

Final Report: Establishment of Affirmative Market Goals

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Draft Final Report: Establishment of Affirmative Market Goals

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Introduction

In creating a policy "benchmark" index for an affirmative market program, one needs to establish the percentage that firms owned by minority populations or women is of all firms in the State. In order to comply with the strict guidelines set down by Federal court decisions, it is probably necessary for this policy index to be pertinent to the area, the appropriate industry, and the time frame of particular, possible awards to which an affirmative market program might apply. This report evaluates several pertinent considerations with regard to contract awards associated with the construction industry in or around Boston at the current time. The report considers six significant questions:

- I.** Is there a possible undercount of minority and women owned businesses associated with the 1992 Censuses of minority and women owned businesses?
This is relevant since we rely heavily on this Census data.
- II.** What are the impacts on affirmative market goals of looking at data relevant to Boston and Brockton PMSA's, areas in which agencies of the Executive Office of Transportation and Construction will do much of their future contracting?
- III.** Should goals be established from data on firms of any type regardless of whether such firms do or do not have employees?
- IV.** In reviewing other state's data on women and minority owned firms, is there evidence that we should worry about having sufficient capacity of women and minority owned firms to draw upon for contracting purposes? This is equivalent to asking whether we should concern ourselves with: two questions, capacity building *and* utilization; rather than one question, utilization *only*?
- V.** How do we specify affirmative market benchmarks?
- VI.** Can we specify the likely 1997 ownership rates of minority and women-owned companies?

I. Possible undercount of minority and women owned businesses

There is a sense (see Margaret C. Simms, How the Census Bureau Devalues Black Businesses, *Black Enterprise*, June 1996, pp. 223-228) that the U.S. Bureau of the Census' 1992 Survey of Minority and Women-Owned Business Enterprises undercounts the number of Hispanic, Black, Asian and other minority-owned enterprises. Documentation accompanying the survey describes that the Census (a) did not include data on C corporations, (b) classified owners by the choice of race and/or ethnicity as given in their individual, original social security number application,¹ and (c) identified potential Hispanic owners of businesses by the correspondence of the owners' last names with a list of names identified in the 1990 Census as Hispanic. At best, these conventions give a systematic bias to the reported results. However, the major basis for the undercount allegation made by Margaret Simms and others rests on the loss of data on C corporations, since these were excluded from the detailed data presentations. Not having reported the C corporations anywhere but in summary data, the Bureau surely does undercount the number of minority and women-owned businesses; but it undercounts firms of any and all ownerships to the extent such firms are C corporations. Given that there is greater income within the white, male population than in other populations and given that income is a correlate of business ownership, the likelihood of a resulting undercount is smaller for minority and women-owned businesses than for white, male-owned businesses. However, our interest lies with whether there is more ownership proportionally of C corporations than of non-C corporations, an issue unlikely to be resolved easily. There are no corrections for this issue and it has not been recognized in Federal court outcomes. Therefore, we do not pursue the issue further.

II. Data relevant to Construction and to the Boston and Brockton PMSA Geographies

The construction of affirmative market contracting benchmarks should use data relevant to the area and the industry in which the goals will be applied. To construct a policy for Massachusetts, for example, it is clearly not sufficient to use national data because national data on minority and women ownership of firms may not reflect conditions in Massachusetts given the variations of population, income and employment opportunities among the various states. One therefore needs to use data as directly pertinent to the area under consideration as possible, implying that it is probably also not sufficient to use state data in establishing benchmarks because there are differences in proportions of persons by race and ethnicity in different areas of Massachusetts and because projects often draw bidders concentrated in a finite geographic space.² Similar arguments suggest the logic that construction projects should be focus on benchmarks established in looking at the percentage of minority and women owned construction firms, not the percentage of firms in other industries.

¹It is important to note that categories of race and ethnicity used by the U.S. Census Bureau have changed over time. Evidence also suggests that persons self identification of their own race and ethnicity have changed over time.

²This is especially true of transportation construction projects for which heavy equipment or a need to be "on" the construction site limits bidders on state projects to firms which come from the vicinity of the project.

Table 1. Ownership of firms in Massachusetts by minority and women ownership of firms.

