THE POPULATION AND EMPLOYMENT OUTLOOK FOR THE METROPOLITAN BOSTON AREA A PRELIMINARY REPORT AND METHODOLOGY MARCH 1988

Prepared by:

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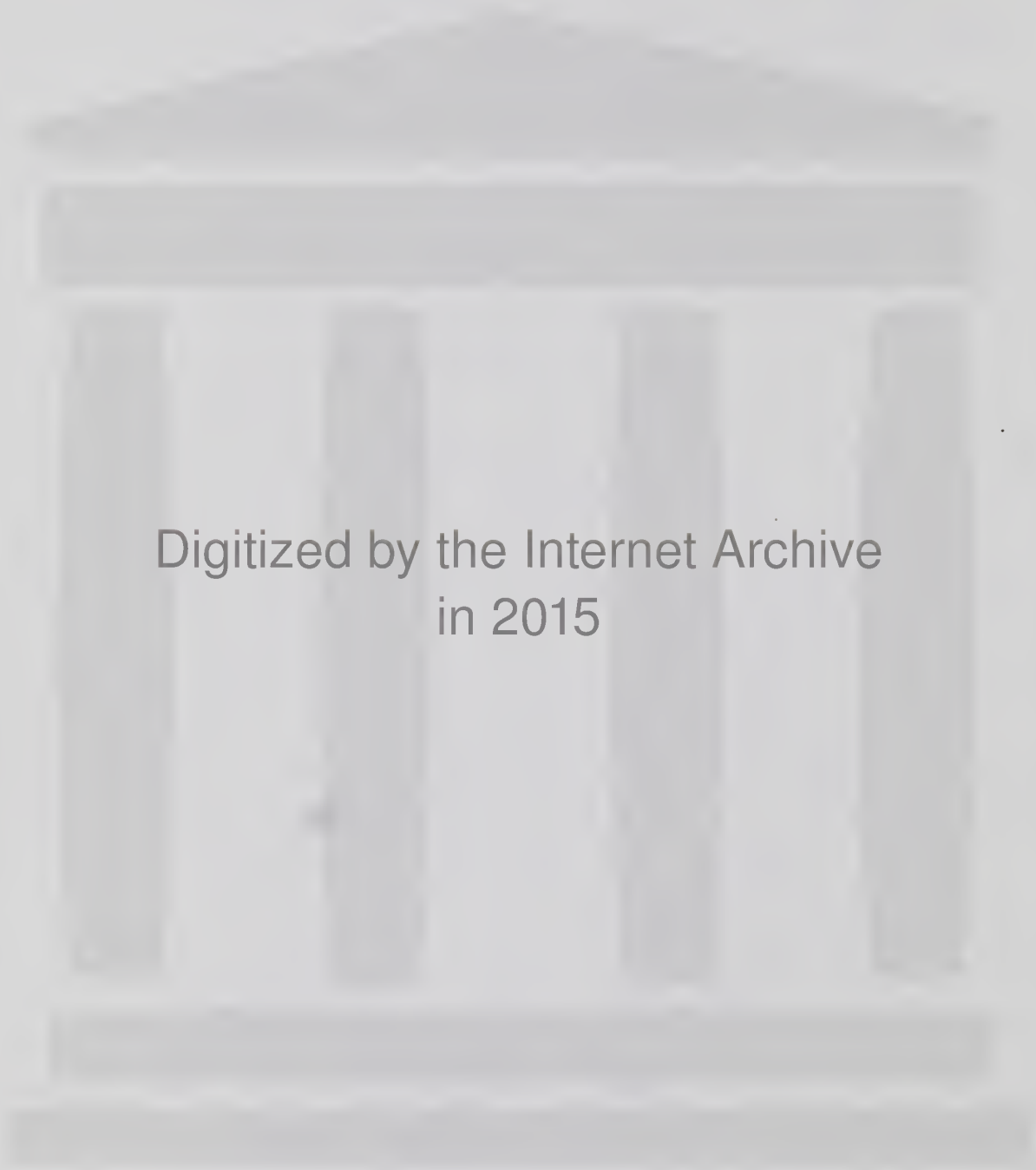


MAPC POPULATION AND EMPLOYMENT OUTLOOK
FOR THE METROPOLITAN BOSTON AREA

• MAPC has recently revised its population and employment forecasts for the region. Forecasts were completed for 101 cities and towns and 610 traffic zones in 5-year intervals through the year 2010.

GRAPH 1: Population and Employment for the MAPC Region

MAPCs regionwide population forecast calls for an increase of 51,000 persons through 1995, followed by a small decline thereafter. This is a 1.8 percent increase over the 1980 population of 2,884,700. Employment is forecast to grow at a more moderate pace than in the recent past. By the year 2010 we foresee 301,000 net new jobs in the MAPC region over the 1986 employment of 1,702,998, an increase of 18 percent.

GRAPH 2: Community Population Forecast

Most of the population increases forecast are concentrated on the periphery of our region especially along I-495 and on the South Shore. Moderate population losses are forecast in several of the older, more densely developed communities.

GRAPH 3: Community Employment Forecast

Greater than average employment growth is projected to take place in the communities along I-495, Route 9, and Route 3 on the South Shore. Major employment centers such as Boston and Cambridge, and many communities along Route 128, are forecast to grow at a rate near the regional average.

Of course, considering numeric change, as opposed to percentage change, would show a far different picture.

• How did MAPC develop these population and employment forecasts? Let's review some general approaches and theories.

MAPCs method was a synthesis of two forecasting approaches:

TOP DOWN - 1) Review national, state, and regional forecasts by others; 2) identify key contrains and strengths which will influence future growth; 3) formulate a probable rate of future regional change.

BOTTOM UP - 1) Review vacant industrial and commercial sites, potential reuse of existing developments, pending developments, present land use, and historical trends in growth; 2) interview local officials about desired extent of future growth; 3) formulate probable rate of future change for each community.

MAPCs regional forecast is a meld of two theoretical approaches:

DEMOGRAPHIC - The driving force is how many people will live in the region. (POPULATION)
Therefore, how many persons will be working or looking for work? (LABOR SUPPLY)

Population = Natural Increase (Births minus Deaths) +
Net Migration (Population Inflow minus Population Outflow).

Labor Supply = (Adult Population X Labor Force Participation Rate) +
(Intraregional Commuters).

ECONOMETRIC - The driving force is how many jobs will be created in the region. (LABOR DEMAND)
Therefore, how many persons will live in the region? (POPULATION)

Regional labor demand is established within the context of national labor demand forecasts.

Regional Labor Demand = Employment in each Industry / Employment required to meet external demand for the industry's products.

Growth rates of the ratios then are estimated using ordinary least-squares regression techniques.

• What were the primary influences on recent population and employment growth in the region and the prospects for change in these influences?

KEY INFLUENCES ON POPULATION GROWTH

Definitions

Natural Increase = Number of births minus the number of deaths.

General Fertility Rate = Number of live births per 1000 women aged 15-44 years in a given year.

Total Fertility Rate = Number of children that would be born to a woman if she were to behave throughout her lifetime the way women did that year.

Replacement-Level Fertility = The level of births necessary to maintain the present population size indefinitely.

Net Migration = Population inflow minus population outflow, after accounting for natural increase.

Recent Regional Patterns

1. Population has increased by one percent since 1980 in a five-county area of eastern Massachusetts which includes the MAPC region.

GRAPH 4: General Fertility Rate

2. The general fertility rate in Massachusetts has been consistently below that of the nation. The rate has also been declining or relatively stable for nearly twenty-five years.

3. Fertility in the MAPC region is 30 percent below the level necessary to maintain present population size indefinitely (1.5 births per women versus 2.1 births per women for eventual replacement.)

GRAPH 5: Net Migration

4. Substantially more persons have left the region than entered it for many decades, including the current one.

Prospects for Regional Population Growth

1. The number of births is likely to decline because the number of women of prime childbearing age will fall 20 percent during the 1990s and more thereafter. Increasing female labor force participation will discourage a significant increase in the fertility rate.

2. The high cost of living, continued economic prosperity of nearby regions which compete for the pool of potential migrants, and the cold climate, will preclude substantial net population inflow.

3. Most other population forecasts for the state and region are similiar to MAPCs in calling for between a decrease of 3 percent and an increase of 2 percent.

KEY INFLUENCES ON EMPLOYMENT GROWTH

Definitions

Projected Employment = (Population of those 16 years and over) X
(Labor Force Participation Rate) +
(Intraregional Commuters).

Recent Regional Patterns

1. The recent rate of employment growth has matched that of the nation for the first time in several decades.

GRAPH 6: Female Labor Force Participation

GRAPH 7: Male Labor Force Participation

2. The labor force participation of women is significantly higher than nationally, but yet has been increasing at a rate comparable to that for the nation. Male labor force participation is comparable to that for the nation.

GRAPH 8: Recent Sources of New Labor

3. Nearly half of the recent expansion in labor supply has probably come from persons commuting from communities which surround the region.

Prospects for Regional Employment Growth

GRAPH 9: Future Sources of New Labor

1. A large supply of new labor will come from additional women entering the labor force. This will occur despite an above average participation rate because of higher than average levels of education and labor force attachment.

2. Other indigenous (or native) sources of new labor will be sharply limited because of the very low rate of natural increase.

3. The long-established pattern of more persons leaving than entering the region will be difficult to reverse unless: future income increases can outpace living expenses, or employment and income opportunities in other areas of the Northeast are substantially reduced. To alter first, the perception, and then the behavior of potential migrants, these new economic environments would need to be established for an extended period of time.

