The Effects of Business Assistance Programs on Employment Growth in Maine Establishments

Prepared for the Maine Economic Development Incentive Commission

Senator Rochelle Pingree, Chair

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Executive Summary

The purpose of this research project is to provide information to the Maine Economic Development Incentive Commission (EDIC) to assist in its evaluation of Maine's economic development incentive programs. As a statistical-based study, the analysis focuses primarily on the relationship between short-term employment change in Maine establishments from 1998 to 1999 and their participation in incentive programs. The programs highlighted in the study are the Business Equipment Property Tax Reimbursement Program (BETR), the Governor's Training Initiative (GTI), Maine Quality Centers (MQC) and the municipal Tax Increment Financing (TIF) program.

Specifically, the report presents information on:

(1) employment change in Maine establishments from 1998 to 1999;

(2) the number of jobs in Maine establishments associated with their participation in the BETR, GTI, MQC and TIF programs;

(3) the amount of wages paid (to employees associated with incentives) per dollar of incentives received by Maine establishments;

(4) the amount of incentives received by Maine establishments per incentive-related job.

The data set used in the study contains information on 36,321 establishments that did (860 establishments) and did not (35,461 establishments) participate in the BETR, GTI, MQC and TIF programs in 1998. Study findings reveal that mean employment growth rates of Maine establishments are related to establishment size and age, the

county where the establishment is located and the establishment's industry. Furthermore, the subset of establishments that received incentives differs from the general population of Maine establishments, when compared by these characteristics. Thus, differences between the average growth rate of establishments that received incentives and the average growth rate of all Maine establishments can be explained (at least partially) by characteristics unrelated to incentives.

Estimated levels of employment change with and without incentives are estimated for Maine establishments that received incentives in 1998 using an econometric model of establishment growth. A key feature of the model is that it isolates the relationship between an establishment's employment growth rate and incentives, while controlling for growth associated with establishment characteristics that are unrelated to incentives. Another key aspect of the model is that it incorporates information on a large number of Maine establishments that did and did not receive incentives in 1998. The model is limited, however, in that it focuses on employment and does not consider the effects of incentives on investment (or other non-employment measures of establishment growth). Simulations based on the model indicate that there is a wide variation in the estimated number of jobs in Maine establishments associated with their participation in incentive programs. This is not surprising given the wide variety of Maine establishments that received incentives and considering that two of the incentive programs evaluated in the study are not geared directly at stimulating job creation.

Some of the key study findings are summarized below.

- 36,321 establishments experienced a combined net increase in employment of 20,408 workers between the first quarters of 1998 and 1999.

- 860 establishments that received incentives from the BETR, GTI, MQC and TIF programs experienced a combined net increase in employment of 690 workers between 1998 and 1999.
- 860 establishments received a total of $38.7 million in incentives from the BETR, GTI, MQC and TIF programs in 1998.
- Businesses that participated in these incentive programs received an average of $44,969 in assistance, or an average of $871 per worker employed by the establishment.
- 77 percent of the establishments that participated in the BETR, GTI, MQC and TIF programs received less than $10,000 in incentives and six percent received $100,000 or more in assistance.
- 198 establishments, that received $10,000 or more in assistance, accounted for $37.5 million of the total amount of incentives provided by the BETR, GTI, MQC and TIF programs.
- Simulations indicate that 4,730 jobs were associated with the BETR, GTI, MQC and TIF programs, and establishments received an average of $8,176 in assistance per incentive-related job.
- Simulations reveal that ten or more jobs were associated with incentives from the BETR, GTI, MQC and TIF programs in 21 percent of the establishments.
- Simulations show that 40 percent of the establishments that received incentives had lower levels of estimated employment change than were estimated for these establishments based solely on their characteristics unrelated to incentives.

- Simulations indicate that 1,586 jobs were associated with the BETR Program and establishments received an average of $16,654 in assistance per (BETR) incentive-related job.
- Simulations reveal that 420 jobs were associated with the GTI and establishments received an average of $5,031 in assistance per (GTI) incentive-related job.
- Simulations show that 1,091 jobs were associated with the MQC program and establishments received an average of $1,004 in assistance per (MQC) incentive-related job.
- There is not a statistically significant relationship between employment growth and an establishment's participation in the TIF program, other things being equal.

It should be noted that many of the findings presented in the report are based on the statistical relationship between employment growth and incentive program participation. The business assistance programs, however, may have costs and benefits that are unrelated to employment, which are not captured by the empirical methods used in the study. Limitations of the study methods are especially relevant when evaluating the BETR and TIF programs, which provide incentives geared at stimulating capital investment rather than job creation. Thus, findings presented in the report should be interpreted as a part, but not the whole, of the evidence in evaluating the effects of Maine's incentive programs.

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1. Background Information

The purpose of this research project is to provide information to the Maine Economic Development Incentive Commission (EDIC) to assist in its evaluation of Maine's economic development incentive programs. As a statistical-based study, the analysis focuses primarily on the relationship between short-term employment change in Maine establishments from 1998 to 1999 and their participation in incentive programs. The programs highlighted in the study are the Business Equipment Property Tax Reimbursement Program (BETR), the Governor's Training Initiative (GTI), Maine Quality Centers (MQC) and the municipal Tax Increment Financing (TIF) program.

Given the study's purpose and its focus on employment change, the report presents information on:

(1) employment change in Maine establishments from 1998 to 1999;

(2) the number of jobs in Maine establishments associated with their participation in the BETR, GTI, MQC and TIF programs;

(3) the amount of wages paid (to employees associated with incentives) per dollar of incentives received by Maine establishments;

(4) the amount of incentives received by Maine establishments per incentive-related job.

Study findings may be used by the EDIC in its report to the Maine State Legislature on the effectiveness of Maine's business assistance programs. The EDIC was formed by the 1998 "Act to Encourage Accountability and Return on Investment for Maine Taxpayers from Economic Development Incentives." Along with providing guidelines for the evaluation of Maine's incentive programs, the act requires Maine employers to report annually on assistance they received from the state's incentive

programs and to provide information on job creation and retention that occurred as a result of the incentives. The act also requires state agencies that administer incentive programs to submit reports that include levels of assistance provided to businesses and assert the public benefit resulting from incentives.

1.1 Data on Incentive Programs and Employment Change

Information used in the study on Maine's incentive programs was provided to the EDIC by the state agencies that administer the programs. Although the programs were in operation prior to January 1, 1998, the study focuses on one year of activity (1998) for each of the incentive programs. Employment figures presented in the report were computed from data provided by the Maine Department of Labor. Throughout the report, employment figures are sufficiently aggregated in order to protect individual establishment confidentiality. Guidelines set by the Maine Department of Labor prohibit the release of information if there are fewer than three employers in a category, or if a single employer accounts for 80 percent or more of the employment within a category.

Although the study focuses on one year of incentive program activity and employment change, some business expansions occur over a multi-year period. Likewise, a number of establishments may have received incentives in 1998 based on expansions launched in earlier years. Thus, in some cases, employment change associated with incentives received in 1998 may have occurred in earlier years, which is not reflected in an establishment's employment change from 1998 to 1999. In other cases, employment change associated with incentives received in 1998 may occur in later years, which is not reflected in an establishment's employment change from 1998 to

1999. Future studies will benefit from having more than one year of information available on the business assistance programs.

Building the data set used in the study involved combining incentive information from the agency reports and employment data from the Maine Department of Labor. Although every attempt was made to match incentive information and employment data for each of the establishments that participated in incentive programs, the data set does not contain information on every establishment that participated in incentive programs in 1998. The data set contains information on 793 of 1,061 establishments that received BETR incentives, 56 of 68 establishments that participated in the GTI, 31 of 46 establishments that received MQC incentives and 39 of 44 establishments that received TIF incentives.

1.2 Study Methodologies

Although technical details about the study's conceptual framework are not discussed in the report, the study methods are based on prominent economic theories. The study uses a statistical-based approach to evaluating Maine's incentive programs, which involves estimating the relationship between employment change in Maine establishments from 1998 to 1999 and their participation in the incentive programs. Well-known firm growth theories provide a rationale for the inclusion of several establishment characteristics (that are not directly related to an establishment's participation in incentive programs) in the model used to estimate the number of jobs associated with incentives. Furthermore, the statistical methods used in the study are based on sound statistical and econometric theories.