	Any Firms, with or without employees					Firms with employees, only				
	Any ownership	Black	Hispanic	Asian	Women	Any ownership	Black	Hispanic	Asian	Women
All industries, 1992										
State-wide, number	442,848	7,225	6,914	7,009	147,572	73,069	567	838	1,292	16,948
, percent*	100%	1.63%	1.56%	1.58%	33.32%	100%	0.78%	1.15%	1.77%	23.19%
Boston, number	255,204	5,036	3,541	4,772	86,133	40,634	353	398	824	9,312
, percent	100%	1.97%	1.39%	1.87%	33.75%	100%	0.87%	0.98%	2.03%	22.92%
Brockton, number	14,201	370	251	132	4,347	2,267	38	35	23	490
, percent	100%	2.61%	1.77%	0.93%	30.61%	100%	1.68%	1.54%	1.01%	21.61%
Boston/Brockton Total, number	269,405	5,406	3,792	4,904	90,480	42,901	391	433	847	9,802
, percent	100%	2.01%	1.41%	1.82%	33.59%	100%	0.91%	1.01%	1.97%	22.85%
State minus Boston/Brockton, no.	173,443	1,819	3,122	2,105	57,092	30,168	176	405	445	7,146
, percent	100%	1.05%	1.80%	1.21%	32.92%	100%	0.58%	1.34%	1.48%	23.69%
Construction industries, 1992										
State-wide, number	53,321	404	711	417	4,483	11,779	66	119	41	1,286
, percent	100%	0.76%	1.33%	0.78%	8.41%	100%	0.56%	1.01%	0.35%	10.92%
Boston, number	26,035	260	328	251	2,218	5,551	37	31	18	612
, percent	100%	1.00%	1.26%	0.96%	8.52%	100%	0.67%	0.56%	0.32%	11.03%
Brockton, number	2,389	20	29	17	208	499	4	5	1	64
, percent	100%	0.84%	1.21%	0.71%	8.71%	100%	0.80%	1.00%	0.20%	12.83%
Boston/Brockton Total, number	28,424	280	357	268	2,426	6,050	41	36	19	676
, percent	100%	0.99%	1.26%	0.94%	8.54%	100%	0.68%	0.60%	0.31%	11.17%
State minus Boston/Brockton, no.	24,897	124	354	149	2,057	5,729	25	83	22	610
, percent	100%	0.50%	1.42%	0.60%	8.26%	100%	0.44%	1.45%	0.38%	10.65%
All industries, 1987										
State-wide, number	356,780	4,761	2,636	3,916	111,376	82,882	628	411	827	13,885
, percent	100%	1.33%	0.74%	1.10%	31.22%	100%	0.76%	0.50%	1.00%	16.75%
Boston, number	178,721	3,191	1,420	2,637	58,975	38,404	422	226	508	6,666
, percent	100%	1.79%	0.79%	1.48%	33.00%	100%	1.10%	0.59%	1.32%	17.36%
Brockton, number	9,196	188	53	66	2,524	2,343	29	16	---	330
, percent	100%	2.04%	0.58%	0.72%	27.45%	100%	1.24%	0.68%		14.08%
Construction industries, 1987										
State-wide, number	50,589	400	293	187	2,472	17,228	107	71	41	848
, percent	100%	0.79%	0.58%	0.37%	4.89%	100%	0.62%	0.41%	0.24%	4.92%
Boston, number	20,682	236	130	119	1,066	6,883	54	34	29	359
, percent	100%	1.14%	0.63%	0.58%	5.15%	100%	0.78%	0.49%	0.42%	5.22%
Brockton, number	1,772	22	16	4	72	577	9	6	0	23
, percent	100%	1.24%	0.90%	0.23%	4.06%	100%	1.56%	1.04%	0.00%	3.99%

*percentages reflect the proportion of each industry and area's firms of any ownership represented by firms of specific racial and ethnic ownership.

The Executive Office of Transportation and Construction (EOTC) estimates that the majority of its agencies' project dollars are spent in and its agencies' construction contractors come from the Boston and Brockton PMSA areas (presented spatially in **attachment 1**). Therefore, it is reasonable to evaluate the volume of minority and women owned construction firms in the Boston/Brockton PMSAs as compared to other areas. We need to be more specific about the exact proportions of contracting that fall in various State areas and the ability of bidders to creditably bid long distances from project sites. This will require a survey of EOTC contracts and subcontracts which would look at geography of the project, contractor/bidder characteristics (ownership, prime/sub-relationship to the project, location of contractor's operational base and size of contract). Such a survey was beyond the scope of work of this project.

Table 1 above shows data pertinent to the State as a whole, Boston and Brockton as specific substance areas, and the rest of the State. The Table contains a great deal of data about firms in 1987 and in 1992, comparing:

- ◆ firms from the construction industry with firms from all industries,
- ◆ firms for Boston and Brockton with firms from anywhere in the State, and
- ◆ firms with employees with firms with and without employees (any firms).

The first two of these are relevant to this section of the report; the third, to the next section, dealing with issues of firms with or without employees.

We see in **Table 1** that the percentage of all firms of minority and women ownership increased significantly throughout most parts of the State from 1987 to 1992. The major exception to this was that black owned construction companies increased only little, and they actually decreased in Brockton during the period. This pattern generally holds for both types of firms, those with and those without employees. The fact that the percentage and number of black owned firms was stagnant in construction everywhere in the State between 1987 and 1992 while at the same time, the percentage and number of black owned businesses rose rapidly for the aggregate of all other industries implies that construction was either a very hard industry for black owned firms to succeed in or that there were better opportunities for potential black owners as employers or for black owned firms themselves elsewhere, in other industries. This is a question which must be answered in addressing an affirmative market policy; certainly, it deserves further study. The answer to this question speaks to the issue of the need to develop the capacity of construction firms of certain kinds of ownerships. Unfortunately, answers would likely require survey information of persons currently and previously in the construction field; they are not likely to be elucidated with information available from the Census.

The overall summary results **Table 1S**, nonetheless, generally show higher total concentrations of minority and women owned construction businesses in the urban areas of the State, as would be expected:

Table 1S: Summary statistics: ownership of construction companies in Massachusetts

	With or without employees, 1987		With or without employees, 1992	
	Minority-owned	Total Minority or Women-owned	Minority-owned	Total Minority or Women-owned
State-wide	1.74	6.63	2.87	11.28
Boston	2.35	7.50	3.22	11.74
Brockton	2.37	6.43	2.76	11.47

Results similar to these obtain for firms with employees, only. Overall, we see that the percentage of firms which are prepared to engage in construction contracting have risen markedly between 1987 and 1992. If the percentage of contracts awarded to minority and women owned businesses has not risen proportionately, then there is a prima facie case for the implementation of affirmative market goals.

