so that the counties sum to the State.

1965 TO 1970 CRUDE COMPONENT PROJECTIONS (C65)

The purpose of this series (C65) is to demonstrate the effect of coupling the birth and death patterns of the middle 1970's with a return to the migration behavior of the latter half of the 1960's, projected to the end of the century. In addition, the series includes population increases in Atlantic and nearby counties due to the projected economic impact of casino gambling in Atlantic City.

This series projects the three components of population change independently for each of the counties and the State. Births, deaths and net migration are computed for each projection interval. These figures

together with the population at the start of each interval yield the population at the end. The process starts with the 1976 estimates of population for the counties and the State. Births and deaths in the four-year interval from 1976 to 1980 are computed based on 1975 crude birth and death rates applied to the 1976 estimates. Net migration is similarly computed using rates based on migration for the years 1965 to 1970 as reported in the 1970 Census. These figures together with the 1976 estimates yield the 1980 projected populations of the counties and the State. The process is repeated for all the subsequent five-year intervals to the year 2000. The figures for each component as well as the projected populations are controlled so that the counties sum to the State.

SIMPLE LINEAR REGRESSION PROJECTION (REG)

The purpose of the series is to demonstrate how the growth trends that have prevailed since the beginning of the century would affect population changes if they continued until the year 2000. The series is based on a regression of population data for each county and the State against time for the period 1900 to 1975. The results of this regression are used to make a straight line projection of population growth for each county using the 1976 estimate as a starting point. Additional population increases in Atlantic and nearby counties due to the projected casino gambling impact in Atlantic City have been incorporated into the series. The main feature of this method is that it uses an extensive history of population changes on which to base the projections.

IN APPRECIATION

This Department would like to acknowledge the technical assistance of several individuals and organizations, who made invaluable contributions and recommendations to our modeling efforts. We are very grateful for the constructive criticism of our procedures and suggestions for future research provided by the following academic demographers:

Bryan Boulier, Office of Population Research, Princeton University
 Eugene P. Ericksen, Institute for Survey Research, Temple University
 Stephen Gale, Population Study Center, University of Pennsylvania
 Michael R. Greenberg, Department of Community Affairs, Livingston College,
 Rutgers University
 James W. Hughes, Department of Urban Planning, Livingston College,
 Rutgers University
 Abram J. Jaffe, School of Applied Social Research, Columbia University
 Donald A. Krueckeberg, Department of Urban Planning, Livingston College,
 Rutgers University
 Philip Sagi, Population Study Center, University of Pennsylvania
 James Trussell, Office of Population Research, Princeton University
 Julian Wolpert, School of Architecture, Princeton University

In addition, we appreciate the comments and suggestions of attendees of the U.S. Census Bureau's Seminar on Advanced Methods of Making Population Projections (April 17-21, 1978), and special thanks are extended to the Maryland Department of State Planning, Division of Research Programs, for technical assistance provided in the development of the computer programming for the ODEA model.

Also, we appreciate the willingness of the county planning boards to cooperate in a survey we conducted with regard to potential growth in their respective counties:

Atlantic County Planning Board	- John R. Gideonse
	Clark Doran, Jr.
Bergen County Planning Board	- James E. Hulsizer
Burlington County Planning Board	- A. Jerome Walnut
Camden County Planning Board	- Joseph T. Patermo
Cape May County Planning Board	- Elwood R. Jarmer
Cumberland County Planning Board	- Carl B. Holm
Essex County Planning Board	- Joseph D'Addario
Gloucester County Planning Board	- Charles Romick
Hudson County Planning Board	- James Rodino
Hunterdon County Planning Board	- Barry Bourquin
Mercer County Planning Board	- Ray Worob
Middlesex County Planning Board	- John A. Sully
Monmouth County Planning Board	- Robert W. Clark
Morris County Planning Board	- Raymond Zabihach
Ocean County Planning Board	- Alan Avery
Passaic County Planning Board	- Herbert Berman
Salem County Planning Board	- Chester W. Ambler
Somerset County Planning Board	- Thomas J. Schrope
Sussex County Planning Board	- Wayne T. McCabe
Union County Planning Board	- Kenneth Shatten
Warren County Planning Board	- Bernard Rooney