1.3 Interpreting the Study Findings

Section 3 presents findings on employment change and incentive program participation based on ***actual*** employment data from Maine establishments. The information reported on employment change in Maine establishments illustrates the relationship between employment growth and several key establishment characteristics (referred to collectively as ***non-incentive growth characteristics***) that are not directly related to their participation in incentive programs. Research has shown that establishment growth rates are related closely to establishment size and age, and related (to a lesser extent) to characteristics of the area where the establishment is located and characteristics of the establishment's industry. Study findings reveal that mean employment growth rates of Maine establishments are related to establishment size and age, the county where the establishment is located and the establishment's industry. These findings are consistent with previous research on establishment growth.

Information presented in section 3 on incentive program participation demonstrates how the subset of establishments that received incentives differs from the general population of Maine businesses. This information is key when making comparisons between the growth of establishments that participated in incentive programs and the general population of Maine businesses. Study findings indicate that the subset of Maine establishments that received incentives differs from the general population of Maine businesses, when comparisons are made according to their non-incentive growth characteristics.

These two sets of findings suggest that the mean growth rate of establishments that received incentives will differ from the mean growth rate of the general population of

Maine establishments for reasons unrelated to incentives. Thus, it is necessary to control for an establishment's non-incentive growth characteristics when analyzing the relationship between an establishment's growth rate and its participation in incentive programs. The study uses an econometric model that isolates the relationship between an establishment's growth rate and incentives, while controlling for growth associated with an establishment's non-incentive growth characteristics. The model incorporates information from a large number of establishments, which is key because the reliability of econometric estimates generally increases with more information.

Model results are used to estimate levels of employment change in Maine establishments (that received incentives) from 1998 to 1999 with and without their participation in incentive programs. Section 4 presents findings on the number of jobs associated with incentives based on these ***simulations***. Given the wide variety of Maine establishments that received incentives, a wide variation in the estimated number of jobs associated with incentives is expected. A large number of jobs may be associated with incentives in some businesses; especially establishments with non-incentive growth characteristics that are associated with low growth rates. In other establishments, estimated levels of employment change given their participation in incentive programs may be less than estimated employment change levels based solely on their non-incentive growth characteristics.

It should be noted that many of the findings presented in the report are based on the statistical relationship between employment growth and incentive program participation. The business assistance programs, however, may have costs and benefits that are unrelated to employment, which are not captured by the empirical methods used

in the study. Limitations of the study methods are especially relevant when evaluating the BETR and TIF programs, which provide incentives geared at stimulating capital investment rather than job creation. Thus, findings presented in the report should be interpreted as a part, but not the whole, of the evidence in evaluating the effects of Maine's incentive programs. Future studies would benefit from having information available on investments in new capital and equipment made by Maine establishments.

1.4 Acknowledgments

Faculty and staff members in the Department of Resource Economics and Policy at the University of Maine conducted the research presented in the report between January and June of 2000. Mr. Thomas Allen (Research Associate) constructed the data set and Ms. Tabitha Plaisted (Graduate Associate) assisted with the data entry. The study benefited from the financial support provided by the EDIC and from the assistance provided by the commission in obtaining the incentive program agency reports and the surveys of Maine establishments that participated in the incentive programs. The study also benefited from the use of employment data on Maine businesses provided by the Division of Labor Market Information Services, Maine Department of Labor.

Finally, the study benefited from the comments made by Mr. Thomas Allen, Dr. Sharon Brucker and Dr. James McConnon on an earlier version this report. Any errors remaining in the report are the full responsibility of the author.

1.5 Organization of Report

The remainder of the report is organized as follows. Section 2 describes the incentive programs that are evaluated in the study. Information on incentive program participation and employment growth in Maine establishments is presented in section 3. Section 4 presents information on the number of jobs in Maine establishments that are associated with their participation in incentive programs. Section 5 explains the methodologies that are commonly used to evaluate economic development incentive programs. The report concludes with a summary of the study findings and some suggestions for future research in section 6.

2. Description of Incentive Programs

The 1998 "Act to Encourage Accountability and Return on Investment for Maine Taxpayers from Economic Development Incentives" provides guidelines for the evaluation of seven of Maine's economic development incentive programs. These programs are the Business Equipment Property Tax Reimbursement Program (BETR), the Employment Tax Increment Financing (ETIF) program, the Governor's Training Initiative (GTI), the Jobs and Investment Tax Credit (JITC), Maine Quality Centers (MQC), the Research Expense Tax Credit (R&D), and the municipal Tax Increment Financing (TIF) program. According to agency reports, the ETIF program did not provide assistance to any Maine businesses in 1998 and information on businesses that participated in the JITC and R&D programs is not publicly available. Thus, the study focuses on the BETR, GTI, MQC and TIF programs, which are collectively referred to as the ***highlighted incentive programs***. The program descriptions below are based on information included in the agency reports and a publication titled "State of Maine Business Assistance and Business Climate Information," published by the Maine Department of Economic and Community Development in October of 1999.

The BETR Program is administered by Maine Revenue Services. Through the BETR Program, businesses can apply for a reimbursement for 12 years or less on all local property taxes paid on "qualified" business property that was placed in service in Maine after April 1, 1995. Based on information included in the agency report, the BETR Program reimbursed a total of $29,993,437 in personal property taxes to 1,061 establishments (for 1,535 investment projects) in 1998.

The Maine Department of Labor and Department of Economic and Community Development jointly administer the GTI. The GTI reimburses to businesses a portion of the "non-routine" worker training costs associated with either the hiring of new workers or the re-training of existing workers. According to the program's agency report, the GTI provided $2,473,175 in assistance to 68 businesses through 74 contracts in 1998. These companies committed to train a total of 1,320 new workers and to re-train 4,254 existing workers.

The MQC program is administered by the Maine Technical College System. The MQC program provides training and education, delivered through Maine's technical colleges, to new workers hired by Maine establishments that commit to create eight or more full-time jobs. The MQC agency report indicates that the program provided $1,558,531 in educational services to support 46 projects in 1998. Maine businesses involved in these projects anticipated creating a total of 3,119 jobs.

The Maine Department of Economic and Community Development administers the TIF program. The program allows Maine municipalities to provide financial assistance, based on the property taxes resulting from new investment, to companies that make "substantial" capital investments in Maine. The TIF agency report indicates the program provided $10,000 or more in assistance to 44 businesses. Based on surveys completed by 43 of these companies, the report indicates that the TIF program provided a total of $9,751,058 in assistance in 1998. Businesses receiving TIF incentives reported a net increase of 24 full-time employees and a net decrease of 83 part-time employees in 1998.

3. Employment Change and Incentive Program Participation

This section presents information on employment change in Maine establishments and their participation in the highlighted incentive programs. The data set used in the study contains information on 36,321 establishments that were in operation between the first quarters of 1998 and 1999. These establishments employed a total of 519,779 workers in the first quarter of 1999 and 499,371 workers in the first quarter of 1998, which translates into a combined net increase of 20,408 workers. Of these establishments, 860 participated in one or more of the highlighted incentive programs in 1998. Establishments that received incentives employed 78,342 workers in the first quarter of 1999 and 77,652 workers in the first quarter of 1998, which translates into a combined net increase of 690 workers. [Employment information used in the study does not distinguish between part-time and full-time workers. Employment and job figures presented in the report should be considered with this fact in mind.]

Table 1 presents summary statistics on all establishments included in the data set and the subset of establishments that received incentives. The statistics show that establishments that received incentives employed an average of 91 workers in the first quarter of 1999, compared to an average of 14 workers in all establishments. The average establishment increased its employment level by 0.56 workers between the first quarters of 1998 and 1999. Establishments that received incentives increased their employment levels by an average of 0.80 workers between the first quarters of 1998 and 1999. The statistics also reveal that establishments that received incentives had been in operation an average of 15 years, where an establishment's first year of operation is

Table 1

Summary statistics of Maine business establishments

	All Establishments		*Establishments Receiving Incentives*	
Variable	Mean	Standard Deviation	Mean	Standard Deviation
Employment size, first quarter 1999	14.3 workers	75.3	91.1 workers	343.1
Employment size, first quarter 1998	13.7 workers	72.9	90.3 workers	329.3
Employment growth rate (1998 to 1999)	17.9 percent	0.91	8.3 percent	0.54
Net employment change (1998 to 1999)	0.56 workers	12.6	0.80 workers	42.6
Years in operation, measured from 1999	10.5 years	10.5	15.4 years	14.2
Wages per worker, 1999	$23,169	31,190	$28,257	19,882
Number of establishments	36,321		860	

determined by its initial liability year for unemployment insurance. In comparison, the average establishment had been in operation for 11 years.