Data also exist for construction firms at a more detailed industry level showing the type of work which the firms do. This, however, loses the detail by geography shown in **Table 1** because the Bureau of the Census restricts release at greater detail for fear of losing confidentiality of their data respondents. **Table 2**, shows the more detailed data on numbers of firms by type of ownership at the State level in:

- SIC 15: General Building Contractors,
- SIC 16: Heavy Construction, except Buildings, and
- SIC 17: Special Trade Contractors.

While **Table 2** shows heavier concentration of women and minority construction firms in SIC's 16 and 17, the fact that there is no sub-industry data for geographic subareas limits the precise application of numbers to specific geographies and industries simultaneously. One could obtain more detailed data by multiplying the simple probabilities of geographically specific "all construction" minority/women ownership (**Table 1**) by the simple probabilities of the various sub-construction industries in the "all construction" industry aggregate (Table 2). The result will fail to the extent that ownership by geography and ownership by sub-industry category are not independent.

III. Considerations About Firms With or Without Employees

The data presented in **Table 1** show that there are considerable differences between firms depending on whether they have employees or not. The number without employees is growing quite quickly, not only in Massachusetts but everywhere in the U.S. Only 16.5% of all Massachusetts firms in 1992 had employees compared to 18.2% nationally. Between 1987 and 1992, in Massachusetts the number of total firms (with or without employees) grew by 72.5%;

however, the number of firms with employees fell by -11.8%. Nationally, these numbers were 26.0% and -10.1%, respectively. We might ask what accounts for these changes; and since the results seem to differ, depending on whether one draws the affirmative market benchmarks with reference to the alternative universes of employee or non-employee firms, which measure should we use?

The answer to this question is somewhat speculative. Namely, there are three kinds of non-employee based firms:

- those which are dormant, out of operation and at least temporarily without employees;
- those which are holding companies with no direct sales of their own; and
- those which are partnerships without employees or proprietorships which by definition have no employees.

If the increase of firms without employees is due largely to the first two sources, then we should want primarily to reflect on the firms with employees, in order to focus on firms capable of contracting with the State. However, if the increase of such firms is due to the third rationale, then we should want to reflect on all firms with or without employees, because all of these firms can qualify as State contractors.

Given the prevalence of non-employee firms in the service industry, including legal, drafting, small engineering and consulting firms we should expect that the latter category of firms (with or without employees) is more desirable for constructing State benchmarks. **Table 3** shows that firms without employees make up a great percentage of all firms in all industries everywhere. In Massachusetts such firms represent 8.35% of all firms in all industries and 77.9% of all firms in the construction industry. Elsewhere in the U.S. firms without employees represent 81.8% of all firms in all industries and 73.7% of all firms in the construction industry. So surely firms without employees are plentiful. **Table 3** also shows that the percentage of total industry sales which emanate from firms without employees has fallen between 1987 and 1992 with the growth of such firms, but that the percentage of sales coming from firms without employees is much greater in construction than in other industries, 20.2% relative to 12.0% in Massachusetts in 1992 for example. This fact plus the fact that there have been significant increases in the percentage of firms in construction which do not have employees (65.9% of firms in 1987 did not have employees whereas 77.9% of firms in 1992 did not have firms) contribute to the recommendation that the State use data on all firms in constructing affirmative market benchmarks, regardless of whether such firms have employees or not.

Table 2: Summary Statistics of Ownership of Types of Construction Companies in Massachusetts, 1987 and 1992

Massachusetts, 1992									
	All Firms	Black-owned	Hispanic-owned	Asian-owned	Women-owned	Percentage Black-owned	Percentage Hispanic-owned	Percentage Asian-owned	Percentage Women-owned
All construction	53,321	404	711	417	4,483	0.76	1.33	.78	8.41
General Building Contractors	8212	43	68	51	724	0.52	0.83	.62	8.82
Heavy Construction, except Buildings	719	7	9	12	70	0.97	1.25	1.67	9.74
Special Trade Contractors	43,071	352	626	353	3,503	0.81	1.45	.82	8.13
Massachusetts, 1987									
All construction	50,589	400	293	187	2,472	.79	.58	.37	4.89
General Building Contractors	not available	59	34	23	466	not compatible			
Heavy Construction, except Buildings		6	6	3	29				
Special Trade Contractors		331	251	152	1830				
Percentage Growth in Ownership, 1987-92									
All construction	5.40	1.00	142.66	111.68	81.35				
General Building Contractors	not available	(37.12)	50.00	121.74	55.36				
Heavy Construction, except Buildings		16.67	50.00	300.00	141.38				
Special Trade Contractors		6.34	149.40	132.24	91.42				

IV. The Review of Other State's Data on Women and Minority Owned Firms—the Question of Whether We Should Work on Developing Capacity

Table 4 shows data on the number of firms (in the construction industry and in all industries) owned by various racial and ethnic groups as well as the corresponding population for such groups in various States and for the nation as a whole in comparison to Massachusetts. For firms of any ownership, this table shows exceptional growth across the industry total and slower growth in the construction industry. The one exception to this is Tennessee, Alabama and Georgia which grew almost as fast on a per capita³ which grew almost as fast on a per capita⁴ in construction as in the all industry total. **Table 4** also shows uniform growth for firms owned by persons of each of the separate race, ethnic and gender categories across all industries and in construction with the notable exception being the slower growth in construction for firms of black-ownership. Massachusetts' 1987-92 growth rates across all categories in comparison to other States and the U.S. are quite favorable.