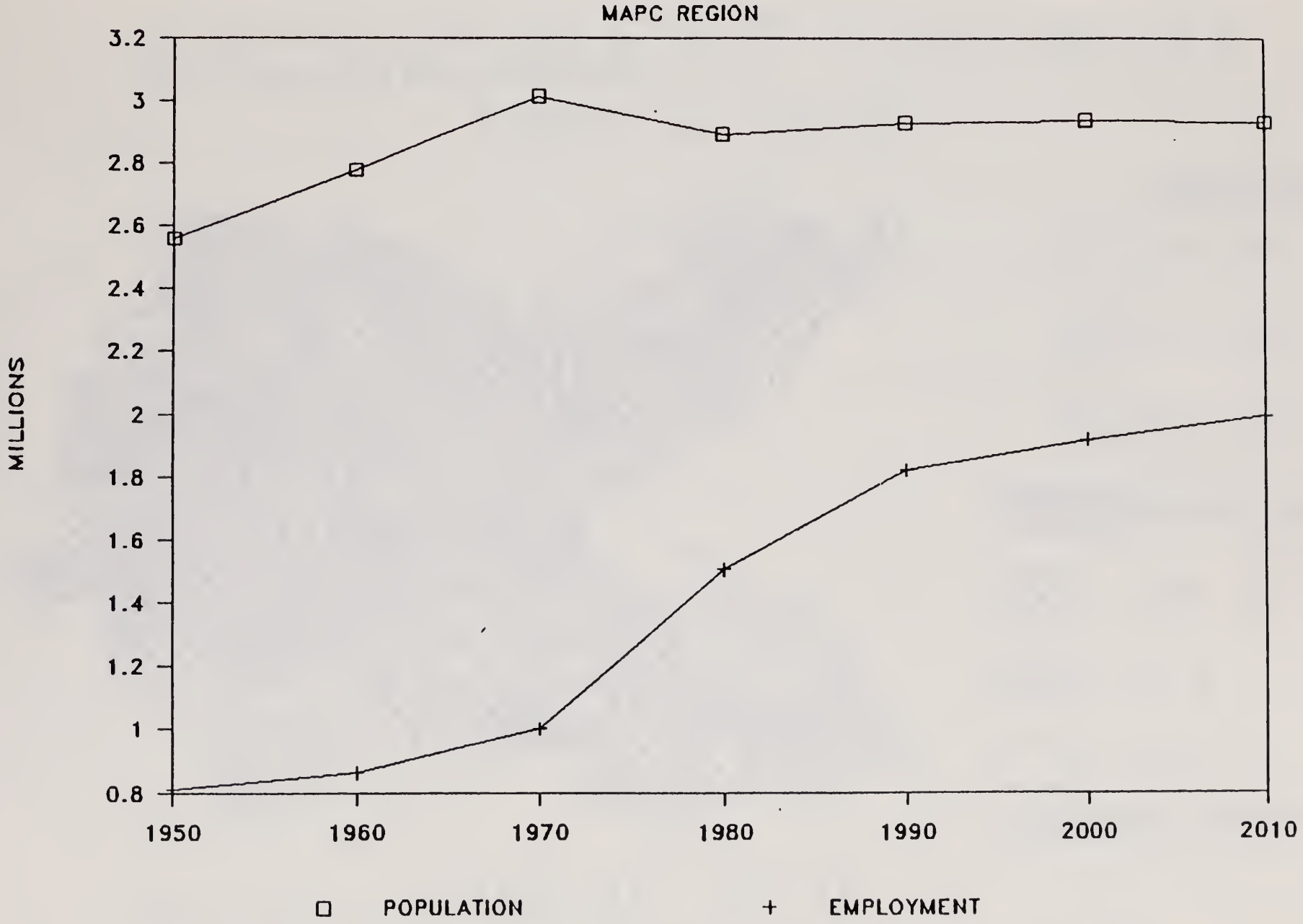
4. The majority of new workers will reside outside but work within the MAPC region. In order to attain the level of employment we have forecast, employers in metropolitan Boston will need to "capture" a large proportion of potentially available labor supply that will reside within a 30-mile radius of the MAPC region.

5. Several recent econometric-based employment forecasts heavily weight the recent past in order to create their fairly optimistic outlooks. On the other hand, the thirty-year rate of employment growth has been just 85 percent of the nation. A recent forecast of national employment projects an increase of 19 percent by the year 2000. This federal Bureau of Labor Statistics forecast, when adjusted for the historical rate of 85 percent, would provide a regional rate of employment growth similiar to MAPCs.

The author wishes to acknowledge research assistance by Bruno Berszoner and the helpful technical review by David Soule, Ed Bates, and Carol Blair. The community and traffic-zone population and employment forecasts and supporting data were developed under the supervision of Jonathan Kunz with assistance provided by Patti Johnson, Sten Ternblad, and Bruno Berszoner.

GRAPH 1.

POPULATION AND EMPLOYMENT

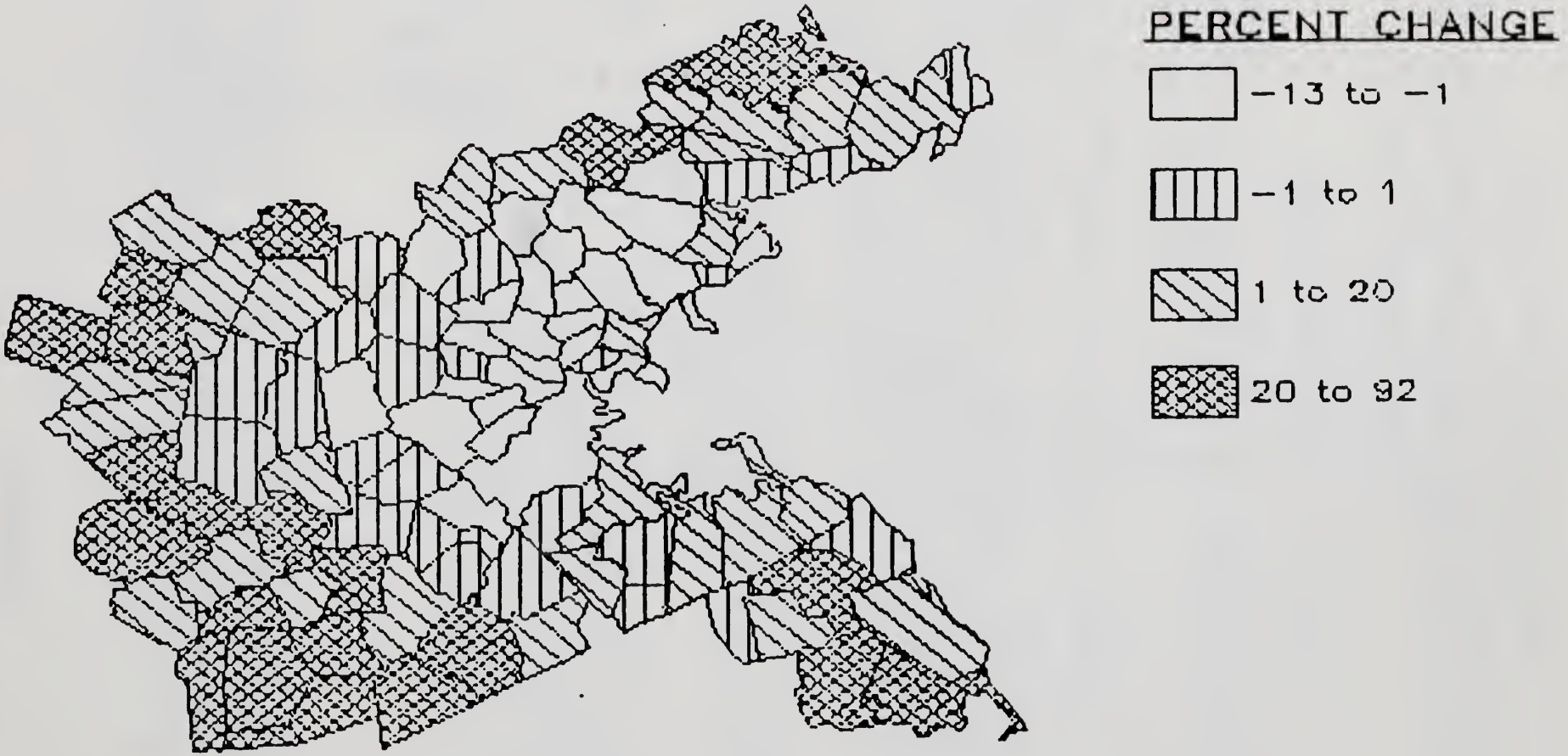


Sources: U.S. Bureau of the Census.
Massachusetts Division of Employment Security.
Metropolitan Area Planning Council.

GRAPH 2.