Table 2 presents information on incentive amounts received by establishments that participated in one or more of the highlighted incentive programs. The four highlighted programs provided a total of $38.7 million in assistance to 860 establishments in 1998. The BETR Program provided a total of $26.4 million to 793 establishments, and 39 establishments received a total of $9 million from the TIF program. The GTI provided $2.1 million to 56 establishments, and 31 establishments received $1.1 million from the MQC program. Establishments received an average of $44,969 in combined incentives from the four highlighted programs. [Recall that the data set does not contain information on all the establishments that participated in the incentive programs in 1998.]

Since establishment size varies across businesses that participated in the incentive programs, incentive amounts are also calculated relative to an establishment's employment level. Businesses that participated in the highlighted incentive programs received an average of $871 in assistance per worker employed by the establishment. Establishments that participated in the BETR Program received an average of $33,308 in incentives, or $594 per worker. The GTI provided an average of $37,736 in incentives to establishments that participated in the program, or $2,329 per worker. The average establishment that participated in the MQC program received $35,338 in assistance, or $433 per worker. Establishments received an average of $232,090 in assistance from the TIF program, or $3,438 per worker.

Table 2

Incentive program participation

		Economic Development Incentive Program			
Variable	All Programs	BETR	GTI	MQC	TIF
Number of establishments	860	793	56	31	39
Total amount of incentives	$38,673,150	$26,412,910	$2,113,205	$1,095,474	$9,051,562
Average incentive amount per establishment	$44,969	$33,308	$37,736	$35,338	$232,090
Total number of employees (1999)	78,342	71,797	7,845	5,844	13,984
Average incentive amount per employee	$870.6	$593.7	$2,328.6	$432.8	$3,437.6

Tables 3 and 4 present additional information on incentive amounts received by Maine businesses in 1998. As shown in table 3, 77 percent of the establishments received less than $10,000 in incentives and 17 percent received between $10,000 and $99,999 in assistance. The 198 establishments that received $10,000 or more in assistance, however, accounted for $37.5 million of the total amount of incentives provided by the four highlighted programs. Table 4 shows that 84 percent of the businesses that participated in the incentive programs received less than $250 per worker employed by the establishment.

Employment growth rates are defined as the difference between an establishment's mean employment level in the first quarter (January – March) of 1999 and its mean employment level in the first quarter of 1998, divided by the establishment's average employment level in the first quarters of 1998 and 1999. Mean employment levels calculated over a three-month period are used instead of employment levels from any particular month to lessen the effects of month-to-month fluctuations in establishment employment levels. Employment growth rates are calculated relative to an establishment's average employment level (in the first quarters of 1998 and 1999) because 6,719 establishments in the data set employed zero workers in either the first quarter of 1998 or the first quarter of 1999. Establishments with zero employees in 1998 and employment levels in 1999 greater than zero have growth rates of 2.0 and establishments with zero employees in 1999 and employment levels in 1998 greater than zero have growth rates of –2.0. Using this definition of employment growth, the average establishment grew by 18 percent between the first quarters of 1998 and 1999 and establishments that received incentives grew an average of 8 percent.

Table 3

Incentive amounts received by Maine establishments (1998)

	Establishments Receiving Incentives	
Incentive amount	Number	Percentage
Less than $500	273	31.7
$500 to $999	94	10.9
$1,000 to $4,999	226	26.3
$5,000 to $9,999	69	8.0
$10,000 to $24,999	77	9.0
$25,000 to $49,999	47	5.5
$50,000 to $99,999	22	2.6
$100,000 to $499,999	39	4.5
$500,000 to $999,999	5	0.6
$1,000,000 or more	8	0.9
Total	860	100.0

Table 4

Incentive amounts per employee received by Maine establishments (1998)

	Establishments Receiving Incentives	
Incentive amount per employee	Number	Percentage
Less than $100	461	53.6
$100 to $249	177	20.6
$250 to $499	88	10.2
$500 to $999	58	6.7
$1,000 to $2,499	41	4.8
$2,500 to $4,999	16	1.9
$5,000 to $9,999	11	1.3
$10,000 to $49,999	4	0.5
$50,000 or more	4	0.5
Total	860	100.1

Tables 5 and 6 present additional information on employment growth in Maine establishments between the first quarters of 1998 and 1999. Table 5 shows that 42 percent of all establishments and 44 percent of the establishments that received incentives have employment growth rates between zero and 24 percent. Table 6 reveals that 62 percent of all establishments and 42 percent of the establishments that received incentives increased their employment levels by zero to four workers between the first quarters of 1998 and 1999.

3.1 Employment Change and Program Participation by Establishment Size

Tables 7, 8 and 9 present information on an establishment's program participation and employment growth by establishment-size category, separated by the establishment's employment level in the first quarter of 1999. Table 7 shows that 76 percent of all Maine establishments employed less than ten workers in the first quarter of 1999, whereas only 33 percent of the establishments that received incentives employed less than ten workers. The employment size category of 20 to 49 workers contains the highest percentage of establishments that participated in the highlighted incentive programs. Table 8 reveals that 27 percent of all employees worked in establishments with less than 20 workers, whereas only four percent of the workers in establishments that received incentives were employed by businesses in this size category. Table 8 also shows that 50 percent (24,286 out of 48,830) of all workers in businesses with 1,000 or more employees worked in establishments that received incentives.

The information reported in table 9 reveals that the mean growth rates of establishments in the data set generally decrease with establishment size. Establishments

Table 5

Employment growth rates (1998 to 1999) of Maine establishments

	All Establishments		***Establishments Receiving Incentives***	
Growth rate	Number	Percentage	Number	Percentage
-2.00	1,954	5.4	8	1.0
–1.99 to –1.76	24	0.1	0	0.0
–1.75 to –1.51	51	0.1	1	0.1
-1.50 to –1.26	100	0.3	5	0.6
–1.25 to –1.01	312	0.9	1	0.1
–1.00 to –0.76	402	1.1	8	1.0
–0.75 to –0.51	883	2.4	18	2.1
– 0.50 to –0.26	2,264	6.2	48	5.6
–0.25 to -0.01	5,067	14.0	251	29.2
0.00 to 0.24	15,089	41.5	382	44.4
0.25 to 0.49	3,053	8.4	61	7.1
0.50 to 0.74	1,233	3.4	24	2.8
0.75 to 0.99	394	1.1	7	0.8
1.00 to 1.24	511	1.4	5	0.6
1.25 to 1.49	136	0.4	2	0.2
1.50 to 1.74	63	0.2	0	0.0
1.75 to 1.99.	20	0.1	0	0.0
2.00	4,765	13.1	39	4.5
Total	36,321	100.1	860	100.1

Table 6

Net employment change (1998 to 1999) in Maine establishments

	All Establishments		***Establishments Receiving Incentives***	
Net employment change	Number	Percentage	Number	Percentage
Decrease of more than 500 workers	0	0.0	0	0.0
-500 to -101	44	0.1	14	1.6
-100 to -51	79	0.2	13	1.5
-50 to -26	171	0.5	22	2.6
-25 to -11	468	1.3	36	4.2
-10 to -6	749	2.1	35	4.1
-5 to -1	9,546	26.3	220	25.6
zero to 4	22,612	62.3	360	41.9
5 to 9	1,476	4.1	62	7.2
10 to 24	793	2.2	51	5.9
25 to 49	221	0.6	22	2.6
50 to 99	114	0.3	13	1.5
100 to 499	47	0.1	11	1.3
Increase of 500 or more workers	1	0.0	1	0.1
Total	36,321	100.1	860	100.1