By comparing the number of firms within each area and industry by type of ownership to the relevant population by race and ethnicity, we can see whether there are as many firms as might be expected for the population of a given type. For all types of ownership in the all industries category, we see in such comparisons between 1987 and 1992 that the Commonwealth of Massachusetts has moved past the rest of the U.S. in business ownership. The ownership per person within Massachusetts rose from .084 firms/person⁵ to .141 firms/person between 1987 and 1992. This allowed us to pass the rate of ownership within the U.S. which also rose during the period but only from .112 to .132 firms per person. Massachusetts, thus might well proudly refer to itself as the "Entrepreneurial State." In construction there have been no gains in ownership per capita except for the high growth states of Tennessee, Alabama and Georgia. But in construction with .017 firms/person, we started ahead of other States and, at least, we have

³The States of Tennessee, Alabama and Georgia were lumped together to limit the data presentation in **Table 4**.

⁴The population used in **Table 4** is restricted for each State and for the US to those between the ages of 25 and 65.

⁵ This is alternatively stated as one firm for each 11.9 persons in the State of Massachusetts.

stayed there between 1987 and 1992. It is in the area of minority ownership that we might be strategically concerned. There are more black owned businesses across all industries in Massachusetts than in other States. However fewer construction firms are owned by blacks per person in Massachusetts than in the U.S. And for Asian and Hispanic owned firms, there are fewer of these per person in Massachusetts than in the U.S. whether we are talking about all industries or just the construction industry. Such conditions not only strongly support the establishment of a broad affirmative market program in construction but also encourage building Asian and Hispanic minority-owned capacity in the other various industries too.

Table 3: Sales Values of Firms, With and Without Employees in Construction and Other Industries—1987 and 1992

1992								
	Firms With Employees, Only			Firms With No Employees, Only			% Firms With	% Sales From Firms
	Firms	Sales Value, in 000's	Value / Firm	Firms	Sales Value, in 000's	Value / Firm	No Employees	Without Employees
Massachusetts								
All industries	73,069	\$86,508,000	\$1,183,922	369,779	\$11,850,000	\$32,046	83.5%	12.0%
Construction	11,779	\$5,973,000	\$507,089	41,542	\$1,508,000	\$36,301	77.9%	20.2%
United States								
All industries	3,134,959	\$2,907,132,000	\$927,327	14,118,184	\$417,068,000	\$29,541	81.8%	12.5%
Construction	481,908	\$260,771,000	\$541,122	1,347,712	\$46,352,000	\$34,393	73.7%	15.1%
1987								
Massachusetts								
All industries	82,882	\$57,397,002	\$692,515	273,898	\$8,966,532	\$32,737	76.8%	13.5%
Construction	17,228	\$5,667,215	\$328,954	33,361	\$1,804,440	\$54,088	65.9%	24.2%
United States								
All industries	3,487,454	\$1,709,301,000	\$490,129	10,208,026	\$285,507,000	\$27,969	74.5%	14.3%
Construction	565,017	\$191,467,000	\$338,869	1,086,085	\$40,905,000	\$37,663	65.8%	17.6%

Table 4. Comparisons of Massachusetts, the US and other selected states in minority and women ownership of firms.

	Total Population: Any Race Ethn./Gend.	Total Firms: Any Ownership	Firms per Person	Black Population	Black- owned Firms	Firms per Person	Hispanic Population	Hispanic- owned Firms	Firms per Person	Asian Population	Asian- owned Firms	Firms per Person	Female Population	Female- owned Firms	Firms per Person
All industries: firms with or without employees															
Massachusetts: '92	3,148,562	442,848	0.141	163,538	7,225	0.044	137,952	6,914	0.050	82,480	7,009	0.085	1,608,028	147,572	0.092
Massachusetts: '87	3,043,950	256,780	0.084	143,330	4,761	0.033	102,850	2,636	0.026	59,960	3,916	0.065	1,563,420	111,376	0.071
United States: '92	130,692,214	17,253,143	0.132	15,066,672	620,912	0.041	11,235,535	771,708	0.069	4,406,723	606,438	0.138	66,380,286	5,888,883	0.089
United States: '87	121,884,300	13,695,480	0.112	13,494,180	424,165	0.031	8,968,630	422,373	0.047	3,301,050	376,711	0.114	62,157,040	4,114,787	0.066
California: '92	16,027,109	2,259,327	0.141	1,205,406	68,968	0.057	3,775,530	249,717	0.066	1,719,143	232,672	0.135	7,944,138	801,487	0.101
California: '87	14,299,000	1,809,252	0.127	1,047,890	47,728	0.046	2,923,760	132,212	0.045	1,277,020	147,633	0.116	7,119,880	559,821	0.079
Texas: '92	8,916,706	1,256,121	0.141	1,024,407	50,008	0.049	2,084,104	155,909	0.075	207,656	38,763	0.187	4,496,627	414,179	0.092
Texas: '87	8,242,770	1,025,617	0.124	911,980	35,725	0.039	1,733,570	94,754	0.055	146,450	22,682	0.155	4,166,280	298,138	0.072
Florida: '92	6,720,397	1,000,542	0.149	872,782	40,371	0.046	906,677	118,208	0.130	101,837	17,499	0.172	3,437,029	352,048	0.102
Florida: '87	5,952,550	735,810	0.124	735,590	25,527	0.035	699,270	64,413	0.092	69,510	8,902	0.128	3,064,740	221,361	0.072
TN, GA, AL: '92	8,237,844	977,603	0.119	1,720,715	67,891	0.039	92,801	8,132	0.088	82,964	13,764	0.166	4,239,068	315,645	0.074
TN, GA, AL: '87	7,546,450	734,755	0.097	1,521,450	41,791	0.027	69,950	2,882	0.041	57,570	6,892	0.120	3,898,550	203,516	0.052
Construction industry, only: firms with or without employees															
Massachusetts: '92	3,148,562	53,321	0.017	163,538	404	0.002	137,952	711	0.005	82,480	417	0.005	1,608,028	4,483	0.003
Massachusetts: '87	3,043,950	50,589	0.017	143,330	400	0.003	102,850	293	0.003	59,960	187	0.003	1,563,420	2,472	0.002
United States: '92	130,692,214	1,829,620	0.014	15,066,672	43,381	0.003	11,235,535	97,476	0.009	4,406,723	28,295	0.006	66,380,286	183,695	0.003
United States: '87	121,884,300	1,651,102	0.014	13,494,180	36,763	0.003	8,968,630	55,516	0.006	3,301,050	16,223	0.005	62,157,040	94,308	0.002
California: '92	16,027,109	190,538	0.012	1,205,406	2,997	0.002	3,775,530	24,458	0.006	1,719,143	9,961	0.006	7,944,138	18,581	0.002
California: '87	14,299,000	174,230	0.012	1,047,890	2,541	0.002	2,923,760	14,155	0.005	1,277,020	5,806	0.005	7,119,880	8,858	0.001
Texas: '92	8,916,706	135,392	0.015	1,024,407	3,209	0.003	2,084,104	32,464	0.016	207,656	1,657	0.008	4,496,627	12,300	0.003
Texas: '87	8,242,770	125,506	0.015	911,980	2,773	0.003	1,733,570	18,523	0.011	146,450	744	0.005	4,166,280	7,268	0.002
Florida: '92	6,720,397	104,554	0.016	872,782	3,234	0.004	906,677	12,678	0.014	101,837	901	0.009	3,437,029	13,947	0.004
Florida: '87	5,952,550	92,691	0.016	735,590	2,751	0.004	699,270	8,231	0.012	69,510	311	0.004	3,064,740	6,780	0.002
TN, GA, AL: '92	8,237,844	132,673	0.016	1,720,715	6,645	0.004	92,801	1,770	0.019	82,964	550	0.007	4,239,068	11,931	0.003
TN, GA, AL: '87	7,546,450	95,577	0.013	1,521,450	5,282	0.003	69,950	465	0.007	57,570	256	0.004	3,898,550	6,180	0.002