Finally, we welcome suggestions and comments from reviewers of these projections. In particular, we are interested in feedback on the results from the ODEA model. Please contact the Office of Demographic and Economic Analysis, Division of Planning and Research, N.J. Department of Labor and Industry, P.O. Box 845, Trenton, N.J. 08625.

New Jersey State Library

ODEA
(Demographic-Economic Linked Model)

County	1975	Projections				
	Estimate	1980	1985	1990	1995	2000
Atlantic	187,900	209,500	275,600	307,200	319,400	327,400
Bergen	879,100	850,600	855,500	878,600	894,000	904,500
Burlington	347,600	373,300	419,300	471,600	522,000	568,100
Camden	475,600	482,900	506,400	533,100	546,500	548,900
Cape May	72,300	86,200	114,900	134,900	148,800	163,600
Cumberland	132,000	138,800	149,400	159,400	166,700	172,600
Essex	881,600	825,500	795,600	785,200	796,600	805,800
Gloucester	190,900	199,900	218,100	240,200	263,900	285,200
Hudson	577,600	547,800	540,100	548,800	554,000	559,900
Hunterdon	78,500	84,000	88,900	95,500	102,400	107,700
Mercer	318,000	323,000	335,900	352,600	373,500	390,200
Middlesex	594,000	592,000	611,800	654,700	701,300	735,700
Monmouth	491,400	497,700	513,500	552,700	602,400	644,400
Morris	395,000	397,000	424,200	450,000	470,100	487,700
Ocean	293,800	360,800	425,600	483,300	524,300	557,000
Passaic	452,200	464,000	479,100	505,100	522,200	538,200
Salem	62,400	62,700	63,700	66,400	69,400	72,100
Somerset	203,700	208,300	222,500	247,400	276,400	302,500
Sussex	99,000	117,000	132,400	150,500	171,700	193,600
Union	520,500	498,100	496,700	503,200	506,400	509,500
Warren	80,000	85,000	87,300	93,900	98,700	100,100
STATE TOTAL	7,333,000	7,404,000	7,756,000	8,214,000	8,631,000	8,975,000

C70
(1970-75 Migration Rate)

County	1975 Estimate	Projections				
		1980	1985	1990	1995	2000
Atlantic	187,900	211,200	277,300	306,800	318,700	328,400
Bergen	879,100	852,400	823,700	793,200	761,400	728,900
Burlington	347,600	383,600	418,500	451,600	484,000	515,800
Camden	475,600	489,300	515,100	535,800	550,600	565,500
Cape May	72,300	88,000	117,100	136,000	147,400	157,700
Cumberland	132,000	142,100	154,400	163,400	171,900	180,400
Essex	881,600	824,500	761,500	696,900	632,700	570,200
Gloucester	190,900	206,400	224,500	240,100	254,900	269,500
Hudson	577,600	545,500	509,400	472,100	434,400	397,400
Hunterdon	78,500	86,000	93,900	101,600	108,900	115,900
Mercer	318,000	326,600	337,200	347,400	357,300	366,900
Middlesex	594,000	593,200	592,600	590,600	587,500	583,300
Monmouth	491,400	513,100	538,500	562,600	585,300	607,000
Morris	395,000	398,500	402,700	406,400	409,700	412,500
Ocean	293,800	386,300	510,200	644,600	780,900	923,400
Passaic	452,200	438,200	421,200	402,500	382,800	362,300
Salem	62,400	63,900	65,600	67,300	69,000	70,700
Somerset	203,700	208,100	211,200	214,300	217,300	220,300
Sussex	99,000	120,700	145,600	172,300	200,200	229,000
Union	520,500	494,800	465,400	435,000	404,300	373,800
Warren	80,000	85,300	90,500	95,500	100,100	104,400
STATE TOTAL	7,333,000	7,458,000	7,676,000	7,836,000	7,959,000	8,083,000

