NEW ENGLAND
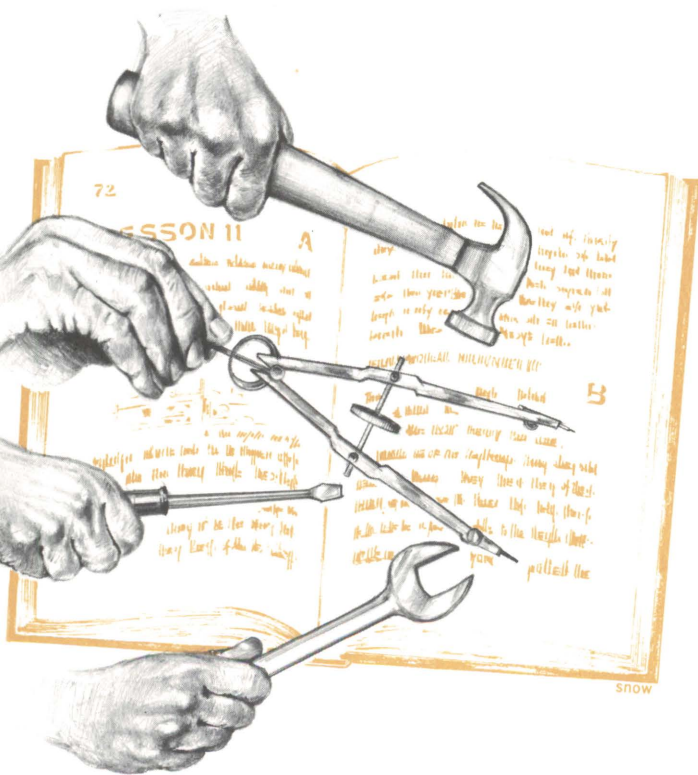# BUSINESS
REVIEW

Does Retraining Pay?

This article evaluates the costs and benefits of public retraining programs. It concludes that the benefits are particularly high for society as a whole, thus justifying government spending.

New England's Gross Product

Estimates of the region's gross product indicate that it doubled during the 1950-1964 period. Among the states, Connecticut led in relative growth, followed by New Hampshire.

EDERAL RESERVE BANK OF BOSTON

Does Retraining Pay?

THE Nation's over-all unemployment rate has declined this year to the lowest level since 1953. It is rapidly approaching the level of a fully-employed economy. Nevertheless, certain members of the labor force continue to experience relatively high levels of unemployment. For example, the unemployment rate both for teenagers and for unskilled workers continues around 10 percent. Moreover, about one-fifth of the unemployed have been without work for 15 weeks or more.

At the same time the demand for highly-skilled workers continues strong and exceeds the supply in some areas. Such shortages of labor can slow up the economy's expansion and put pressure on costs and prices. The unemployed all too often do not have the skills required to fill the available jobs.

Thus, the need continues for programs designed to upgrade the skills of certain workers and to retrain some workers in new skills. Such programs are functioning and expanding rapidly. In 1965 more than 100,000 persons completed training under the Manpower Development and Training Act. Three out of four

of these individuals were placed in jobs within 90 days after completion of training. This year it is anticipated that the number trained will be about twice that of last year.

To evaluate these public training programs it is necessary to determine the costs and benefits derived from. them. Costs are incurred and benefits are received by the worker, the government, and the economy as a whole. The important questions are who receives the greatest benefits in relation to costs and therefore who should pay for the training. At present, most training is paid for by private employers.[1] On the other hand, because the benefits of these programs are greater for society as a whole than they are for private firms, not all retraining can be left to private initiative.