V. Specification of Affirmative Market Benchmarks

Affirmative market goals will require benchmarks of the availability of firms in an industry and area (stated as the percentage minority and women firms represent of all firms). These numbers must weight the availability of firms in different areas by the probability to which a particular project is likely be serviced by firms from those various geographic areas. The latter is unknown until we have a particular project in mind. Only for specific projects can we begin to blend the data from specific geographic regions into a single goal. If we believed that a project, for example, was as likely to attract winning bids from Boston based firms as from Brockton based firms, given the different relative proportions of firms in the two areas, then the two percentages of minority firms would need to be averaged with appropriate (.5) weights.

This procedure was followed in building **Table 5's** summary of material based on the 1992 availability of construction firms with or without employees presented in **Table 1**. **Table 5** shows three scenarios. One demonstrates a project whose geographic positioning of a project makes individual firms whether in Boston or in Brockton equally likely to win a contract; a second where each firm in Brockton is three times more likely to win a project than each firm in Boston; and a third in which each firm in Boston is three times more likely to win a project than each firm in Brockton. The first scenario implies that Boston firms, collectively, are 91.6% likely to win and of course, Brockton firms are only 8.4% likely to win. The second and third scenarios change the collective likelihood of a Boston firm winning to 78.4% and 97.0%, respectively.

Scenario	1	2	3
Category of Ownership	Goal	Goal	Goal
Black	.99%	.97%	1.00%
Hispanic	1.26%	1.25%	1.26%
Asian	.94%	.91%	.95%
Women	8.54%	8.56%	8.53%

The greater the likelihood of a win by any of Boston's firms, the more the affirmative market benchmarks should be set to resemble the percentages of minority or women owned firm availability in Boston. There is not a great deal of difference in benchmarks among the three scenarios because the availabilities in Boston and Brockton are quite similar and because Boston is so large relative to Brockton. Specific goals should be set, nonetheless, for the different geographic venues of each project. These benchmarks might still be appropriately adjusted upward depending on the State's decision about fostering capacity, given the conclusions of the last section.

VI. Estimating the Proportion of Minority and Women Owned Construction Businesses in 1997

The establishment of affirmative market goals which meet the legal requirements of Crosson and later Federal court rulings requires specific, timely estimates of the proportion of the minority owned businesses in small geographic areas for recent dates. **Tables 1** and **4** show the dramatic, historical changes in the percentages of minority and women owned businesses in Massachusetts, Boston and Brockton. The most dramatic of these are summarized in **Table 6** or firms with and without employees:

Ownership Type⁶	1987	1992	Change,1987-92	Percent Change⁷
Asian	187	417	230	123% / 8.4%
Black	400	404	4	1% / .1%
Hispanic	293	711	418	143% / 15.3%
Total, Minority	880	1,532	652	74% / 23.9%
Women	2,472	4,483	2,011	81% / 73.6%
Total, All Owners	50,589	53,321	2,732	5% / 100.0%

Because of the large and varied changes in ownership of firms, numbers from 1992 are likely to be no longer sufficiently timely to satisfy requirements of the court. **Table 6** suggests (by the

⁶ Minority ownership adds to a total without double counting since each race group includes only non-Hispanic owners. However, there is double counting if female ownership is added to race/ethnic ownership because the latter includes both male and female ownership and female ownership includes persons of all race and ethnicities.