Table 7

Maine establishments by 1999 employment level

	All Establishments		***Establishments Receiving Incentives***	
Size category	Number	Percentage	Number	Percentage
Zero workers	1,954	5.4	8	0.9
1 to 4	18,939	52.1	147	17.1
5 to 9	6,784	18.7	125	14.5
10 to 19	4,189	11.5	137	15.9
20 to 49	2,634	7.3	184	21.4
50 to 99	982	2.7	100	11.6
100 to 249	603	1.7	99	11.5
250 to 499	160	0.4	32	3.7
500 to 999	51	0.1	17	2.0
1,000 or more workers	25	0.1	11	1.3
Total	36,321	100.0	860	99.9

Table 8

Employment in Maine establishments by 1999 employment level

	All Establishments		*Establishments Receiving Incentives*	
Size category	Employees	Percentage	Employees	Percentage
Zero workers	0	0	0	0
1 to 4	38,817	7.5	340	0.4
5 to 9	45,771	8.8	874	1.1
10 to 19	57,132	11.0	1,959	2.5
20 to 49	80,877	15.6	5,925	7.6
50 to 99	67,448	13.0	7,017	9.0
100 to 249	91,341	17.6	15,546	19.8
250 to 499	54,802	10.5	10,827	13.8
500 to 999	34,761	6.7	11,568	14.8
1,000 or more workers	48,830	9.4	24,286	31.0
Total	519,779	100.1	78,342	100.0

Table 9

Mean employment growth rates and net employment change (1998 to 1999) by 1999 employment level

	All Establishments	
Size category	Mean Growth Rate	Net Employment Change
Zero workers	-2.00	-13,737
1 to 4	38.8%	2,830
5 to 9	23.6%	4,397
10 to 19	18.2%	4,821
20 to 49	16.1%	6,099
50 to 99	17.0%	5,453
100 to 249	15.1%	7,147
250 to 499	6.0%	2,026
500 to 999	-1.4%	-686
1,000 or more workers	3.8%	2,059
Total		20,409

that employed between one and nine workers had considerably higher average growth rates than establishments that employed 250 or more workers. Table 9 also shows, however, that establishments in the size categories with ten or more workers contributed a substantial number of jobs to the overall net employment growth that occurred in Maine. The 603 establishments that employed between 100 and 249 workers increased their employment levels by a combined 7,147 workers.

3.2 Employment Change and Program Participation by Establishment Age

Employment and incentive information is reported by several establishment-age categories in tables 10, 11 and 12. Table 10 reveals that 40 percent of the businesses in the data set and 55 percent of the establishments that received incentives had been in operation for ten years or more. The information shown in table 11 indicates that 11 percent of Maine employees worked in establishments that had been in operation for less than three years, whereas only eight percent of the employees in establishments that received incentives worked in businesses less than three years old. Table 11 also shows that 28 percent of the employees (5,885 out of 21,197) in businesses with 50 or more years of experience worked in establishments that received incentives.

Table 12 reveals that mean employment growth rates generally decrease with establishment age. Furthermore, a substantial amount of the net employment growth in Maine occurred in businesses with between zero and three years of experience, whereas establishments in the age categories with three years or more experience had a combined net decrease in employment levels. It should be noted, however, that the growth rate of 2.0 reported in table 12 for new establishments is rounded up from 1.9954. Given the

Table 10

Maine establishments by establishment age, measured from 1999

	All Establishments		***Establishments Receiving Incentives***	
Age category	Number	Percentage	Number	Percentage
New establishments	1,041	2.9	13	1.5
0 to 2 years old	6,345	17.5	84	9.8
3 to 9	14,579	40.1	292	34.0
10 to 19	8,387	23.1	231	26.9
20 to 49	5,519	15.2	203	23.6
50 or more years old	449	1.2	37	4.3
Total	36,320	100.0	860	100.1

Table 11

Employment in Maine establishments by establishment age, measured from 1999

	All Establishments		***Establishments Receiving Incentives***	
Age category	Employees	Percentage	Employees	Percentage
New establishments	8,075	1.6	375	0.5
0 to 2 years old	51,378	9.9	5,616	7.2
3 to 9	190,622	36.7	31,611	40.3
10 to 19	101,524	19.5	16,314	20.8
20 to 49	146,967	28.3	18,542	23.7
50 or more years old	21,197	4.1	5,885	7.5
Total	519,763	100.1	78,343	100.0

Table 12

Mean employment growth rates and net employment change (1998 to 1999) by establishment age, measured from 1999

	All Establishments	
Age category	Mean Growth Rate	Net Employment Change
New establishments	2.00	7,930
0 to 2 years old	92.4%	17,054
3 to 9	-5.0%	-1,350
10 to 19	-5.0%	-2,753
20 to 49	-4.7%	-105
50 or more years old	-9.0%	-303
Total		20,473

study's method for calculating growth rates, a "new" establishment in 1999 should have a growth rate of exactly 2.0. The reason that the average growth rate of new establishments is slightly less than 2.0 is because a few of the establishments that had initial insurance liability dates in 1999, which classifies them as new establishments, have employment figures for the first quarter of 1998 that are greater than zero. This also explains why there is a slight discrepancy between the employment figure for new establishments in table 11 and the net employment change figure for new establishments in table 12.

3.3 Employment Change and Program Participation by County

Tables 13, 14 and 15 report employment and incentive information by county where the establishment is located. Table 13 reveals that 25 percent of the establishments in the data set are located in Cumberland County and another 21 percent are located in Penobscot and York Counties. Table 13 also shows that, while 21 percent of the establishments that received incentives are in Androscoggin and Aroostook Counties, these counties accounted for only 13 percent of the total establishments. On the other hand, whereas 12 percent of the establishments are located in York County, this county accounted for seven percent of the establishments that received incentives. Information presented in table 14 indicates that establishments that participated in the highlighted incentive programs employed 24,782 workers in Cumberland County. Table 14 also reveals that 22 percent (2,640 out of 11,766) of the workers in Franklin County were employed by establishments that received incentives.

Table 13

Maine establishments by county

	All Establishments		***Establishments Receiving Incentives***	
County	Number	Percentage	Number	Percentage
Androscoggin	2,439	6.7	107	12.4
Aroostook	2,109	5.8	71	8.3
Cumberland	9,026	24.9	260	30.2
Franklin	775	2.1	11	1.3
Hancock	1,806	5.0	18	2.1
Kennebec	2,886	7.9	63	7.3
Knox	1,351	3.7	38	4.4
Lincoln	1,046	2.9	13	1.5
Oxford	1,249	3.4	19	2.2
Penobscot	3,566	9.8	99	11.5
Piscataquis	436	1.2	5	0.6
Sagadahoc	700	1.9	16	1.9
Somerset	1,127	3.1	30	3.5
Waldo	732	2.0	11	1.3
Washington	867	2.4	18	2.1
York	4,177	11.5	63	7.3
Other or out of state	2,029	5.6	18	2.1
Total	36,321	99.9	860	100.0

Table 14

Employment in Maine establishments by county

	All Establishments		*Establishments Receiving Incentives*	
County	Employees	Percentage	Employees	Percentage
Androscoggin	43,287	8.3	7,394	9.4
Aroostook	27,931	5.4	3,441	4.4
Cumberland	151,874	29.2	24,782	31.6
Franklin	11,766	2.3	2,640	3.4
Hancock	18,222	3.5	2,521	3.2
Kennebec	45,226	8.7	3,986	5.1
Knox	14,678	2.8	1,970	2.5
Lincoln	8,988	1.7	429	0.5
Oxford	17,558	3.4	2,373	3.0
Penobscot	62,453	12.0	7,211	9.2
Piscataquis	5,588	1.0	294	0.4
Sagadahoc	15,262	2.9	**	**
Somerset	17,625	3.4	3,531	4.5
Waldo	8,930	1.7	1,618	2.1
Washington	10,280	2.0	**	**
York	50,988	9.8	6,785	8.7
Other or out of state	9,122	1.8	730	0.9
Total	519,778	99.9	78,343	100.0

Note: ** indicates information is not released to protect individual establishment confidentiality.

Table 15 reveals that mean establishment growth rates tend to vary by county. Establishments located in Knox, Lincoln, Sagadahoc, Waldo and York Counties had average employment growth rates higher than 20 percent. On the other hand, establishments in Aroostook, Franklin and Somerset counties had average growth rates lower than 12 percent. The information shown in table 15 also indicates that establishments located in Cumberland, Penobscot and York Counties increased their employment levels by a combined 10,451 workers. None of the counties in Maine experienced a net decrease in total employment, although Franklin and Kennebec Counties increased their employment levels by less than 100 workers.