POPULATION CHANGE

1980 to 2010

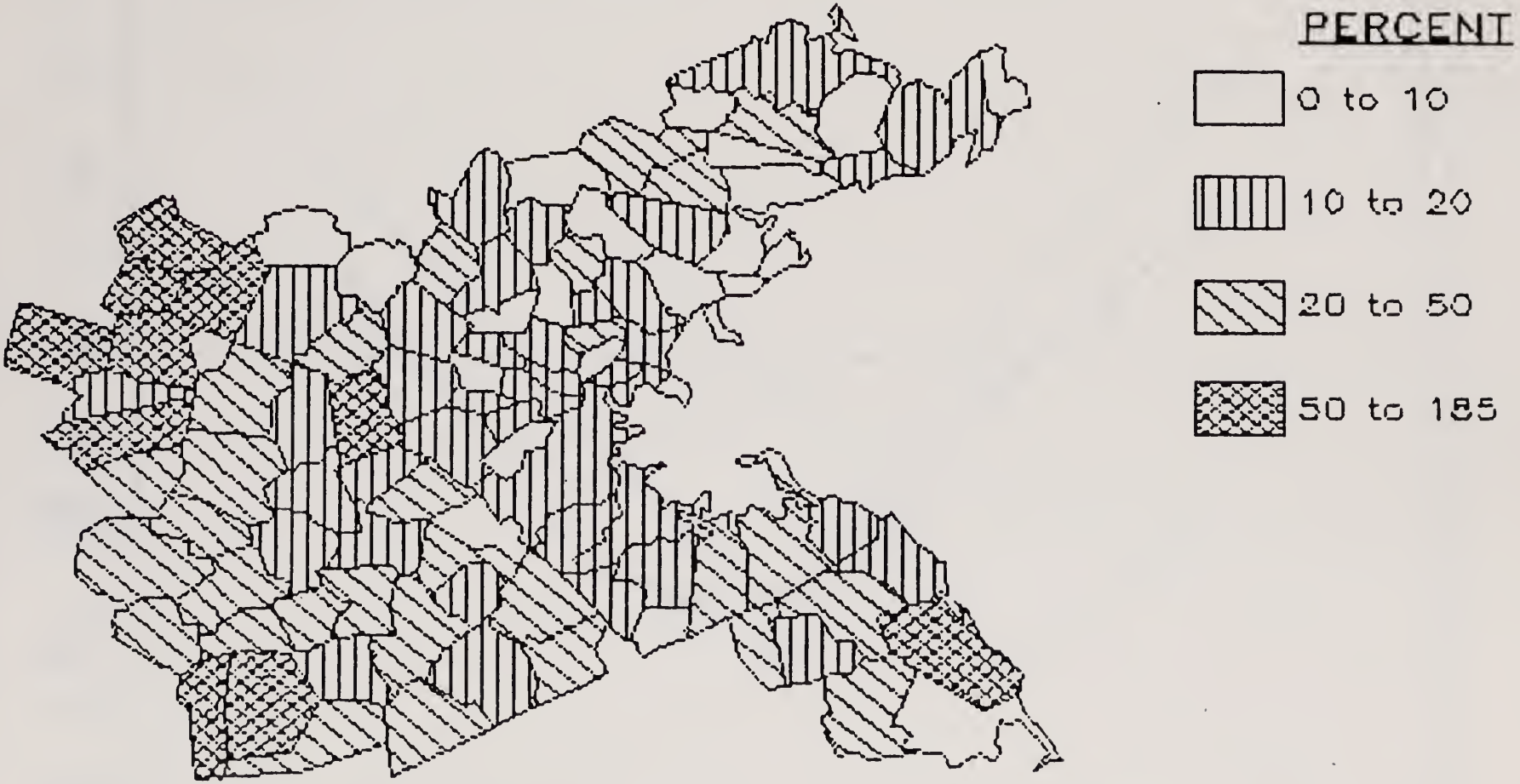


Source: Metropolitan Area Planning Council.

GRAPH 3.

EMPLOYMENT GROWTH

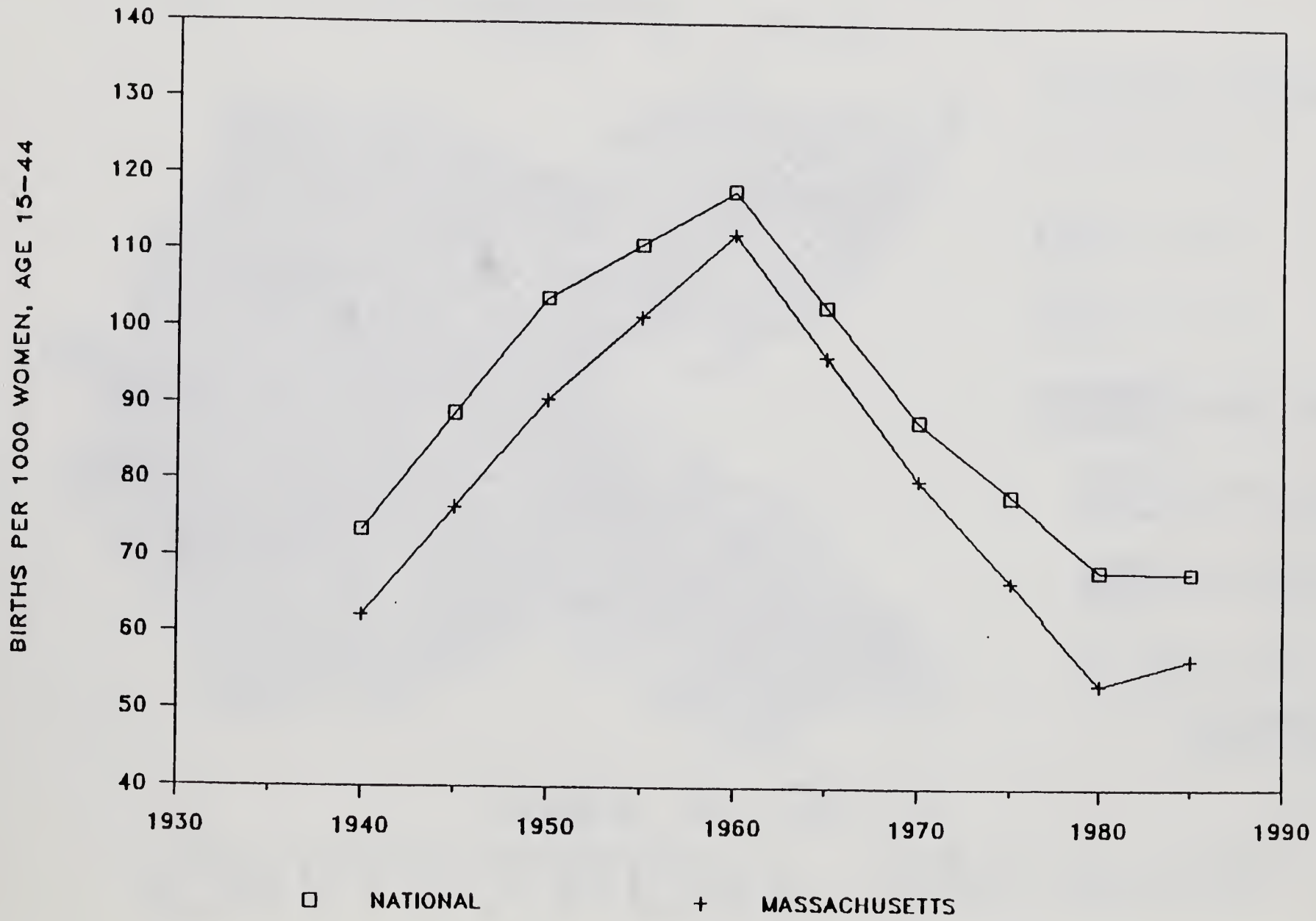
1986 to 2010



Source: Metropolitan Area Planning Council.

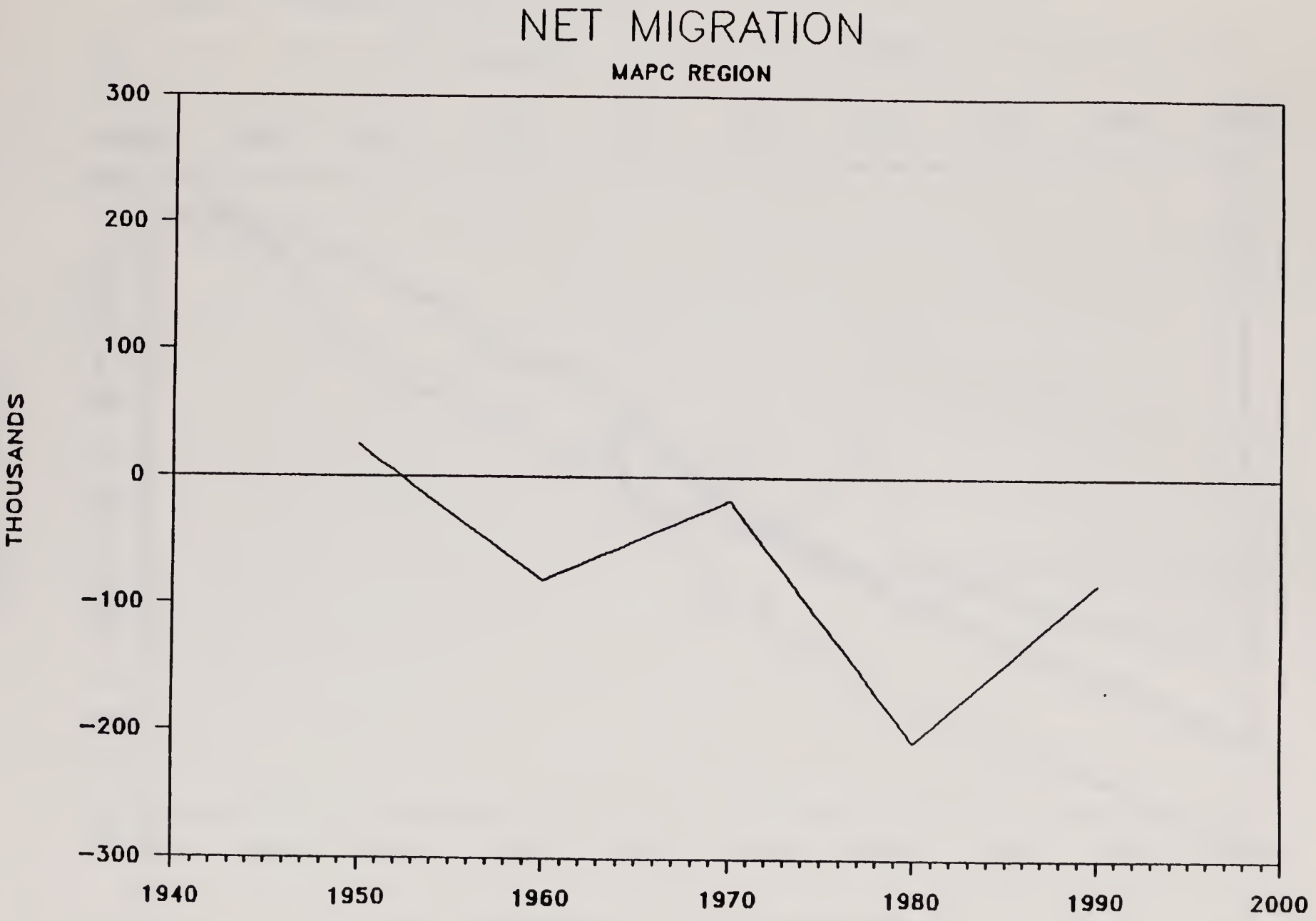
GRAPH 4.