⁷ This column presents the percentage growth in firms between 1987 and 1992 by type of ownership before the “/” and the percentage of the total growth categorized by ownership after the “/”.

size and variety of the changes contained within it) that the percentage ownership by minority groups is likely to be as different today from 1992 as the table shows 1992 to have been different from 1987. Indeed, data only recently available from the ES202 files of the Department of Employment and Training (DET) show significant increases in the number of firms in the construction industries, although this data base is not able to show the composition of ownership by minority and women owners. By 1995, however, the number of construction establishments with employees had risen to more than 14,318 from the 11,779 companies reported by the Census in 1992, a nearly 22% growth.⁸

The 1992 Census data is the newest and only consistent source of ownership information released by the Census. However, the 1992 data is not likely to be recent enough to satisfy challenges in Federal court. Newer Census data deriving from the 1997 Census to be administered in December of this year will not be released until 2001, leaving us just before its release, as much as 9 years out of date. We therefore continue to recommend that the State use its own administrative data to develop better, more current estimates.

Short of the State building an appropriate administrative records data base, we face choosing among three alternatives:

1. using the 1992 data as provided by the Census, leaving the data badly out of date and insufficient to withstand court challenges;
2. using alternative, non-State data on minority ownership, running the risk that it may not be sufficiently broad to produce “statistically adequate” estimates of the percentages of minority and women owned firms within the State; and
3. using 1992 Census data in combination with an “estimates procedure” to produce approximations of the current, 1997, proportion of construction firms owned by

⁶A range of uncertainty exists around the 1995 number because the data was reported by the town and city location of establishments and suppression of the data occurs in 328 cases where there is three or fewer establishments in individual two digit SIC's. Additionally, there is a difference in comparing the data between 1992 Census files and 1995 DET files because the former reports on individual companies and the latter reports on establishments. There are possibilities that there might be more than one establishments per company, although this is less likely in the construction industries than in some other industries. Therefore, the comparison is thought to be reasonably indicative of growth in the industry.

minority and women, potentially introducing statistical errors into the resulting estimates.

There is no course of action which does not have a shortcoming. A close reading of legal precedent for affirmative market proposals shows that alternative 1 is most likely to be not satisfactory. Alternative 2 requires the use of other data base beyond the Census files on minority and women owned companies the best of which is probably the Dun and Bradstreet data base on small businesses known as the D&B Small Business Sourcing File (SBSF). For Massachusetts, this data base shows a total of only 480 minority owned firms across all industries.⁹ This is a very small proportion, 2.3%, of the 20,749 minority firms identified by the Census within the Commonwealth.¹⁰ The small coverage of and likely deviation between reporting rates for minority owned and majority owned Massachusetts firms raises serious issue with the inherent selectivity biases of the D&B SBSF data. We believe that this result renders the alternative not viable.

As a consequence, this report explores alternative 3 (*estimates*) at length. The primary concern in considering use of alternative 3 is whether sufficiently small confidence intervals can be drawn around the 1997 estimates of minority and women owned firms that the result will have appropriate legal validity. As a result of our work exploring ownership of construction firms by minority status of owner, we believe this to be the case.

⁹ There are an additional 896 women owned businesses in the D&B small business data base.

⁸ Of all firms, minority or not, the D&B SBSF data base picks up 4,443 of the 442,848 firms of all types (with or without employees) in the State--just 1%. The inherent difference in sampling rates of minority and non-minority firms, themselves, underlie the concerns for selectivity bias and the appropriate scaling of sample data to population estimates.

Technically, *estimates* must simultaneously project the percentage of firms owned by each of the minority populations while considering changes in each group's relative population size, the growth in industry¹¹ within the relevant geographic area and the prior percentage of ownership by the minority population. Estimates of the proportion of firms owned by various population components must add up to 100% whatever changes occur among the explanatory variables. The latter requirement exists because it is tautological that the totals must always add across an exhaustive set of sub-group populations to 100%. Estimates which might produce any other outcome would be technically incorrect.

While satisfying adding up requirements, estimation procedures must also take care to be statistically efficient since the size of the standard errors of the estimates are important for comparison to those of alternatives laid out above. It is fortunate that there are procedures already devised to account simultaneously for both adding up and efficiency: Zellner's seemingly unrelated regressions (SUR)¹². These can implement constraints to the regression coefficients which ensure additivity while considering cross-equation covariances of the error terms. In comparison, any other possible estimates are statistically inefficient.

For minority ownership of construction firms, appropriate techniques worked extraordinarily well, i.e., they produced very significant empirical results. We chose to estimate the change in ownership over a five year period, focusing on the more difficult issue of estimating *change in the share of ownership rather than* level of ownership. We simultaneously applied Zellner's SUR to construction firm ownership by Asian, Black, Hispanic and non-minority populations, using data on the changes experienced between 1987 and 1992 among the 50 states and the District of Columbia. The use of this data set is appropriate because the variance in ownership is magnified across the states and also because we believe that Massachusetts will look like other states do now when its minority populations and economic activity grow to match those of its sister states. How better to evaluate our future than to look at those who look now as we will look in the future? In testing our empirical hypotheses, we tried a variety of mathematical functions which could explain the change in ownership, each specification using modestly different assumptions about the explicit competition among the race/ethnicities--who suffers for others' gains. These results varied very little. Therefore, we present in Table 7 the best, most defensible of the alternative specifications.