3.4 Employment Change and Program Participation by Industry

Employment and incentive information is presented by major industrial classification in tables 16, 17 and 18. The information shown in table 16 indicates that 35 percent of the establishments are in the services sector and 22 percent are in the "retail trade" sector. Table 16 also shows that, while 6 percent of the establishments are in the manufacturing sector, 24 percent of the establishments that received incentives are manufacturing businesses. Table 17 shows that 39 and 22 percent of Maine employees worked in the services and "retail trade" sectors, whereas only 12 and ten percent of the employees in establishments that received incentives worked in businesses in these sectors. The information shown in table 17 also indicates that 54 percent (42,588 out of 79,202) of the workers in manufacturing businesses were employed by establishments that received incentives.

Table 15

Mean employment growth rates and net employment change (1998 to 1999) by county

	All Establishments	
County	Mean Growth Rate	Net Employment Change
Androscoggin	13.3%	1,719
Aroostook	10.3%	1,048
Cumberland	17.3%	6,341
Franklin	11.3%	51
Hancock	17.0%	949
Kennebec	13.3%	12
Knox	21.1%	468
Lincoln	21.5%	458
Oxford	19.1%	332
Penobscot	13.8%	2,096
Piscataquis	13.3%	101
Sagadahoc	26.2%	1,277
Somerset	11.5%	375
Waldo	22.3%	828
Washington	12.3%	403
York	20.2%	2,014
Other or out of state	43.7%	1,938
Total		20,410

Table 16

Maine establishments by industry

	All Establishments		***Establishments Receiving Incentives***	
Industry	Number	Percentage	Number	Percentage
Agriculture, forestry, fishing and mining	2,100	5.8	29	3.4
Construction	2,860	7.9	49	5.7
Manufacturing	2,318	6.4	210	24.4
Transportation and public utilities	4,063	11.2	81	9.4
Wholesale trade	1,703	4.7	36	4.2
Retail trade	8,060	22.2	156	18.1
Finance, insurance and real estate	2,609	7.2	56	6.5
Services	12,608	34.7	243	28.3
Total	36,321	100.1	860	100.0

Table 17

Employment in Maine establishments by industry

	All Establishments		***Establishments Receiving Incentives***	
Industry	Number	Percentage	Number	Percentage
Agriculture, forestry, fishing and mining	11,256	2.2	369	0.5
Construction	24,926	4.8	3,572	4.6
Manufacturing	79,202	15.2	42,588	54.4
Transportation and public utilities	44,573	8.6	3,890	5.0
Wholesale trade	17,985	3.5	2,863	3.7
Retail trade	113,263	21.8	7,811	10.0
Finance, insurance and real estate	27,823	5.4	7,912	10.1
Services	200,750	38.6	9,337	11.9
Total	519,778	100.1	78,342	100.2

Table 18

Mean employment growth rates and net employment change (1998 to 1999) by industry

	All Establishments	
Industry	Mean Growth Rate	Net Employment Change
Agriculture, forestry, fishing and mining	29.2%	1,314
Construction	28.5%	2,109
Manufacturing	14.4%	-1,233
Transportation and public utilities	19.5%	1,173
Wholesale trade	14.8%	1,022
Retail trade	11.6%	4,616
Finance, insurance and real estate	16.6%	1,613
Services	18.4%	9,795
Total		20,409

The information reported in table 18 reveals that mean establishment growth rates tend to vary by industry. Table 18 indicates that establishments in the "agriculture, forestry, fishing and mining" sector as well as establishments in the construction sector had average employment growth rates close to 30 percent. On the other hand, businesses in the "retail trade" and manufacturing industries grew by an average of less than 15 percent. Table 18 also reveals that establishments in the services and "retail trade" sectors increased their employment levels by a combined 14,411 workers. Employment levels in Maine's manufacturing industries decreased by 1,233 workers.

3.5 Section Three Summary

Findings presented in this section reveal two noteworthy trends. First, there is a wide variation in the employment growth rates of Maine establishments from 1998 to 1999. Mean employment growth rates, however, vary according to establishment size and age, the county where the establishment is located and the establishment's industry. A second general trend is that the subset of establishments that received incentives in 1998 differs from the sample all Maine establishments, when compared by these establishment characteristics. Thus, differences between the average growth rate of establishments that received incentives and the average growth rate of all Maine establishments can be explained (at least partially) by characteristics unrelated to incentives. In the next section, an econometric model is used to estimate the relationship between an establishment's employment growth rate and its participation in incentive programs, controlling for growth associated with characteristics unrelated to incentives.

Some of the key findings from this section are summarized below:

- 36,321 establishments experienced a combined net increase in employment of 20,408 workers between the first quarters of 1998 and 1999.
- 860 establishments that received incentives from the BETR, GTI, MQC and TIF programs experienced a combined net increase in employment of 690 workers between 1998 and 1999.
- 860 establishments received a total of $38.7 million in incentives from the BETR, GTI, MQC and TIF programs in 1998.
- Businesses that participated in these incentive programs received an average of $44,969 in assistance, or an average of $871 per worker employed by the establishment.
- 77 percent of the establishments that participated in the BETR, GTI, MQC and TIF programs received less than $10,000 in incentives and six percent received $100,000 or more in assistance.
- 198 establishments, that received $10,000 or more in assistance, accounted for $37.5 million of the total amount of incentives provided by the highlighted incentive programs.
- Maine establishments grew by an average of 18 percent and establishments that received incentives grew by an average of 8 percent between 1998 and 1999.
- Mean employment growth rates decrease with establishment size and age.
- Establishments that received incentives were, on average, substantially larger and slightly older than establishments that did not receive incentives.

4. Jobs Associated with Maine's Incentive Programs

This section presents information on the number of jobs associated with Maine's economic development incentive programs based on simulations from an establishment growth model. The model estimates the relationship between an establishment's employment growth rate and its participation in the highlighted incentive programs. The model also includes variables for establishment size and age, the growth rate of the county where the establishment is located and the growth rate of the establishment's major industrial sector. Including information on these non-incentive growth characteristics is key to control for employment growth that is unrelated to incentives. The model analyzes information from 36,321 Maine establishments that did (860 establishments) and did not (35,461 establishments) participate in the BETR, GTI, MQC and TIF programs in 1998. Including a large number of establishments that did not receive incentives is key because, as indicated, the reliability of a model's estimates generally increases with more information.

Empirical estimates from the model are used to simulate levels of employment change between the first quarters of 1998 and 1999 with and without an establishment's participation in incentive programs. An establishment's estimated employment change without incentives is determined by its non-incentive growth characteristics. In other words, an establishment's non-incentive growth characteristics are used to estimate "expected" levels of employment change if the establishment had not received incentives. The difference between an establishment's estimated employment change with and without incentives is referred to as the ***number of jobs associated with incentives***. If an establishment's estimated employment change given its participation in incentive

programs is greater than (less than) the estimated employment change based on its non-incentive growth characteristics, the number of jobs associated with incentives is greater than (less than) zero.

[For example, if model simulations indicate that an establishment would have decreased its employment level by 42 workers based on its non-incentive growth characteristics and the same establishment would have decreased its employment level by 28 workers given its participation in incentive programs, 14 jobs are associated with incentives. On the other hand, if model simulations indicate that an establishment would have increased its employment level by five workers based on its non-incentive growth characteristics and it would have increased its employment level by three workers given its participation in incentive programs, -2 jobs are associated with incentives.]

The number of jobs associated with incentives in each establishment is translated into a dollar amount of employee wages associated with incentives. This amount is calculated as the number of jobs associated with incentives multiplied by the average annual wages per worker paid by the establishment, based on its wages paid in the first quarter of 1999. The amount of wages associated with incentives is divided by the amount of incentives received by the establishment, which results in a measure referred to as the ***wages paid per dollar of incentives***. The number of jobs associated with incentives is also translated into a measure referred to as the ***amount of incentives per incentive-related job***. This is computed as the dollar amount of incentives received by an establishment divided by the number of jobs associated with incentives. In cases where the number of jobs associated with an incentive program is less than zero, both the

amount of wages per dollar of incentives and the amount of incentives per incentive-related job are less than zero as well.