Michael Borus, while a doctoral candidate at Yale University, studied the costs and benefits of a retraining program conducted in the early 1960's in Connecticut to help resolve these questions. He concluded that the benefits from

[1]Edwin F. Estle, "Industrial Investment in Manpower," *New England Business Review*, Federal Reserve Bank of Boston, February, 1964.

government-sponsored retraining outweighed the cost for all groups involved: the worker, the government, and the economy as a whole. Retrained workers who used their new skills earned higher incomes and suffered less unemployment than they would have without retraining. The extent to which benefits exceeded costs varied, however, with the worker's characteristics. Probably because of their greater adaptability and motivation, the younger, more educated workers and those who were employed at the time they applied for retraining were more likely to find jobs requiring their new skills. However, when unemployed workers did succeed in finding jobs after being retrained they received the greatest benefits. For all groups, workers' benefits exceeded their own costs when they participated in retraining programs sponsored by the government.

On the other hand, many fewer workers would enter retraining if they rather than the government were forced to pay the full bill. If the worker were to pay all the cost of retraining, his benefit-cost ratio would fall to low levels. In some cases, the worker's costs might exceed his benefits. Yet for society as a whole the benefits of retraining usually greatly exceed the costs thus justifying government spending for these programs.

Likewise, society would lose if all retraining were left to private firms. The present government programs operate where labor shortages have existed for long periods. This indicates that the firms consider the retraining unprofitable due to the risk that the worker would leave the firm after completing training. Nevertheless, the gains to the economy from retraining would be significant.

Borus concludes, therefore, that the government should be willing to carry the costs of many retraining programs. His study also suggests, however, that the government retraining programs are not a complete answer in solving a chronic unemployment situation. First of all, only 73 percent of those eligible to take the course actually enrolled. Of those who did not enroll, one-third continued to remain unemployed. Moreover, only two-thirds of those who enrolled in the courses made use of their training. The remainder of the workers either withdrew from the courses (20 percent) or graduated and found jobs which did not require the retraining (13 percent). In general, the older, the less educated, and the long-term unemployed worker had less chance of using and benefiting from the retraining.

This indicates that supplementary programs continue to be needed to raise the educational level of adults as well as youngsters, to provide guidance and counseling services, and to improve information channels on existing job opportunities.

Character of the Sample

The State of Connecticut was one of the first in the country to offer publicly-supported classes specifically designed to retrain unemployed workers. These early efforts permitted the selection of a sample of workers with sufficiently long post-retraining employment records to judge the impact of retraining. A personal interview survey was made of more than 300 male workers who had qualified for retraining courses in Connecticut. Some of the workers did not take part in the retraining programs; others did not complete the retraining course they started.

3

The study group was selected from male workers eligible for courses given between May 1961 and March 1962 in machine shop operations, shipfitting, and pipefitting. Since the effects of retraining may depend on the level of unemployment — that is, workers may be more easily placed in areas of higher employment — four different labor markets were chosen with unemployment rates varying from 3 to 12 percent. The men in the study group were considerably younger than most of the unemployed. The median age of the men studied was 23 years compared with 39 years for the unemployed labor force. As a result of their youth, more than half the men in the sample were unmarried, and about three-tenths were just entering the labor force. The experienced workers in the group were mostly unskilled or semiskilled.

Not only were the men in the sample younger, they were also more educated than the average male population of Connecticut, and considerable more than the unemployed. Only a third of the men eligible for retraining had not graduated from high school in contrast with 60 percent of the men in the State.

About one-third of the sample group were employed at the time they took the aptitude test for retraining. Of those workers who were unemployed, about one-fourth had been unemployed six months or longer.

Costs and Benefits

To measure the benefits of retraining, the experience of those who completed the retraining course was compared with those who didn't start, those who dropped out before completion, and those who completed retraining but didn't use their new skills. Because all the workers involved in the study met the minimum qualifications necessary for retraining, the major differences in income and employment could be assumed to reflect the effects of retraining.

The study found that, on the average, the worker who utilized his retraining increased his wage income by $500 a year and reduced his annual unemployment by about 5 weeks in the first year after retraining. These are not, however, the net benefits received by the worker. Some of the increased income would go into income and Social Security taxes. Also an allowance must be made for the reduction in unemployment compensation benefits received by the worker who utilized retraining as compared to what would have been received if he had not been retrained. His net income increased in the first year by only $300.