GENERAL FERTILITY RATE



Source: Massachusetts Division of Health Statistics and Research.

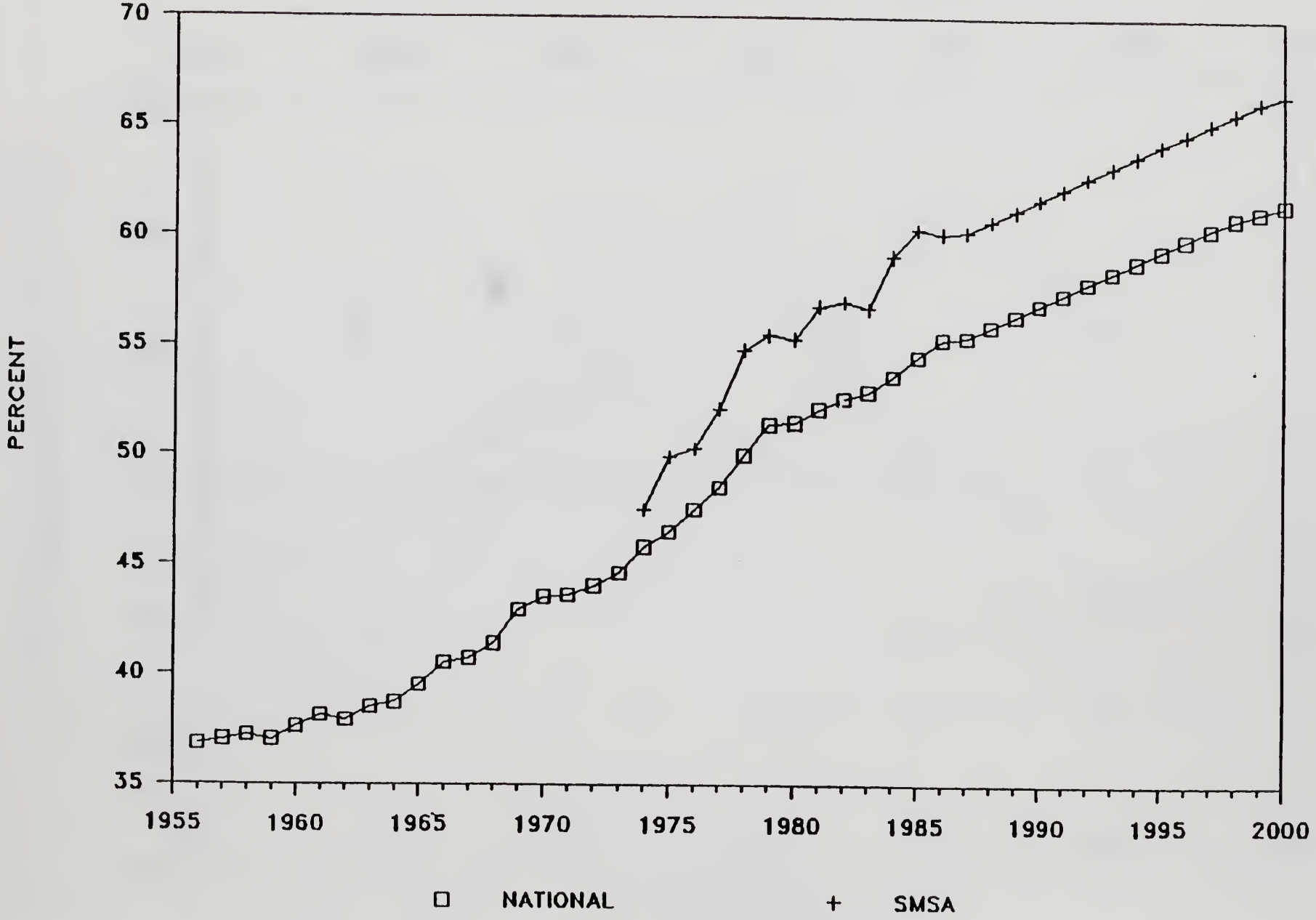
GRAPH 5.



Sources: Massachusetts Department of Commerce.
Metropolitan Area Planning Council.

GRAPH 6.

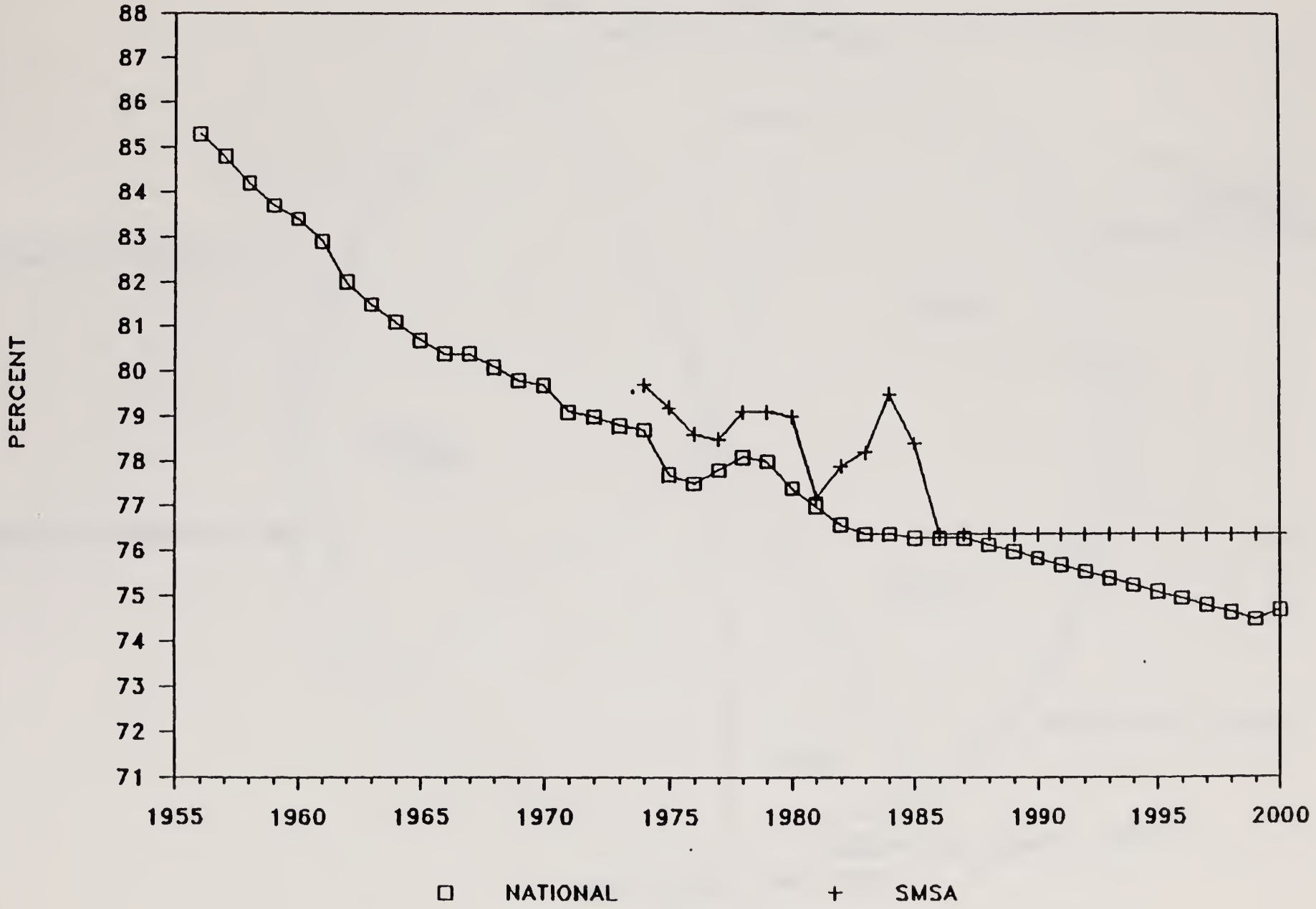
FEMALE LABOR FORCE PARTICIPATION



Sources: U.S. Bureau of Labor Statistics.
Metropolitan Area Planning Council.

GRAPH 7.