[For example, if 14 jobs are associated with incentives in an establishment that paid $25,000 in wages per worker and received $50,000 in incentives, the wages paid per dollar of incentives is equal to $7. Furthermore, if –2 jobs are associated with incentives in an establishment that received $1,000 in assistance, the amount of incentives per incentive-related job is equal to -$500.]

The analysis presented in section 4.1 focuses on the relationship between an establishment's employment growth rate and the combined amount of incentives received from the BETR, GTI, MQC and TIF programs. The results presented in sections 4.2 through 4.5 are from a separate analysis that isolates the relationship between an establishment's employment growth rate and its participation in each of the incentive programs individually. Given that the results are from separate models, the number of jobs associated with each of the individual programs (presented in sections 4.2 to 4.5) does not sum to the number of jobs associated with the combined amount of assistance from the four highlighted programs (presented in section 4.1).

4.1 Jobs Associated with the Highlighted Incentive Programs

Simulations based on the model results indicate that, other things being equal, 5.5 jobs were associated with incentives in the average establishment that participated in the BETR, GTI, MQC and TIF programs. Since an establishment's non-incentive growth characteristics are used in model simulations, this figure is based on data from 838 establishments that have complete information on their non-incentive growth

characteristics. Using this average figure, a total of 4,730 jobs were associated with incentives in the 860 establishments that participated in the BETR, GTI, MQC and TIF programs.

Table 19 illustrates the variation in the estimated number of jobs associated with incentives in Maine establishments that participated in the four highlighted programs. Model simulations reveal that 40 percent of the establishments have estimated employment change levels given their participation in incentive programs that are less than their estimated employment change levels given their non-incentive growth characteristics. This means that, after controlling for expected levels of employment change related to establishments' non-incentive growth characteristics, levels of employment change associated with incentives are less than zero in 40 percent of the establishments. The estimates also indicate, however, that ten or more jobs were associated with incentives in 21 percent of the establishments. This means that, after controlling for expected levels of employment change related to establishments' non-incentive growth characteristics, substantial levels of employment growth are associated with incentives in 21 percent of the establishments.

Table 20 reports information on the amount of wages paid per dollar of incentives for 825 establishments that have complete information on their non-incentive growth characteristics and the amount of wages paid per worker. Simulations based on the model results indicate that 52 percent of the establishments paid $10.00 or more in wages (to workers associated with incentives) per dollar of incentives. Included in this 52 percent are 165 establishments that paid $150.00 or more in wages per dollar of incentives. As shown in table 20, the model simulations indicate that the amount of

Table 19

Number of jobs associated with BETR, GTI, MQC and TIF programs

	Model Estimates	
Jobs associated with incentives	Number of Establishments	Percentage
Less than zero jobs	337	40.2
Zero to 0.99 jobs	92	11.0
1 to 1.99 jobs	45	5.4
2 to 2.99 jobs	46	5.5
3 to 4.99 jobs	54	6.4
5 to 9.9 jobs	92	11.0
10 to 24.9 jobs	69	8.2
25 to 49.9 jobs	36	4.3
50 to 99.9 jobs	24	2.9
100 or more jobs	43	5.1
Total	838	100.0

Table 20

Wages paid per dollar of BETR, GTI, MQC and TIF incentives

	Model Estimates	
Wages paid per dollar of incentives	Number of Establishments	Percentage
Less than zero	329	39.8
$0.00 to $4.99	41	5.0
$5.00 to $9.99	28	3.4
$10.00 to $24.99	72	8.7
$25.00 to $49.99	70	8.5
$50.00 to $74.99	40	4.8
$75.00 to $99.99	31	3.8
$100.00 to $149.99	49	5.9
$150.00 or more	165	20.0
Total	825	99.9

wages paid per dollar of incentives is less than zero in 40 percent of the establishments. As indicated, the amount of wages paid per dollar of incentives is less than zero in cases where an establishment's estimated employment change given its participation in incentive programs is less than its estimated employment change given its non-incentive growth characteristics.

Information on incentive amounts per incentive-related job is presented in table 21. Model simulations indicate that the amount of incentives received per job is less than zero in 40 percent of the establishments. Once again, these are the cases in which the establishment's estimated employment change given its participation in incentive programs is less than its estimated employment change given its non-incentive growth characteristics. The simulations also indicate, however, that 55 percent of the establishments received between zero and $14,999 per incentive-related job. Using model estimates for the total number of jobs associated with incentives and the actual amount of incentives provided by the four highlighted programs, the average establishment received $8,176 per incentive-related job ($38,673,150 / 4,730 jobs).

4.2 Jobs Associated with the BETR Program

Model simulations indicate that 2.0 jobs were associated with BETR incentives in the average establishment, holding constant levels of assistance received from the other programs and an establishment's non-incentive growth characteristics. This average is based on 773 establishments that have complete information on their non-incentive growth characteristics. Based on an average of 2.0 jobs, a total of 1,586 jobs were associated with incentives in 793 establishments that participated in the BETR Program.

Table 21

Incentive amounts per job associated with BETR, GTI, MQC and TIF programs

	Model Estimates	
Incentive amount per incentive-related job	Number of Establishments	Percentage
Less than zero	329	39.9
Zero to $4,999	290	35.2
$5,000 to $9,999	68	8.2
$10,000 to $14,999	99	12.0
$15,000 to $19,999	20	2.4
$20,000 to $24,999	11	1.3
$25,000 to $49,999	5	0.6
$50,000 to $99,999	1	0.1
$100,000 or more	2	0.2
Total	825	99.9

Findings shown in table 22 reveal that 42 percent of the establishments have estimated employment change levels given their participation in the BETR Program that are less than their estimated employment change given their non-incentive growth characteristics. The results also suggest, however, that ten on more jobs were associated with BETR incentives in 21 percent of the establishments. Table 23 presents information on the amount of wages paid per dollar of BETR incentives. Model simulations indicate that 52 percent of the establishments paid $10.00 or more in wages per dollar of BETR incentives.

Table 24 reports information on the amount of incentives per job associated with the BETR Program. Model simulations indicate that 55 percent of the establishments received between zero and $4,999 in assistance per (BETR) incentive-related job. Using model estimates for the total number of jobs associated the BETR Program and the actual amount of BETR incentives received by 793 establishments, establishments received an average of $16,654 in incentives per job associated with the BETR Program ($26,412,910 / 1,586 jobs).

4.3 Jobs Associated with the GTI

Model simulations indicate that an average of 7.5 jobs were associated with GTI incentives, based on 54 establishments that received GTI incentives that have complete information on their non-incentive growth characteristics. Based on this figure, a total of 420 jobs were associated with incentives in 56 establishments that participated in the GTI. Empirical results reported in table 25 show that 32 percent of the establishments that participated in the GTI have estimated employment change levels given their

Table 22

Number of jobs associated with the BETR Program

	Model Estimates	
Jobs associated with BETR incentives	Number of Establishments	Percentage
Less than zero jobs	326	42.2
Zero to 0.99 jobs	86	11.1
1 to 1.99 jobs	39	5.0
2 to 2.99 jobs	36	4.7
3 to 4.99 jobs	57	7.4
5 to 9.9 jobs	71	9.2
10 to 24.9 jobs	68	8.8
25 to 49.9 jobs	34	4.4
50 to 99.9 jobs	20	2.6
100 or more jobs	36	4.7
Total	773	100.1

Table 23

Wages paid per dollar of BETR incentives

	Model Estimates	
Wages paid per dollar of BETR incentives	Number of Establishments	Percentage
Less than zero	317	41.7
$0.00 to $4.99	31	4.1
$5.00 to $9.99	21	2.8
$10.00 to $24.99	50	6.6
$25.00 to $49.99	60	7.9
$50.00 to $74.99	47	6.2
$75.00 to $99.99	26	3.4
$100.00 to $149.99	41	5.4
$150.00 or more	167	22.0
Total	760	100.1

Table 24

Incentive amounts per job associated with the BETR Program

	Model Estimates	
Incentive amount per (BETR) incentive-related job	Number of Establishments	Percentage
Less than zero	317	41.7
Zero to $4,999	416	54.7
$5,000 to $9,999	8	1.1
$10,000 to $14,999	5	0.7
$15,000 to $19,999	1	0.1
$20,000 to $24,999	4	0.5
$25,000 to $49,999	2	0.3
$50,000 to $99,999	7	0.9
$100,000 or more	0	0.0
Total	760	100.0

Table 25

Number of jobs associated with the GTI

	Model Estimates	
Jobs associated with GTI incentives	Number of Establishments	Percentage
Less than zero jobs	17	31.5
Zero to 0.99 jobs	3	5.6
1 to 1.99 jobs	2	3.7
2 to 2.99 jobs	3	5.6
3 to 4.99 jobs	4	7.4
5 to 9.9 jobs	6	11.1
10 to 24.9 jobs	15	27.8
25 to 49.9 jobs	2	3.7
50 to 99.9 jobs	0	0.0
100 or more jobs	2	3.7
Total	54	100.1

participation in the GTI that are less than their estimated employment change levels given their non-incentive growth characteristics. Simulations based on model results also suggest, however, that five or more jobs were associated with incentives in 46 percent of the establishments that participated in the GTI.