C65
(1965-70 Migration Rate)

County	1975 Estimate	Projections				
		1980	1985	1990	1995	2000
Atlantic	187,900	206,400	267,100	291,800	299,700	306,100
Bergen	879,100	878,100	883,400	888,400	893,100	897,700
Burlington	347,600	393,500	443,800	495,800	550,900	609,400
Camden	475,600	494,600	527,100	554,800	576,700	598,900
Cape May	72,300	81,600	102,400	113,300	117,000	120,500
Cumberland	132,000	138,000	145,300	149,500	153,500	157,800
Essex	881,600	846,000	811,500	775,900	739,800	703,600
Gloucester	190,900	204,500	220,600	234,900	249,000	263,700
Hudson	577,600	573,600	574,100	574,200	573,700	572,800
Hunterdon	78,500	85,900	93,900	102,200	110,700	119,500
Mercer	318,000	325,300	334,400	343,500	352,500	361,500
Middlesex	594,000	630,600	678,900	728,300	778,800	830,200
Monmouth	491,400	530,100	578,900	629,000	680,300	732,800
Morris	395,000	436,400	491,600	550,100	611,900	677,000
Ocean	293,800	355,200	431,700	512,000	591,100	677,100
Passaic	452,200	461,700	468,500	475,000	481,300	487,500
Salem	62,400	62,800	63,100	63,300	63,500	63,600
Somerset	203,700	219,200	236,400	253,900	271,700	289,800
Sussex	99,000	115,300	133,000	152,200	173,100	195,800
Union	520,500	510,000	500,400	490,300	479,800	468,900
Warren	80,000	83,600	86,900	90,000	93,200	96,300
STATE TOTAL	7,333,000	7,632,000	8,073,000	8,468,000	8,841,000	9,230,000

REG
(Regression: 1900-1975)

County	1975 Estimate	Projections				
		1980	1985	1990	1995	2000
Atlantic	187,900	209,600	274,700	304,200	317,000	328,700
Bergen	879,100	920,600	979,200	1,037,900	1,096,500	1,155,100
Burlington	347,600	370,800	391,400	410,500	429,400	448,400
Camden	475,600	496,700	531,600	561,400	585,300	609,300
Cape May	72,300	80,300	99,800	109,600	112,400	115,200
Cumberland	132,000	139,000	147,200	152,500	157,300	162,200
Essex	881,600	900,200	934,900	969,600	1,004,300	1,039,000
Gloucester	190,900	201,800	214,500	225,000	235,100	245,300
Hudson	577,600	579,100	587,200	595,300	603,300	611,400
Hunterdon	78,500	81,900	84,700	87,500	90,400	93,200
Mercer	318,000	329,500	343,900	358,400	372,900	387,400
Middlesex	594,000	620,400	655,200	690,000	724,800	759,600
Monmouth	491,400	514,600	542,600	570,600	598,500	626,500
Morris	395,000	412,900	435,600	458,300	481,000	503,700
Ocean	293,800	320,200	346,700	370,300	385,800	401,100
Passaic	452,200	471,800	491,200	510,700	530,100	549,600
Salem	62,400	64,600	67,200	69,900	72,500	75,100
Somerset	203,700	215,100	227,000	238,900	250,700	262,600
Sussex	99,000	105,700	110,000	114,200	118,500	122,800
Union	520,500	542,000	573,200	604,300	635,500	666,600
Warren	80,000	83,100	85,600	88,200	90,800	93,400
STATE TOTAL	7,333,000	7,660,000	8,124,000	8,527,000	8,892,000	9,256,000

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