MALE LABOR FORCE PARTICIPATION

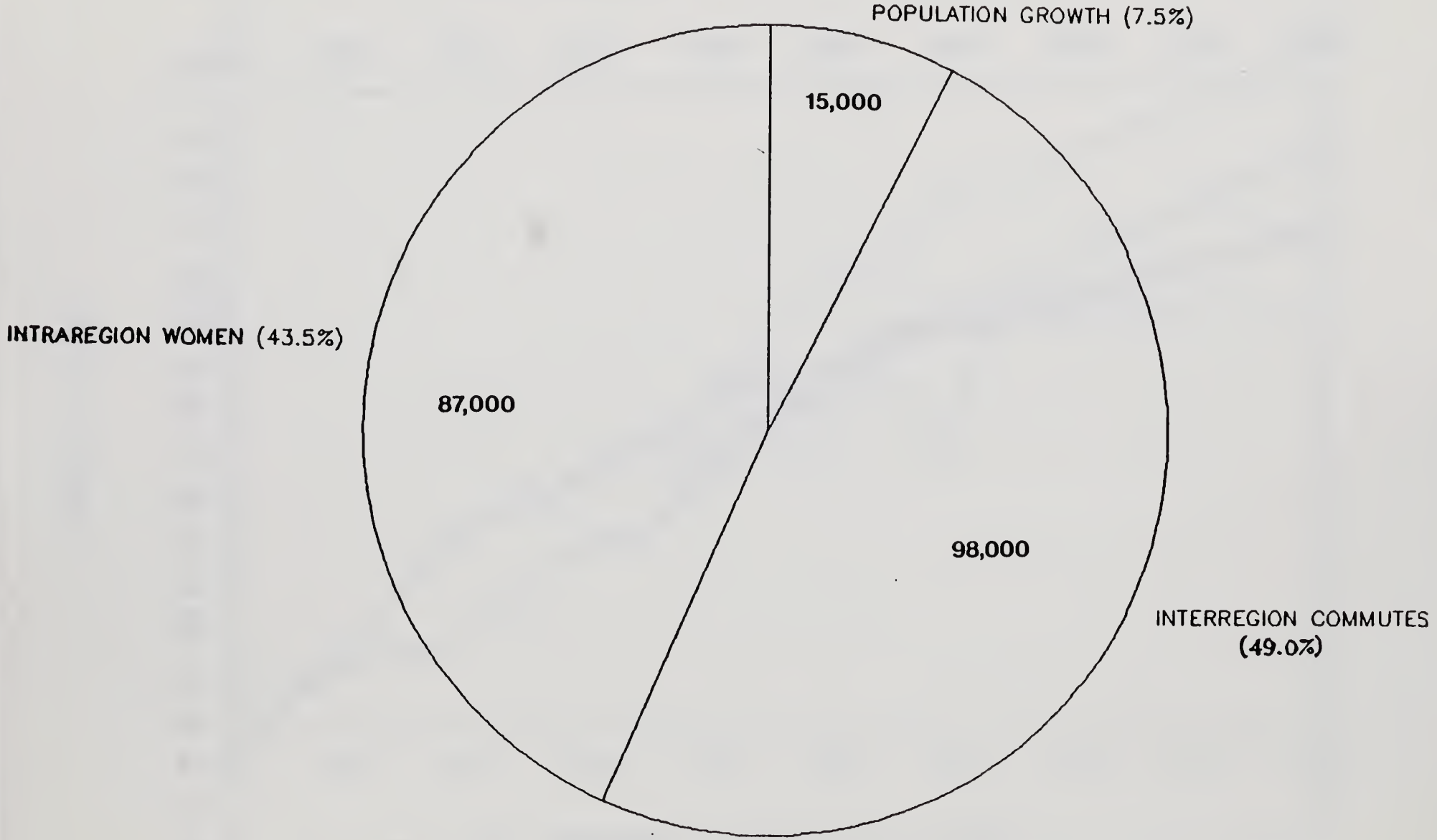


Sources: U.S. Bureau of Labor Statistics.
Metropolitan Area Planning Council.

Graph 8.

SOURCES OF NEW LABOR

MAPC REGION: 1980–1986

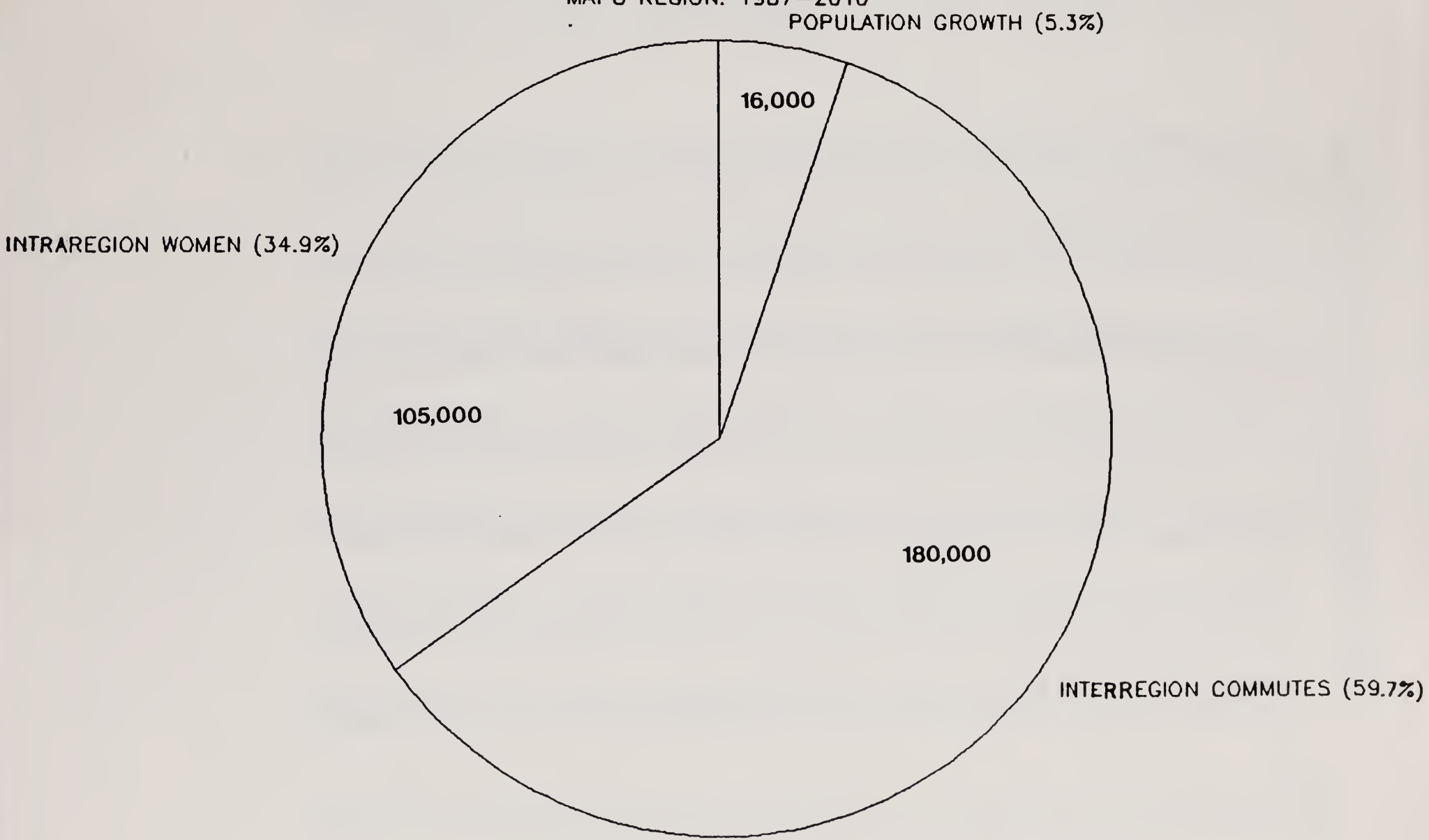


Source: Metropolitan Area Planning Council.

Graph 9.

SOURCES OF NEW LABOR

MAPC REGION: 1987–2010



Source: Metropolitan Area Planning Council

(2/88) POPULATION FORECASTS FOR CITIES AND TOWNS IN METROPOLITAN BOSTON
PRODUCED BY THE METROPOLITAN AREA PLANNING COUNCIL

COMMUNITY	1980	1985	1990	1995	2000	2005	2010	PERCENT CHANGE 1985-1990	PERCENT CHANGE 1985-2010
ACTON	17,544	17,431	18,680	18,880	19,070	19,260	19,450	7.2	11.6
ARLINGTON	48,219	46,893	45,510	45,210	44,920	44,830	44,740	(2.9)	(4.6)
ASHLAND	9,165	10,531	13,190	13,820	13,880	13,940	14,000	25.2	32.9
BEDFORD	13,067	13,100	13,020	13,040	13,040	13,040	13,040	(0.6)	(0.5)
BELLINGHAM	14,300	13,677	15,830	17,470	18,310	19,520	20,000	15.7	46.2
BELMONT	26,100	26,100	26,100	26,100	26,100	26,100	26,100	0.0	0.0
BEVERLY	37,655	37,700	38,170	38,450	38,200	37,960	37,730	1.2	0.1
BOLTON	2,530	2,958	3,320	3,830	4,170	4,510	4,850	12.2	64.0
BOSTON	562,994	570,900	553,000	549,400	545,700	544,500	543,300	(3.1)	(4.8)
BOXBOROUGH	3,126	3,170	3,300	3,580	3,800	4,030	4,250	4.1	34.1
BRAINTREE	36,337	36,400	36,400	36,400	36,400	36,400	36,400	0.0	0.0
BROOKLINE	55,062	55,800	54,300	53,900	53,500	53,400	53,300	(2.7)	(4.5)
BURLINGTON	23,486	23,500	23,100	22,800	22,610	22,420	22,230	(1.7)	(5.4)
CAMBRIDGE	95,322	92,701	91,800	91,200	90,600	90,400	90,200	(1.0)	(2.7)
CANTON	18,182	18,200	18,200	18,200	18,200	18,200	18,200	0.0	0.0
CARLISLE	3,306	3,862	4,010	4,270	4,430	4,590	4,750	3.8	23.0
CHELSEA	25,431	26,140	26,140	26,020	25,900	25,600	25,300	0.0	(3.2)
COHASSET	7,174	7,200	7,250	7,250	7,250	7,250	7,250	0.7	0.7
CONCORD	16,293	16,300	16,700	16,700	16,700	16,700	16,700	2.5	2.5
DANVERS	24,100	24,100	24,410	24,390	24,150	23,910	23,690	1.3	(1.7)
DEDHAM	25,298	24,300	24,300	24,300	24,300	24,300	24,300	0.0	0.0
DOVER	4,703	4,700	4,700	4,700	4,700	4,700	4,700	0.0	0.0
DUXBURY	11,807	13,100	13,400	13,700	13,900	14,100	14,300	2.3	9.2
ESSEX	2,998	2,971	3,060	3,130	3,150	3,180	3,200	3.0	7.7
EVERETT	37,195	36,100	35,990	35,650	35,300	34,600	33,900	(0.3)	(6.1)
FOXBOROUGH	14,148	14,522	15,230	15,990	16,340	16,690	17,040	4.9	17.3
FRAMINGHAM	65,113	65,100	65,100	65,100	65,100	65,100	65,100	0.0	0.0
FRANKLIN	18,217	17,865	22,200	25,920	27,110	27,910	29,500	24.3	65.1
GLOUCESTER	27,768	27,800	28,010	28,140	28,120	28,110	28,100	0.8	1.1
HAMILTON	6,960	7,103	7,300	7,450	7,520	7,560	7,650	2.8	7.7
HANOVER	11,358	12,100	12,700	13,000	13,200	13,200	13,200	5.0	9.1
HINGHAM	20,339	21,176	22,060	22,260	22,460	22,530	22,600	4.2	6.7
HOLBROOK	11,140	11,100	11,100	11,100	11,100	11,100	11,100	0.0	0.0
HOLLISTON	12,622	12,606	13,650	13,900	13,930	13,970	14,000	8.3	11.1
HOPKINTON	7,114	7,711	8,580	9,000	9,130	9,220	9,400	11.3	21.9
HUDSON	16,408	17,251	17,800	18,100	18,150	18,200	18,250	3.2	5.8
HULL	9,714	9,700	10,800	11,500	11,500	11,500	11,500	11.3	18.6
IPSWICH	11,158	11,368	12,390	13,050	13,460	13,740	14,300	9.0	25.8
LEXINGTON	29,479	29,500	29,500	29,500	29,500	29,500	29,500	0.0	0.0
LINCOLN	7,098	7,100	7,100	7,100	7,100	7,100	7,100	0.0	0.0
LITTLETON	6,970	6,984	7,050	7,250	7,400	7,500	7,700	0.9	10.3
LYNN	78,471	80,200	79,940	79,060	77,730	76,430	75,170	(0.3)	(6.3)
LYNNFIELD	11,267	11,300	11,170	11,050	10,890	10,730	10,570	(1.2)	(6.5)
MALDEN	53,386	53,300	54,250	53,900	53,340	52,820	52,300	1.8	(1.9)
MANCHESTER	5,424	5,472	5,480	5,480	5,470	5,450	5,440	0.1	(0.6)
MARBLEHEAD	20,126	20,199	19,970	19,710	19,360	19,010	18,680	(1.1)	(7.5)
MARLBOROUGH	30,617	32,100	33,800	34,750	34,920	35,030	35,250	5.3	9.8
MARSHFIELD	20,916	22,295	23,500	23,900	24,200	24,350	24,400	5.4	9.4
MAYNARD	9,590	9,708	10,150	10,150	10,150	10,150	10,150	4.6	4.6
MEDFIELD	10,220	11,000	11,800	12,000	12,200	12,300	12,300	7.3	11.8
MEDFORD	58,076	57,200	56,400	56,000	55,600	55,500	55,400	(1.4)	(3.1)
MEDWAY	8,447	9,037	9,570	10,000	10,270	10,540	10,810	5.9	19.6
MELROSE	30,055	29,228	28,650	28,260	27,710	27,190	26,670	(2.0)	(8.8)