Table 26 presents information on the amount of wages paid per dollar of GTI incentives. Simulations from the model indicate that 24 percent of the establishments paid $10.00 or more in wages per dollar of assistance from the GTI. Table 27 presents information on the amount of incentives per job associated with the GTI. Model simulations indicate that 61 percent of the establishments received between zero and $9,999 in incentives per (GTI) incentive-related job. Using model estimates for the total number of jobs associated with the GTI and the actual amount of incentives received by 56 establishments, the average amount of assistance per incentive-related job is $5,031 ($2,113,205 / 420 jobs).

4.4 Jobs Associated with the MQC Program

Simulations from the model suggest that 35.2 jobs were associated with incentives in the average establishment that participated in the MQC program. Using this figure, a total of 1,091 jobs were associated with the MQC program in 31 establishments. Findings shown in table 28 indicate that 26 percent of the establishments that participated in the MQC program have estimated employment change levels given their participation in the MQC program that are less than their estimated employment change levels given their non-incentive growth characteristics. Model simulations also indicate, however,

Table 26

Wages paid per dollar of GTI incentives

	Model Estimates	
Wages paid per dollar of GTI incentives	Number of Establishments	Percentage
Less than zero	17	31.5
$0.00 to $4.99	14	25.9
$5.00 to $9.99	10	18.5
$10.00 to $24.99	6	11.1
$25.00 to $49.99	2	3.7
$50.00 to $74.99	2	3.7
$75.00 to $99.99	1	1.9
$100.00 to $149.99	1	1.9
$150.00 or more	1	1.9
Total	54	100.1

Table 27

Incentive amounts per job associated with the GTI

	Model Estimates	
Incentive amount per (GTI) incentive-related job	Number of Establishments	Percentage
Less than zero	17	31.5
Zero to $4,999	27	50.0
$5,000 to $9,999	6	11.1
$10,000 to $14,999	3	5.6
$15,000 to $19,999	0	0.0
$20,000 to $24,999	0	0.0
$25,000 to $49,999	0	0.0
$50,000 to $99,999	0	0.0
$100,000 or more	1	1.9
Total	54	100.1

Table 28

Number of jobs associated with the MQC program

	Model Estimates	
Jobs associated with MQC incentives	Number of Establishments	Percentage
Less than zero jobs	8	25.9
Zero to 0.99 jobs	1	3.2
1 to 1.99 jobs	1	3.2
2 to 2.99 jobs	3	9.7
3 to 4.99 jobs	1	3.2
5 to 9.9 jobs	2	6.5
10 to 24.9 jobs	5	16.1
25 to 49.9 jobs	5	16.1
50 to 99.9 jobs	3	9.7
100 or more jobs	2	6.5
Total	31	100.1

Table 29

Wages paid per dollar of MQC incentives

	Model Estimates	
Wages paid per dollar of MQC incentives	Number of Establishments	Percentage
Less than zero	8	25.8
$0.00 to $4.99	3	9.7
$5.00 to $9.99	3	9.7
$10.00 to $24.99	8	25.8
$25.00 to $49.99	3	9.7
$50.00 to $74.99	2	6.5
$75.00 to $99.99	0	0.0
$100.00 to $149.99	1	3.2
$150.00 or more	3	9.7
Total	31	100.1

Table 30

Incentive amounts per job associated with the MQC program

	Model Estimates	
Incentive amount per (MQC) incentive-related job	Number of Establishments	Percentage
Less than zero	8	25.8
Zero to $4,999	21	67.7
$5,000 to $9,999	2	6.5
$10,000 to $14,999	0	0.0
$15,000 to $19,999	0	0.0
$20,000 to $24,999	0	0.0
$25,000 to $49,999	0	0.0
$50,000 to $99,999	0	0.0
$100,000 or more	0	0.0
Total	31	100.0

that five or more jobs were associated with incentives in 55 percent of the establishments that participated in the MQC program.

Table 29 presents information on the amount of wages paid per dollar of MQC incentives. Simulations based on the model suggest that 55 percent of the establishments paid $10.00 or more in wages per dollar of MQC incentives. Table 30 presents information on incentive amounts per job associated with the MQC program. Model simulations indicate that 74 percent of the establishments received between zero and $9,999 per (MQC) incentive-related job. Using model estimates for the total number of jobs associated with the MQC program and the actual amount of MQC incentives received by 31 establishments, establishments received an average of $1,004 per incentive-related job ($1,095,474 / 1,091 jobs).

4.5 Jobs Associated with the TIF Program

Empirical results from the model do not indicate that a statistically significant relationship exists between an establishment's employment growth rate and its participation in the TIF Program, other things being equal. Thus, model results are not used to simulate the number of jobs associated with an establishment's participation in the TIF program, the amount of wages paid per dollar of TIF incentives, or the amount of incentives per job associated with the TIF program.

4.6 Section Four Summary

Simulations based on model results indicate that there is a wide variation in the estimated number of jobs in Maine establishments associated with their participation in

incentive programs. This is not surprising given the wide variety of Maine establishments that received incentives and considering that two of the incentive programs evaluated in the study are not geared directly at stimulating job creation. In some cases, estimated levels of employment change in Maine establishments were much greater given their participation in incentive programs than would have been expected based on their non-incentive growth characteristics. In other cases, estimated employment change levels in establishments that received incentives were no greater (or even less) than would have been expected based on their non-incentive growth characteristics.

Some of the key findings from this section are summarized below.

- Model simulations indicate that 4,730 jobs were associated with the BETR, GTI, MQC and TIF programs, and establishments received an average of $8,176 in assistance per incentive-related job.
- Model simulations indicate that ten or more jobs were associated with incentives from the BETR, GTI, MQC and TIF programs in 21 percent of the establishments.
- Model simulations reveal that 40 percent of the establishments have estimated employment change levels given their participation in the BETR, GTI, MQC and TIF programs that are less than what would have been expected given their non-incentive growth characteristics.
- Model simulations indicate that 1,586 jobs were associated with the BETR Program and establishments received an average of $16,654 in assistance per (BETR) incentive-related job.

- Model simulations indicate that 420 jobs were associated with the GTI and establishments received an average of $5,031 in assistance per (GTI) incentive-related job.
- Model simulations indicate that 1,091 jobs were associated with the MQC program and establishments received an average of $1,004 in assistance per (MQC) incentive-related job.
- There is not a statistically significant relationship between employment growth and an establishment's participation in the TIF program, other things being equal.

5. Evaluating Economic Development Incentive Programs

This section presents a brief overview of some of the approaches commonly used to evaluate state and local economic development incentive programs. The approaches covered in sections 5.1 to 5.5 are statistical-based studies, hypothetical firm studies, case studies, interview-based studies, and studies that evaluate incentive programs according to a set of guidelines that are believed to be desirable criteria for incentive programs to achieve. Although the methods are discussed separately, they are complementary in nature and can be used together in a comprehensive evaluation of incentive programs. This section does not present results from other studies that have evaluated incentive programs. Several books and articles (included in the bibliography in section 6.1) have been written in recent years that summarize the key findings from previous incentive evaluation studies. Because of the differences across states in the design and administration of incentive programs, findings from other studies need to be interpreted carefully when used to make predictions or conclusions about Maine's incentive programs.