The individual worker's costs of retraining were largely the transportation costs to and from classes and the cost of income lost during the course. The average transportation cost per retrained worker in the sample was $25. The cost of lost income is dependent upon the worker's expected employment status and earnings if he does not enter the course. If the worker expects to be unemployed during the retraining course, he will actually increase his income by receiving training allowances greater than his normal unemployment benefits. On the other hand, if the worker expects to be employed during the period of the course if he does not take training, he will experience a reduction in income by the amount to which his earnings would have exceeded training allowances.

To determine these costs it becomes necessary to make several assumptions: for example, assumptions as to what the retrainee could have earned if not taking retraining, what the tax

4

rate on his wage income would be, which in turn depends upon the number of dependents, and what the difference in transportation costs would be if he were employed.

This points up the difficulty in making benefit-cost comparisons. Some subjective judgments must enter into the calculations since expectations are involved. It is not possible to give one benefit-cost ratio, but only to give the possible range of ratios depending upon the assumptions made.

The benefits for the worker from retraining, of course, extend beyond the first year if he continues in the new job. Assumptions must again be made as to the probability of his staying — about 18 percent of the sample group left their new jobs for occupations unrelated to retraining within 12 months after graduation — and the appropriate discount rate to apply to future benefits to determine their present value.

On the basis of the sample data and his set of assumptions, Borus concluded that the benefit-cost ratio for the average worker would range between 3 and 6. That is, for every dollar of cost to the worker for retraining, he would receive $3 to $6 in benefits. If the retrainee was among the long-term unemployed, however, the benefit-cost ratio would be somewhat higher. For although he will have a lower probability of completing the course and finding a training-related job, the worker unemployed for more than 15 weeks who used his training earned average benefits approximately twice as great as the worker who was unemployed for a shorter period. Borus attributes these higher benefits to the scarcity of alternative work opportunities for the long-term unemployed if they are not retrained.

The Government

Retraining costs for the government include those of selecting and processing trainee applicants, paying retraining allowances, paying for instructors, tools, etc. Benefits for the government would be principally the reduction in costs of unemployment and public assistance and the increase in tax receipts which resulted from the higher income levels achieved through retraining. These benefits would again depend upon the characteristics of the trainees and their likelihood of leaving their new jobs.

Borus concludes that benefits would exceed costs in the range of 11 to 40 times for the government. These ratios would decline slightly, however, if the number of weeks of retraining were lengthened (the average length of the courses studied was only 6 weeks), and if training allowances were increased. The ratios would decline drastically if retrainees merely replace other employed workers rather than add to total employment. Similarly, the ratios would fall sharply if retraining caused a shift in spending patterns that resulted in reduced employment in some other part of the economy. For example, firms employing retrained workers generally increase their output. If as a result more of their products are purchased in lieu of the products of other firms, employment in these other firms would be reduced. Thus, the reduction in unemployment compensation and public assistance in communities offering retraining programs might be largely offset because of increased unemployment in other places.

5

The Economy

The costs to the economy are much the same as those to the government except for the retraining allowances which constitute a cost for government but are merely a redistribution of income for the economy as a whole. Benefits would depend upon the same factors as for the workers. However, they would be larger because of the assumption that the total value of the worker's production is to be included, rather than just the increase in his output.

Borus' assumptions for the economy as a whole are based on the premise that the jobs for which retraining was given would remain unfilled if retraining did not take place, and that the economy is at a less than fully-employed level. Thus, the entire output of the retrained worker becomes a benefit to the economy.

The economy's benefit will fall as the full employment level is reached. The retrainee will move from a lower to higher skill job, but there will be no one unemployed to take the lower skill job. In this instance benefits are raised only by the increase, not the full amount of the retrainee's output. In addition, even in a less than fully-employed economy it may be that the jobs would not remain unfilled if retraining were not conducted. For example, firms might be able to redefine jobs in such a way as to employ more unskilled or semi-skilled workers. Or again, firms might extend their normal work weeks to obtain the increased output.