(2/88)

POPULATION FORECASTS FOR CITIES AND TOWNS IN METROPOLITAN BOSTON
PRODUCED BY THE METROPOLITAN AREA PLANNING COUNCIL

COMMUNITY	1980	1985	1990	1995	2000	2005	2010	PERCENT CHANGE 1985-1990	PERCENT CHANGE 1985-2010
MIDDLETON	4,135	4,300	5,340	6,100	6,400	6,600	7,000	23.1	55.6
MILFORD	23,390	24,038	24,510	24,740	24,650	24,560	24,480	2.0	1.8
MILLIS	6,908	6,689	7,010	7,410	7,680	7,960	8,230	4.8	23.0
MILTON	25,860	25,900	25,900	25,900	25,900	25,900	25,900	0.0	0.0
NAHANT	3,947	4,070	4,020	3,970	3,910	3,850	3,790	(1.2)	(6.9)
NATICK	29,461	30,679	31,900	32,170	32,450	32,720	33,000	4.0	7.6
NEEDHAM	27,901	27,900	27,900	27,900	27,900	27,900	27,900	0.0	0.0
NEWTON	83,622	82,900	81,900	81,300	80,700	80,500	80,400	(1.2)	(3.0)
NORFOLK	6,363	8,210	9,330	10,100	10,690	11,270	11,860	13.6	44.5
NORTH READING	11,455	11,897	12,700	13,250	13,370	13,440	13,600	6.7	14.3
NORWELL	9,182	10,100	10,400	10,600	10,770	10,930	11,100	3.0	9.9
NORWOOD	29,711	29,700	29,700	29,700	29,700	29,700	29,700	0.0	0.0
PEABODY	45,976	44,400	44,820	44,900	44,430	43,990	43,550	0.9	(1.9)
PEMBROKE	13,487	14,935	16,100	16,650	16,900	16,900	16,900	7.8	13.2
QUINCY	84,743	88,000	93,150	94,150	94,150	94,150	94,150	5.9	7.0
RANDOLPH	28,218	28,400	28,600	28,600	28,600	28,600	28,600	0.7	0.7
READING	22,678	22,700	22,980	22,960	22,740	22,530	22,330	1.2	(1.6)
REVERE	42,423	42,000	44,000	44,900	45,510	45,480	45,450	4.8	8.2
ROCKLAND	15,695	15,700	15,700	15,700	15,700	15,700	15,700	0.0	0.0
ROCKPORT	6,345	6,300	6,420	6,400	6,400	6,390	6,390	1.9	1.4
SALEM	38,220	38,163	39,700	40,160	39,760	39,370	39,000	4.0	2.2
SAUGUS	24,746	24,700	25,150	25,200	24,950	24,710	24,480	1.8	(0.9)
SCITUATE	17,317	17,300	17,400	17,400	17,400	17,400	17,400	0.6	0.6
SHARON	13,601	14,859	16,190	16,490	16,800	16,900	17,000	9.0	14.4
SHERBORN	4,049	4,400	5,000	5,200	5,300	5,300	5,300	13.6	20.5
SOMERVILLE	77,372	75,000	73,350	72,180	71,000	69,530	68,050	(2.2)	(9.3)
SOUTHBOROUGH	6,193	6,400	7,200	7,400	7,600	7,700	7,700	12.5	20.3
STONEHAM	21,424	21,102	21,080	21,220	20,810	20,540	20,000	(0.1)	(5.2)
STOUGHTON	26,710	27,500	28,700	29,000	29,200	29,300	29,400	4.4	6.9
STOW	5,144	5,308	5,650	5,950	6,050	6,150	6,250	6.4	17.7
SUDBURY	14,027	14,000	14,000	14,000	14,000	14,000	14,000	0.0	0.0
SWAMPSCOTT	13,837	13,524	13,610	13,690	13,690	13,700	13,700	0.6	1.3
TOPSFIELD	5,709	5,700	5,850	5,910	5,970	6,020	6,100	2.6	7.0
WAKEFIELD	24,895	24,900	24,510	24,260	23,940	23,620	23,300	(1.6)	(6.4)
WALPOLE	18,859	19,910	21,020	21,270	21,530	21,620	21,700	5.6	9.0
WALTHAM	58,200	58,200	58,200	58,200	58,200	58,200	58,200	0.0	0.0
WATERTOWN	34,384	33,438	32,450	32,240	32,030	31,970	31,900	(3.0)	(4.6)
WAYLAND	12,170	12,200	12,200	12,200	12,200	12,200	12,200	0.0	0.0
WELLESLEY	27,209	27,200	27,200	27,200	27,200	27,200	27,200	0.0	0.0
WENHAM	3,897	3,838	3,870	4,100	4,150	4,200	4,250	0.8	10.7
WESTON	11,169	10,800	10,800	10,800	10,800	10,800	10,800	0.0	0.0
WESTWOOD	13,212	13,200	13,200	13,200	13,200	13,200	13,200	0.0	0.0
WEYMOUTH	55,601	56,900	56,900	56,900	56,900	56,900	56,900	0.0	0.0
WILMINGTON	17,471	17,704	18,400	19,530	19,820	20,120	20,420	3.9	15.3
WINCHESTER	20,701	20,763	20,720	20,670	20,520	20,380	20,230	(0.2)	(2.6)
WINTHROP	19,294	18,700	18,380	18,160	17,940	17,770	17,600	(1.7)	(5.9)
WOBURN	36,626	36,600	37,510	37,770	37,390	37,020	36,650	2.5	0.1
WRENTHAM	7,580	8,500	9,020	9,460	9,740	10,010	10,280	6.1	20.9
REGION	2,884,712	2,907,686	2,928,970	2,942,170	2,937,880	2,934,770	2,932,300	0.7	0.8

(2/88) EMPLOYMENT FORECASTS FOR CITIES AND TOWNS IN METROPOLITAN BOSTON
PRODUCED BY THE METROPOLITAN AREA PLANNING COUNCIL