5.1 Statistical-Based Studies

One approach used to evaluate economic development incentive programs, and the approach used in this study, is to conduct a statistical-based study. These studies typically focus on the relationship between an outcome measure selected to represent some facet of business growth and an establishment's participation in incentive programs. For example, statistical-based studies can be used to estimate the effects of incentive programs on employment growth or business location decisions, while controlling for the

effects of other factors that influence the chosen outcome measure. Findings from statistical-based studies may be used to simulate the effects of various policy scenarios on the outcome measure of interest.

An issue that arises in statistical-based studies is choosing an appropriate outcome measure that is consistent with the objectives of the incentive program being evaluated. Many studies use an outcome measure that is tied to employment at either the industry, regional or establishment level. The choice of an employment-based outcome measure is warranted in many cases, however, because job creation is an explicit or implicit objective of many economic development incentive programs. Compared to the other methods used to evaluate incentive programs, statistical-based studies require information on a relatively large number of sample observations. Statistical-based studies that focus on individual businesses as the unit of analysis may involve building a data set that contains information on establishments that did and did not participate in incentive programs.

5.2 Hypothetical Firm Studies

Another approach used to evaluate economic development incentive programs is to conduct a hypothetical firm study, also known as a representative firm study. These studies focus on the effects that changes in certain cost items have on a firm's total costs or profit. For example, hypothetical firm studies can be used to estimate the effects of changes in labor costs, energy costs or business taxes on the profit levels of various types of firms. In the evaluation of economic development incentive programs, hypothetical

firm studies can be used to estimate "how much incentives are worth" to various types of firms.

An issue that arises in hypothetical firm studies is that findings, indicating that each dollar of incentives received by an establishment increases its profit by a given amount, do not provide information on the effect that the increase in profit will have on business growth. Another characteristic of hypothetical firm studies is that, unlike statistical-based studies that require information on a large number of sample observations, they require detailed cost information on a small number of establishments. A similarity between statistical-based studies and hypothetical firm studies is that study findings, which are based on sample averages, are generally more applicable to a "typical" business that participated in incentive programs than to any particular individual establishment.

5.3 Case Studies

A third approach to evaluating economic development incentive programs is to conduct case studies on a small number of establishments that received incentives. Unlike statistical-based studies and hypothetical firm studies that analyze data from a sample of businesses, case studies generally focus on a single (or a few) establishment's participation in incentive programs and the outcomes that occurred in the business as the result of the incentives. Since case studies do not typically involve statistical analysis, the extent to which the findings from case studies can be generalized to other establishments is limited. On the other hand, case study findings may provide anecdotal evidence on whether programs have a "causal" effect on business growth.

5.4 Interview-Based Studies

Interview-based studies involve asking business owners or managers about the factors that affect business growth or location decisions. In some interview-based studies, researchers ask business owners to rank a group of factors in order from the most important to the least important factor affecting an establishment's location decision. In other studies, business owners are asked to rate individual factors according to whether they have a positive, negative or neutral impact on business growth. In the evaluation of incentive programs, researchers conducting interview-based studies may ask business owners about whether the growth of their business was affected by its participation in incentive programs.

A characteristic of many interview-based studies is that they do not focus on a well-defined outcome measure. Findings from interview-based studies, especially those that ask business owners to rank a list of growth factors by order of importance, generally do not provide information on how businesses would react to changes in the growth factors. Several researchers have also noted that business owners may overstate the importance of incentive programs in order to ensure that incentives are available to the business in the future.

5.5 Program Evaluation According to a Set of Guidelines

A final approach used to analyze incentive programs is to evaluate programs according to a set of criteria. This method involves establishing a set of guidelines that are believed to be desirable for incentive programs to achieve. For example, guidelines may be specified related to the eligibility requirements of businesses, whether programs

should target specific types of businesses, and whether the program is consistent with the economic development objectives of the state. Once the guidelines are set, this method involves evaluating the extent to which the state's incentive programs satisfy each of the criteria.

Whereas other approaches generally measure a program's success in terms of its effect on business growth, this method measures a program's success in terms of how the program is designed. In some cases, programs that are considered successful in terms of how the policy is designed may be considered unsuccessful by the outcomes that are achieved, and vice versa. Thus, study findings indicating that a program satisfies the list of established (desirable) criteria do not provide information on the program's effect on business growth. Unlike the other approaches described in sections 5.1 to 5.4, evaluating programs according to a set of criteria may or may not require collecting data on businesses that participated in incentive programs.

6. Report Summary

The study examined short-term employment change in Maine establishments and used econometric methods to estimate the number of jobs associated with the BETR, GTI, MQC and TIF incentive programs. Two key sets of findings emerged from the analysis of employment change and incentive program participation presented in section 3. First, the average employment growth rates of establishments in the data set vary by establishment size and age, the county where the establishment is located, and the establishment's industrial sector. Second, the subset of establishments that received incentives differs from the sample of all Maine establishments when compared according to these establishment characteristics.

These findings imply that, for reasons unrelated to incentives, the mean growth rate of establishments that received incentives should differ from the mean growth rate of the sample of all Maine establishments. Thus, the key question that motivated the remainder of the study was: How do levels of employment change in establishments that received incentives differ from levels of employment change that would have been expected based on factors unrelated to incentives? If an establishment's estimated employment change given incentives was greater than what would have been expected based on factors unrelated to incentives, a positive number of jobs were associated with incentives. On the other hand, if an establishment's estimated employment change given incentives was less than (or equal to) what would have been otherwise expected, a negative number of jobs (or zero jobs) were associated with incentives.

An econometric model estimated in section 4 isolates the relationship between employment change in Maine establishments and their participation in incentive

programs, controlling for the effects of their non-incentive growth characteristics. Empirical results from the model indicate that employment growth rates are significantly related to establishment size and age, the growth rate in the county where the establishment is located, and growth rates in the establishment's industry. These findings were expected given the facts revealed in section 3. Holding these non-incentive growth characteristics constant, the empirical results also indicate that growth rates are significantly related to an establishment's participation in incentive programs (except for the TIF program).

Although results from the statistical analysis cannot be used as evidence on the causal effect of incentives on business growth, the results were used to estimate levels of employment change associated with incentives. Simulations based on model results indicate that a total of 4,730 jobs were associated with the BETR, GTI, MQC and TIF programs in 860 establishments. Dividing the actual amount of incentives from these programs by the estimated number of jobs associated with incentives, Maine establishments received an average of $8,176 in assistance per incentive-related job.

Findings presented on the number of jobs associated with incentives were not surprising given the wide variety of establishments that received incentives. As shown in the study, many factors unrelated to incentives can be used to explain differences in employment growth rates across establishments. Thus, it is not surprising that estimated levels of employment change given incentives were less than estimated levels of employment change based on non-incentive growth characteristics in some establishments; especially those with characteristics consistent with high growth rates. Furthermore, it is not surprising that estimated levels of employment change given

incentives were greater than estimated levels of employment change based on non-incentive growth characteristics in some establishments; especially those with characteristics consistent with low growth rates.

Other factors that may have affected the empirical findings are the types of incentive programs evaluated in the study and the fact that the study focused on short-term employment change from 1998 to 1999. As indicated, some business expansions take place over a multi-year period and some establishments may have received incentives in 1998 based on expansions that resulted in job creation in years prior to (or following) 1998. Furthermore, the BETR and TIF programs subsidize the cost of capital and are not designed to stimulate job creation (although, in some cases, job creation occurs simultaneously with investment in new equipment and capital). Future research on Maine's incentive programs would benefit from additional years of information on the incentive programs and employment, as well as information on capital investments made Maine establishments.

Section 5 discussed several approaches that could be used to evaluate economic development incentive programs. Future statistical analysis could be used to investigate the relationship between long-term employment change and incentives, the relationship between wages and incentives, or the factors that affect an establishment's probability of participating in incentive programs. A hypothetical firm study could estimate how much a dollar received from the BETR Program (or any of Maine incentive programs) contributes to the profit levels of various types of firms. Other research could evaluate the design of the state's incentive programs according to a set of criteria established by Maine policymakers, business people, academics and members of the general public.

Future research, along with the current study on the effects of incentives on short-term employment growth in Maine establishments, will contribute to the overall understanding of Maine's incentive programs.

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