Even with a more restrictive set of assumptions, however, the benefits to the economy from retraining would be well above the costs.

New England's Gross Product

THE total output of goods and services in the United States, the Gross National Product, in 1965 was $676.3 billion. This estimate, and it admittedly is only an estimate, was made by the United States Department of Commerce. It is subject to some revisions as additional information becomes available. Even with these qualifications, however, it is the best overall measure of the national economy that is available. It is one of the major guides to economic policy formulation and business planning.

For individual states and regions of the Nation there is no official estimate of the total output. The most complete measure now available is the personal income series published by the U. S. Department of Commerce. This is quite useful for measuring economic performance. Nevertheless, it provides information only on the amount of income received in an area, it does not measure the value of goods and services produced in an area.

A gross product measure at the state and regional levels provides a framework for making economic projections by industry that can be related to gross national product projections. These state and regional projections can be of use in the planning and policy formulation activities of government and business in the region.

The Federal Reserve Bank of Boston has, using the personal income data and other information, estimated New England's gross product for the 1950–1964 period. The estimate indicates that total output in current prices doubled, a 100 percent increase, over the 14-year period to a total of $41.5 billion in 1964. The Nation's gross product shows a somewhat greater increase, rising 121 percent from 1950 to 1964. Real output, that is gross product adjusted for price changes, in New England advanced by almost half, 47 percent, over the 14-year period in terms of 1958 dollars. Thus, the average annual growth of gross product in the region over the period was 2.8 percent. The Nation's average annual growth in real output over the period was 3.5 percent.

The region's personal income expanded, in current prices, by 109 percent over the 14 years, or at a rate 9 percent faster than gross regional product. Consequently, the personal income level in relation to gross product rose from 73 percent in 1950 to 76 percent in 1964. In the intervening years, however, the ratio

varied considerably. In 1956 it was 84 percent, while in 1959 it was down to 74 percent. The distinction between personal income and gross product is rather complicated. To arrive at personal income, it is necessary to deduct certain items from gross product and to add others. The deductions include depreciation, indirect business taxes, and undistributed profits. The additions are primarily transfer payments to persons from business and government, e.g. benefits from social insurance funds.

Personal income, therefore, does not represent all income (e.g. undistributed profits) or economic activity of an area. It deviates significantly from gross product over the business cycle. In recession years personal income does not decline, relatively, as much as gross product because of the anticyclical effect of transfer payments. In years of high business activity it advances relatively less because of the exclusion from personal income of such things as undistributed profits which advance more rapidly in such periods. To illustrate, Chart 1 shows that gross product advanced 5 percent from 1956's level in 1957, a peak of the business cycle in New England. This was almost double the rate recorded for personal income. A comparison of the levels in 1958 with those of 1957 shows the divergence in a recession period. Gross product declined by 2 percent, while personal incomes rose by that percentage.

Gross Product by Industrial Sector

The method used to estimate the region's gross product provides a distribution of the total by sector and industry. Gross product from farming was found to be $390 million in 1964, a decline of one-tenth from its level in 1950. Another industry which showed a decline was railroads, where gross product fell