COMMUNITY	1980	1985	1990	1995	2000	2005	2010	PERCENT CHANGE 1985-1990	PERCENT CHANGE 1985-2010
ACTON	5,365	8,304	12,280	12,900	13,070	13,230	13,400	47.9	61.4
ARLINGTON	7,668	8,577	9,600	9,760	9,870	9,990	10,100	11.9	17.8
ASHLAND	3,564	3,682	4,710	5,000	5,100	5,200	5,300	27.9	43.9
BEDFORD	19,597	23,706	26,090	26,690	27,160	27,620	28,090	10.1	18.5
BELLINGHAM	1,898	2,286	3,250	4,050	4,380	4,610	5,050	42.2	120.9
BELMONT	6,556	6,681	6,960	6,970	6,980	6,990	7,000	4.2	4.8
BEVERLY	12,675	13,848	15,340	15,640	15,840	16,040	16,240	10.8	17.3
BOLTON	1,022	1,239	1,500	1,600	1,630	1,660	1,700	21.1	37.2
BOSTON	505,360	532,729	582,680	591,700	600,750	609,750	618,780	9.4	16.2
BOXBOROUGH	558	645	2,450	3,300	3,600	3,800	4,200	279.8	551.2
BRAINTREE	23,141	28,483	30,300	31,200	31,900	32,600	33,300	6.4	16.9
BROOKLINE	17,112	18,157	18,800	18,800	18,800	18,800	18,870	3.5	3.9
BURLINGTON	26,904	37,279	39,300	40,800	41,600	42,130	43,200	5.4	15.9
CAMBRIDGE	92,044	94,848	99,800	103,400	106,500	109,900	113,100	5.2	19.2
CANTON	13,705	15,013	17,900	18,630	19,020	19,410	19,800	19.2	31.9
CARLISLE	405	602	650	630	650	670	700	8.0	16.3
CHELSEA	9,667	9,210	10,020	10,170	10,240	10,510	10,770	8.8	16.9
COHASSET	1,891	2,155	2,350	2,420	2,440	2,460	2,480	9.0	15.1
CONCORD	9,827	11,983	13,000	13,200	13,370	13,530	13,700	8.5	14.3
DANVERS	15,726	19,018	22,660	23,160	23,660	24,160	24,660	19.2	29.7
DEDHAM	12,184	13,016	14,130	14,380	14,630	14,880	15,130	8.6	16.2
DOVER	653	617	680	700	720	740	760	10.2	23.2
DUXBURY	1,453	2,026	2,200	2,300	2,320	2,330	2,350	8.6	16.0
ESSEX	746	904	980	1,010	1,030	1,050	1,060	8.4	17.3
EVERETT	13,163	13,860	14,060	14,390	14,640	14,890	15,140	1.4	9.2
FOXBOROUGH	8,311	8,809	9,200	10,000	10,330	10,670	11,000	4.4	24.9
FRAMINGHAM	40,136	49,032	56,100	60,000	62,000	63,750	65,000	14.4	32.6
FRANKLIN	3,960	4,398	6,200	7,300	7,630	7,970	8,300	41.0	88.7
GLOUCESTER	12,305	12,270	12,830	13,280	13,550	13,820	14,090	4.6	14.8
HAMILTON	1,168	1,693	1,820	1,900	1,930	1,950	1,980	7.5	17.0
HANOVER	5,657	6,068	6,700	7,100	7,230	7,360	7,500	10.4	23.6
HINGHAM	7,482	9,922	10,780	11,650	12,400	13,150	13,900	8.6	40.1
HOLBROOK	2,534	2,332	2,530	2,600	2,630	2,670	2,700	8.5	15.8
HOLLISTON	2,888	3,726	4,350	4,600	4,670	4,730	4,800	16.7	28.8
HOPKINTON	1,885	2,703	3,200	3,500	3,630	3,770	3,900	18.4	44.3
HUDSON	5,224	6,792	7,700	7,950	8,000	8,050	8,100	13.4	19.3
HULL	1,398	1,174	1,290	1,330	1,340	1,360	1,370	9.9	16.7
IPSWICH	2,256	2,287	2,780	2,950	2,990	3,020	3,050	21.6	33.4
LEXINGTON	17,295	18,846	20,170	20,650	21,070	21,480	21,900	7.0	16.2
LINCOLN	1,374	1,352	1,850	1,900	1,970	2,030	2,100	36.8	55.3
LITTLETON	2,837	3,412	5,000	5,700	5,900	6,100	6,300	46.5	84.6
LYNN	37,070	35,118	32,510	33,160	33,810	34,460	35,110	(7.4)	(0.0)
LYNNFIELD	2,918	2,753	2,950	3,050	3,070	3,080	3,100	7.2	12.6
MALDEN	18,314	18,688	23,300	24,200	24,300	24,400	24,500	24.7	31.1
MANCHESTER	1,041	1,166	1,380	1,420	1,450	1,470	1,490	18.4	27.8
MARBLEHEAD	4,345	4,765	4,820	4,820	4,820	4,820	4,820	1.2	1.2
MARLBOROUGH	13,483	12,907	19,500	24,500	25,500	26,500	27,500	51.1	113.1
MARSHFIELD	2,937	3,889	4,300	4,600	4,750	4,900	5,050	10.6	29.9
MAYNARD	15,926	15,187	15,200	15,200	15,200	15,200	15,200	0.1	0.1
MEDFIELD	3,332	3,578	3,970	4,050	4,120	4,200	4,270	11.0	19.3
MEDFORD	15,176	17,249	20,500	20,950	21,300	21,650	22,000	18.8	27.5
MEDWAY	1,466	2,037	2,200	2,450	2,570	2,680	2,800	8.0	37.5
MELROSE	5,964	6,038	6,640	6,730	6,810	6,900	6,990	10.0	15.8

(2/88)

EMPLOYMENT FORECASTS FOR CITIES AND TOWNS IN METROPOLITAN BOSTON
PRODUCED BY THE METROPOLITAN AREA PLANNING COUNCIL

COMMUNITY	1980	1985	1990	1995	2000	2005	2010	PERCENT CHANGE 1985-1990	PERCENT CHANGE 1985-2010
MIDDLETON	1,725	2,674	2,700	2,790	2,880	2,960	3,050	1.0	14.1
MILFORD	7,186	10,287	11,950	13,250	13,610	13,850	14,330	16.2	39.3
MILLIS	1,595	1,868	2,050	2,150	2,180	2,210	2,250	9.7	20.4
MILTON	4,904	5,155	5,390	5,620	5,840	6,060	6,270	4.6	21.6
NAHANT	506	467	530	540	540	550	550	13.5	17.8
NATICK	15,562	17,809	21,350	21,510	21,670	21,830	22,000	19.9	23.5
NEEDHAM	14,755	19,670	21,540	21,990	22,440	22,890	23,340	9.5	18.7
NEWTON	41,175	49,647	53,970	55,000	55,870	56,730	57,600	8.7	16.0
NORFOLK	1,092	2,042	2,150	2,250	2,300	2,330	2,400	5.3	17.5
NORTH READING	2,598	3,043	4,270	4,420	4,450	4,470	4,520	40.3	48.5
NORWELL	2,196	3,782	4,500	4,800	4,930	5,070	5,200	19.0	37.5
NORWOOD	22,654	21,617	26,000	26,600	26,900	27,200	27,500	20.3	27.2
PEABODY	15,491	17,594	21,050	21,800	22,550	23,300	24,050	19.6	36.7
PEMBROKE	1,301	2,740	3,850	3,980	3,990	4,050	4,100	40.5	49.6
QUINCY	34,109	40,631	43,850	45,300	46,200	47,100	48,000	7.9	18.1
RANDOLPH	7,851	9,712	10,170	10,520	10,870	11,220	11,570	4.7	19.1
READING	4,830	5,614	5,750	6,030	6,250	6,470	6,690	2.4	19.2
REVERE	7,644	7,166	8,010	8,070	8,380	8,610	8,840	11.8	23.4
ROCKLAND	5,006	6,007	6,570	7,270	7,770	8,270	8,770	9.4	46.0
ROCKPORT	1,470	1,382	1,380	1,380	1,380	1,380	1,380	(0.1)	(0.1)
SALEM	20,262	19,636	19,810	19,860	19,910	19,960	20,010	0.9	1.9
SAUGUS	8,121	9,390	10,000	10,400	10,690	10,980	11,270	6.5	20.0
SCITUATE	2,767	3,140	3,250	3,370	3,470	3,570	3,670	3.5	16.9
SHARON	2,417	3,086	3,190	3,290	3,390	3,490	3,590	3.4	16.3
SHERBORN	330	450	490	510	520	530	540	8.9	20.0
SOMERVILLE	17,949	20,287	21,890	22,750	23,230	23,260	23,360	7.9	15.1
SOUTHBOROUGH	3,439	3,269	4,000	4,400	4,500	4,600	4,700	22.4	43.8
STONEHAM	6,647	6,941	7,280	7,340	7,410	7,470	7,530	4.9	8.5
STOUGHTON	8,135	10,614	11,810	12,440	13,060	13,690	14,310	11.3	34.8
STOW	805	1,178	1,900	2,050	2,100	2,150	2,200	61.3	86.8
SUDBURY	7,186	8,984	10,500	10,880	11,250	11,630	12,000	16.9	33.6
SWAMPSCOTT	2,777	2,975	3,020	3,090	3,110	3,120	3,140	1.5	5.5
TOPSFIELD	1,246	1,580	1,750	1,800	1,830	1,870	1,900	10.8	20.3
WAKEFIELD	10,885	12,705	13,840	14,420	14,590	14,760	14,930	8.9	17.5
WALPOLE	8,182	7,853	8,560	9,060	9,560	10,060	10,560	9.0	34.5
WALTHAM	60,857	60,483	66,500	67,500	68,590	69,680	70,770	9.9	17.0
WATERTOWN	16,763	19,230	20,010	20,340	20,660	20,990	21,310	4.1	10.8
WAYLAND	2,948	3,066	3,250	3,320	3,400	3,470	3,550	6.0	15.8
WELLESLEY	16,117	17,868	18,270	18,690	19,100	19,520	19,940	2.2	11.6
WENHAM	498	524	590	600	610	620	620	12.6	18.3
WESTON	3,147	3,809	5,530	5,610	5,680	5,760	5,830	45.2	53.1
WESTWOOD	5,060	8,846	9,290	9,660	10,040	10,410	10,790	5.0	22.0
WEYMOUTH	13,006	15,050	15,840	16,570	17,290	18,020	18,740	5.2	24.5
WILMINGTON	15,279	23,396	24,700	26,000	26,570	27,130	27,700	5.6	18.4
WINCHESTER	5,394	6,236	6,600	6,790	6,860	6,930	7,000	5.8	12.3
WINTHROP	2,656	2,878	3,020	3,020	3,020	3,020	3,020	4.9	4.9
WOBURN	24,126	34,245	35,420	36,630	37,800	38,970	40,130	3.4	17.2
WRENTHAM	4,156	4,289	5,000	5,500	5,670	5,780	6,000	16.6	39.9
MAPC REGION	1,506,371	1,667,974	1,833,800	1,891,500	1,929,780	1,967,080	2,005,220	9.9	20.2

Metropolitan Area Planning Council

110 Tremont Street Boston, Massachusetts 02108 (617)-451-2770

Serving 101 Cities & Towns in Metropolitan Boston

February 8, 1988

TO: The Executive Committee
FROM: Douglas Carnahan, Manager, Demographics and Development Group
Jonathan Kunz, Economic Development Planner
SUBJ: Municipal and Traffic Zone Forecast Methods

MUNICIPAL AND TRAFFIC ZONE FORECAST METHODS

This memorandum describes the forecasting methods used to produce new population and employment forecasts for the MAPC region. A forthcoming forecast report will discuss in some detail the supportive evidence for our region-wide forecast totals. The forecasts were done for 101 cities and towns and 610 traffic zones in 5-year intervals through the year 2010. The new forecasts place greater emphasis on local conditions and developments in order to more fully reflect dynamic changes in population and employment that can occur in individual municipalities and traffic zones. The method and reasoning behind this approach is outlined more fully below.