¹¹ This is the industry relevant for study, here, the construction industry.

¹²The procedures for Zellner's seemingly unrelated regressions (SUR) were originally developed in Arnold Zellner, "An Efficient Method of Estimating Seeming Unrelated Regressions and Tests for Aggregation Bias," ***Journal of the American Statistical Association***, 57: 348-368, 1962.

Ownership Type ¹³	1992	Change, 92-97	1997 Estimate	R ² —Change	R ² —Level
Asian	.782%	.343%	1.125%	.908	.998
Black	.758%	.004%	.762%	.340	.997
Hispanic	1.333%	.551%	1.884%	.830	.986
Total, Minority	2.873%	.898%	3.771%	NA ¹⁴	NA
Total, Non-Minority	97.127%	-.898%	96.229%	.847	.995
Total, All Owners	100.0%	0%	100%	NA	NA

Regression coefficients are remarkably constant among the various equations which explain the proportion of ownership by various race/ethnic groups. Growth of the population of a particular race or ethnicity as expected always had a positive and significant impact on the proportional ownership of that group whatever the group in question. This reduced the share of ownership of other populations. Growth in the construction industry itself seems to provide a modest spur for Asian and Black ownership, although this same advantage did not seem to hold for Hispanic populations; which seemed relatively to gain most when the industry is in decline or growing more slowly. This may indicate perseverance on the part of Hispanic owners, that they stay in business longer when the industry is in decline - thereby gaining an increased percentage of ownership within the industry. Nonetheless, for all, industry growth effects are quite weak. Lastly, the empirical effects seemed to show that Hispanic and black populations' ownership grew most when these populations had a significant prior foothold, i.e., when these populations already owned a larger rather than smaller proportion of the State's construction firms. This did

¹³ Minority ownership adds to a total without double counting since each race group includes only non-Hispanic owners. However, there is double counting if female ownership is added to race/ethnic ownership because the latter includes both male and female ownership and female ownership includes persons of all races and ethnicities.

¹⁴ This and the last lines in **Table 2** were derived from aggregating the previous lines. They were not subject to their own empirical estimation.

not hold for the Asian population, which grew most when its foothold was slight. Throughout these regressions, the specification implied that no growth occurred for any population sub-group unless its size, the economic conditions within the State or the populations' preceding foothold changed.

Most startling, the explanatory power of the model to explain the *change* in proportional ownership by each population sub-group is very high ranging from 83% to 90.4% with only one equation failing to fall within these boundaries -- that for blacks at 34%. These are phenomenal results since they represent the percentage of ownership *changes* which are explained by our model. Since the *level* of ownership changes from year to year much less than the *change* itself (in percentage terms), we would expect to explain much more of the *level* of the percentage ownership. This we do, as shown in the last column of **Table 2**.

In comparison to minority ownership, female ownership was much harder to forecast. This was largely due to the fact that, for minority ownership there were two significant, unique explanations for each group's ownership (change in the group's population percentage of the total population and the fact that growth in one group would come at the expense of other groups), whereas for women neither of these explanatory factors holds. Women, of course, biologically for each race and ethnicity are approximately 50% of the population between 25 and 64 of the various states. These percentages do not change much over time and among the states as minority percentages do. Therefore, this is not a very powerful explanatory factor. Similarly the growth of women's ownership does not come at the expense of minority ownership because women and minority classifications are not mutually exclusive. So minority women owning businesses adds to two of the classifications of ownership which we are tracking and implicitly the power of the relative changes in "competitive groups" explanatory variables is not available to "explaining" women's ownership as it is to minority ownership.¹⁵

We adjusted the explanation then of female ownership to include consideration of female participation in the labor market over time in the various states. This variable has reasonable variation over time and space. We also added relative female/total labor market unemployment rates to account for differential opportunities for women and men in the labor market. Together, both variables, while significant, fail to explain the change in percentage female ownership as well as we can explain changes in the minority ownership of firms. The R^2 in the female ownership equation is only .12, very low in comparison to the minority equation R^2 's in the .80-.90 range (see **Table 7**). We conclude that while there was considerable growth in female ownership between 1987 and 1992 and while we expect to see continuing growth in such ownership, it is too uncertain to forecast growth through 1997.

VII. Summary and Conclusions

¹⁵ Of course, female ownership is competitive with male ownership, but the differences in percentage ownership between males and females as compared to the differences in percentage ownership among minority sub-groups is very large. Large differences of this sort usually give a less good control for changes among the groups.

In establishing the number of minority and women owned firms in the construction industries in Massachusetts in 1997, it is necessary to resort to statistical estimates of the size of this firm population for two reasons:

- Adequate current data is not otherwise available.
- Old data on percentage ownership is inadequate because legal precedent has required timely and specific data.

Taken to its extreme, legal precedent would seem to require focusing on both specific sub-state geographies and specific sub-construction industries. There were not huge variations in minority and women ownership of construction firms found between Boston and Brockton, Tables 1 and 2A, for example, showing a .46% variation in 1992 between Boston and Brockton in minority-owned firms and only a .19% variation between the same two sub-areas in women-owned firms. Table 2B shows higher minority and women ownership of construction firms in the "heavy construction, except buildings" end of the industry. To the extent that EOTC can separate prospective projects into those using different types of contractors, we recommend using the sub-industry specific numbers.

Estimation of the number of minority and women-owned firms requires the use of variables which "explain" the volume of such firms. Such explanations should rely on data which itself is more current than the firm data. It should also use variables containing historical variation related to the observed historical variations in firm ownership. Herein, we have chosen to explain variation in ownership across states from 1987 to 1992. We find adequate explanation in the variation of minority-ownership using three variables: the percentage of minority population, the size/growth of the state's gross state product (GSP) in construction and prior ownership levels of minority persons. These variables were collected for all states for 1987 and 1992 and were also known for Massachusetts in 1997. Therefore, they made good estimating variables.

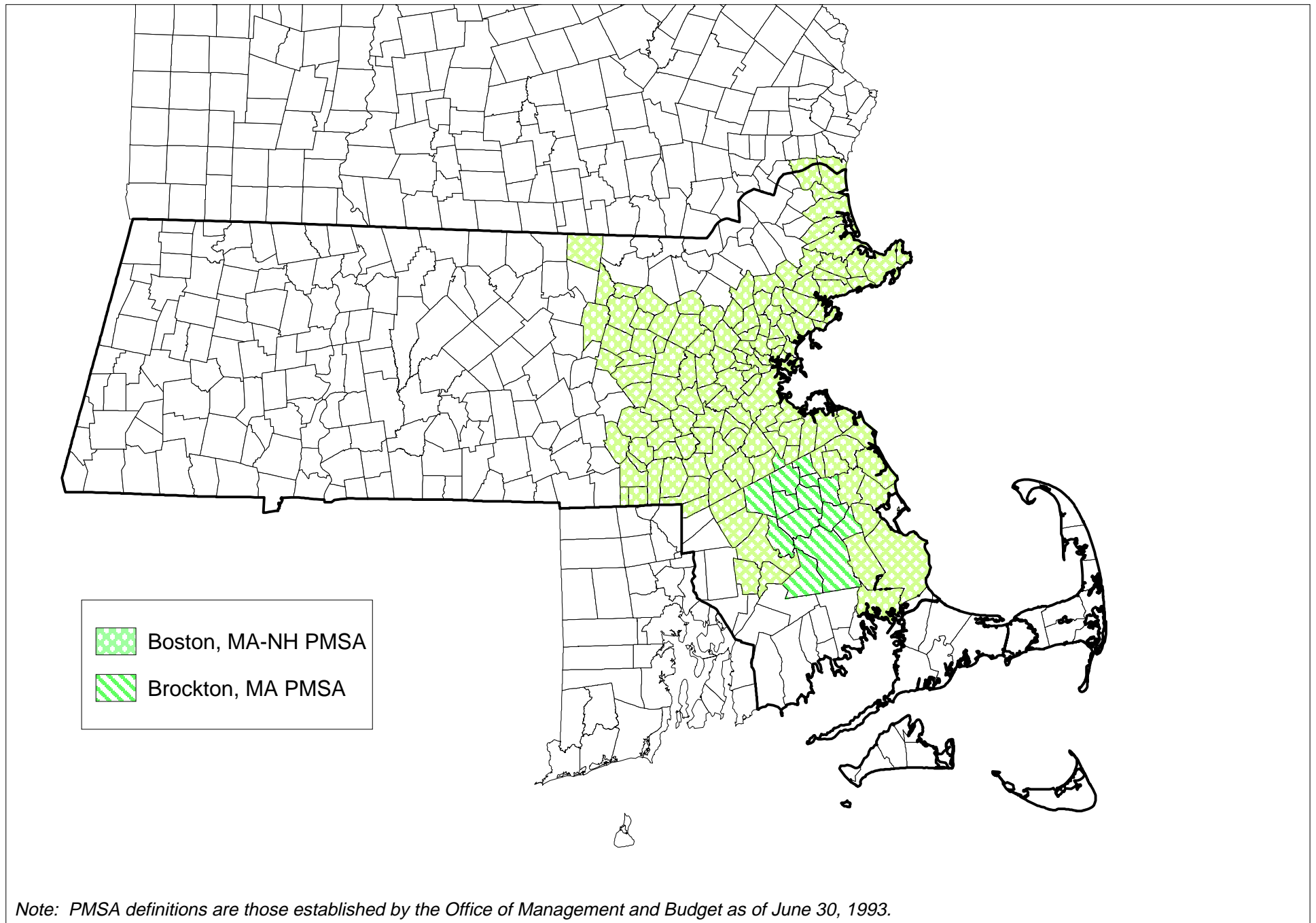
Explanation of minority ownership and the inherent variation in the underlying determinants of such ownership (growth in construction GSP and the minority populations of Massachusetts) imply a likely increase of approximately 1% in minority-owned construction firms in Massachusetts between 1992 and 1997. In setting minority-owned goals, the State should increase the 1992 proportions of minority-owned firms observed by this 1% to account for recent growth.

We also recommend that the State take steps to improve its own data on ownership of firms. Linking the State's administrative records on firms with those in the State Office on Women and Minority Business Assistance (SOWMBA) could significantly improve on the period Census data which is so often badly out-of-date. Newer data on minority and women ownership than that for 1992 will not be released before 2002, leaving the State with data 10 years out of date by that time. Much investigation would need to be done to determine whether such linkages are technically and substantively feasible and no work in this project has been

directed to such end. If such linkages are feasible, enabling legislation would likely be needed to permit the matching.

Finally we recommend that the State evaluate a subset of its construction contracts to evaluate how many are let, in which areas, who bids and from where bidders would emanate. This should tell us information described herein as important such as how far contractors travel for State work and the percentage of potential minority and women contractors are already being utilized.

Boston, MA-NH and Brockton, MA Primary Metropolitan Statistical Areas (PMSAs)



Source: U.S. Bureau of the Census

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