BASE YEAR

The 1985 State Census was used as the most recent population base year for most cities and towns in the region. If this population total seemed questionable when compared to the 1980 census and the subsequent rate of housing permit issuance, then 1985 population was estimated from 1984 Federal Bureau of the Census population estimates. 1985 city and town statistics from the Massachusetts Division of Employment Security (DES) were used as a base year for the employment forecasts.

City and town population and employment for 1985 was distributed into the MAPC region's 610 traffic zones using the same zonal proportions as indicated in 1980 Urban Transportation Package Program (UTPP). When necessary, information on specific projects and land use changes were used to adjust the distribution of population and employment within traffic zones.

MAPC DATA SOURCES USED IN THE FORECASTS

Development File

MAPC's Development File contains summary descriptions of residential, commercial and industrial projects which have been recently completed, are under construction, or are proposed.

The Development File focuses on residential projects of 10 or more units, and industrial and commercial projects that exceed 10,000 square feet of gross floor space. Some smaller projects are also included, however.

Each project in the file is identified by title, type of development, size, approval status, estimated occupation date, and location. The eventual development type, size and completion date were often estimated for projects still in preliminary stages.

The project information, collected from community officials and developers, was entered into Dbase III files for the calculation of potential jobs and residents. Similar project listings were provided by the Boston Redevelopment Authority (BRA) and the Cambridge Community Development Department.

Vacant Sites Survey

MAPC's inventory of vacant sites includes all commercially zoned parcels greater than 10,000 square feet and all industrially zoned sites greater than one acre, excluding the city of Boston. The inventory is based on the most recent zoning maps with each site described by zoning characteristics, neighboring land uses, size, available infrastructure, environmental characteristics, and ownership.

The Vacant Sites Survey was updated during 1986-87 by examining assessor records and taking windshield surveys of each site. In addition to noting early signs of development, special attention was given to the development potential of each site. The Boston Redevelopment Authority (BRA) and the Cambridge Community Development Department identified major undeveloped and underutilized parcels zoned for industrial and commercial use in their respective cities.

MAPC Land Use Study

Mapped and tabulated land use data were used from the MAPC Land Use Study. These data were based upon aerial photographs taken by the MacConnell Group at the University of Massachusetts at Amherst in 1951, 1971, 1980, and 1985. The urban categories include industrial, commercial, and three residential densities. Major undeveloped land uses include agriculture, open, forest, and wetlands.

Community Interviews and Reviews

Local officials were interviewed about development projects, community attitudes and policies, zoning bylaws, environmental concerns, infrastructure capacities, moratoriums, and other factors which could influence future population and employment growth. In addition, the revised community development file and the updated forecasts were sent to local officials for their review and comment on accuracy and reasonableness.

OTHER DATA SOURCES USED IN THE FORECASTS

Housing Units Authorized by Building Permits and Public Contract

This annual report by the U.S. Bureau of the Census provided the number of new privately owned housing units authorized in each community ( ). Units are categorized by one, two, three or four, and five or more per structure. Subsidized developments are represented in our Development File.

Projections of the Number of Households and Families: 1986 to 2000

This U.S. Bureau of the Census report projected average national household size for three scenarios to the year 2000. The middle series was selected for our forecasts ( ).

Average Household Size by Housing Type for New England

New residential development was translated into additional population using the average number of persons per unit for specific housing configurations built during 1975-1980, as presented in a recent Center for Urban Policy Research report ( ). The average sizes given for New England were: single family, 3.33; garden apartment, 1.77; and townhouse, 2.36.

New Jobs to Net Floor Space Ratios

The ratio of new jobs to net floor space (NFS) for different types of development provided an estimation of total new employment. MAPC could find just one set of region-specific jobs to floor space ratios, those derived by the Boston Redevelopment Authority (BRA). The project sizes needed to generate one job in our forecasts are: 220 NFS for office; 400 NFS for retail; 500 NFS for industrial and distribution; and 1.5 rooms for hotel ( ).

SHORT-RANGE FORECASTS

Population

Our short-range population forecasts incorporates both population increase from newly-constructed dwelling units and population reduction from existing dwelling units due to shrinking household size. Population growth from new unit development was estimated from the number of new units in each housing category multiplied by the average number of persons per unit. Population reduction in existing housing units was a function of a projected decline in household size by the U.S. Bureau of the Census.

A baseline rate of new residential construction was derived from the rate of recent housing permit authorizations and from the characteristics of major residential proposals. Adjustments were made to some development proposals based on their likely approval and market conditions.

Occasionally, further adjustments were made to the preliminary development scenario based on community attitudes and policies towards development; infrastructure capabilities; and the availability of vacant and underutilized land.

Future population change in existing housing units was assumed to decline at a rate similar to a projected decline in household size. The U.S. Bureau of the Census has forecast national household size to drop by 2.7 percent each half decade through the year 2000 ( ). A similar rate of decline was assumed for the metropolitan Boston area, with some reduction in the rate of decline in communities with a low average household size.

Employment

The projects listed in MAPC's Development File were the prime source for distributing employment increases for the 1990 forecasts. Potential jobs generated in the new industrial and commercial space were calculated using net square footage (NFS) to employment ratios for each development type derived by the Boston Redevelopment Authority (BRA). NFS was estimated at 79% of gross - the reduction being for "nonproductive" and unoccupied floor area. The new employment was added to traffic zones to obtain preliminary forecasts.

The projects in the development file run the gamut from those already occupied to those still in the speculative or formative stage. If all of the projects with tentative occupancy dates by the end of 1990 were realized, approximately 40 million square feet of gross space would be added to the region, excluding the cities of Boston and Cambridge. Absorption of this much space in so little time is impossible. Therefore, the employment associated with some projects were delayed, reduced, or eliminated if development approval or favorable market conditions appeared in question.

The preliminary forecasts were further adjusted to reflect the likelihood of employment expansion in existing businesses. Factors used to account for this included: recent employment trends; accessibility to major highways; expansion capacity of sewer and water facilities; the expansion prospects of the community's major employment sectors; proximity to communities increasing in employment; the existence of development moratoriums, restrictive zoning, growth control policies, and other political factors which could limit future development; and areas undergoing revitalization, such as downtown centers and commercial strips, as identified by community officials.

LONG-RANGE FORECASTS

Well-specified development proposals are few in number after about 1991. MAPC's long-range forecasts rely upon more subjective growth indicators for later years. Factors which indicate a community's desirability and disposition towards future growth were assessed in detail.

From these growth indicators, communities, and then traffic zones within communities, were ranked according to their likelihood to sustain long-term growth. The growth forecast was a judgement of whether the area had the attributes to grow faster, slower, or at the same rate as the regional average.

Population

As in the short-range, traffic-zone population levels are influenced by both residential construction and declining household size. Accordingly, our long-range forecasts balance these two factors in the same manner described for the short-range population forecasts. The federal Census Bureau's projected rate of household size decline was extrapolated to 2010 at a slightly reduced rate.

The resulting population forecasts were thoroughly reviewed and adjusted to assure consistency between similar groups of communities. These preliminary scenarios were modified based on the following factors:

*Specific residential development proposals expected to be completed in 1990 or later.

*Extrapolation of the recent pace of housing permit authorizations and major residential development proposals.

*Availability of underutilized and undeveloped residentially zoned land. A combination of land use statistics and zoning maps helped indicate residential development potential.

*In a few of the more urbanized areas, expectation that a substantial number of commercial buildings would be converted into housing.

*Adequacy of infrastructure, particularly water and sewer facilities, in supporting new dwelling units.

*Proximity to rapidly expanding employment centers; nearby communities were expected to feel pressure for new residential development.

*Pro-growth community attitudes such as a priority placed on creating new housing units for low-income residents, the elderly, and others.

*Anti-growth community attitudes discouraging new housing construction because of its impacts on water and sewer needs, open space, and traffic congestion.

Employment

Post-1990 employment forecasts emphasized more subjective considerations of growth potential, but did incorporate some specific development proposals. Relatively few development plans extend past 1990, and even fewer of these have tenants committed. Emphasis was placed on a community's ability to absorb and/or compete for a limited number of new jobs. Growth rates established for each community and traffic zone were estimated from the following factors.

*Historical employment trends and recent development activity, a general barometer of a community's ability to maintain and create jobs.

*Employment composition, such as an exceptionally large proportion of "high technology" employers or mature or declining industries.

*Direct access to major highways, considered particularly important for a community to be able to accommodate commuters and support growth.

*Adequacy of infrastructure, particularly water and sewer facilities, in supporting new businesses.

*Attractive, underutilized areas identified by community officials which could be more intensely developed.

*Vacant commercially and industrially zoned land which could support future development. MAPC's Vacant Sites Survey helped to identify sites possessing good development potential. Sites were given priority if they had direct access to a major highway or had additional capacity available in appropriate water and sewer facilities. Many sites had barriers to development, including poor access, environmentally sensitive features, and incompatible neighboring land uses.

*Positive attitude and policies towards new economic development such as active development or redevelopment programs or a heightened interest in new industrial and commercial development to replenish a tax base diminished by Proposition 2 1/2.

*Negative attitudes and policies towards new developments such as the passage of growth control zoning policies and legislation.