Chart 1
NEW ENGLAND'S GROSS PRODUCT AND PERSONAL INCOME
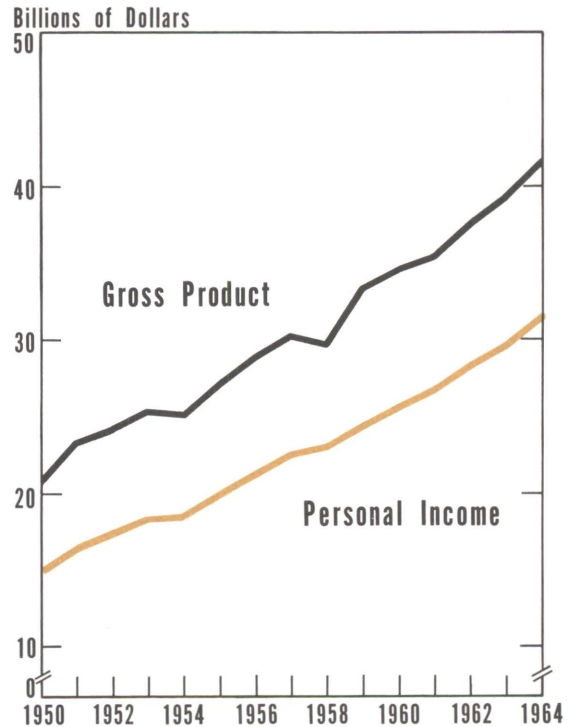
$37 million, or 15 percent, over the 14-year span. All other types of transportation, on the other hand, registered an advance in gross product of more than four-fifths during the period.

As the accompanying table shows, the greatest relative increases in output occurred in the communications-public utilities and government sectors, where output increased almost one and three-fourths times. Other sectors where output more than doubled were services, finance-insurance-real estate, and construction. Manufacturing, which accounts for almost a third of all output from the region, increased

8

its output by four-fifths in the 1950–1964 period.

In summary, the nonmanufacturing industries with the exception of farming and railroads have been expanding their output, primarily in the form of services at a rapid rate. On the other hand, manufacturing has shown a slower, but still sizeable, growth in product. Thus, it is clear that New England's output of services has risen faster than its output of goods.

Gross Product by State

Gross product estimates were also prepared for each New England State. As shown in the accompanying table, Connecticut led the six States with a gross product increase of 128 percent over the 1950–1964 period. This was a greater relative advance than in the Nation as a whole. New Hampshire was in second place, with a gain of 112 percent. Almost two-thirds of this rise occurred in the 1958–1964

NEW ENGLAND'S GROSS REGIONAL PRODUCT

Economic Sector	1964 $ Million	Percent Change from 1950
Private Nonfarm	38,313	+ 98%
Mining	90	+ 96
Construction	2,092	+116
Manufacturing	13,344	+ 78
Trade	7,534	+ 72
Finance, Insurance and Real Estate	5,964	+133
Transportation	1,023	+ 49
Communications and Public Utilities	1,804	+173
Services	6,460	+158
Government	2,801	+172
Farm	390	− 10
Total	41,504	+100

GROSS PRODUCT BY STATE

State	1964 $ Million	Percent Change from 1950
Connecticut	12,589	+128%
Maine	2,508	+ 77
Massachusetts	20,400	+ 92
New Hampshire	1,947	+112
Rhode Island	2,816	+ 66
Vermont	1,148	+ 92

period. Rhode Island trailed the six States in gross product growth, as it did in personal income growth, primarily because of the slow growth in manufacturing output. Gross product from manufacturing in this State grew only by slightly more than a fourth over the 14-year period. Durable goods industries in Rhode Island had a 70 percent growth in output, whereas nondurable goods industries registered an output increase of only 6 percent, largely because of the decline of textiles, in the 1950–1964 period.

Relation of Gross Product to Other Measures

The gross product estimates can be used in conjunction with other measures such as population, capital investment, and employment to give a more detailed picture of the regional economy.

Manufacturing's Investment and Gross Product

Another comparison which can be made is the amount of investment which manufacturers have made in relation to their output. The Bank has conducted surveys of New England manufacturers' capital expenditures since 1957. As a proportion of manufacturers' gross output, these outlays have been rather stable. In 1957 they amounted to 7 percent of gross output. Since then, however, they have held at 5 percent of gross output.

National comparisons show much the same pattern. In 1957 capital outlays were 12 percent of gross product in manufacturing. In the years following they were at 9 to 10 percent of gross product.

Real Product Per Capita

From 1950 to 1964 real product per capita in New England increased a fourth, going from

Chart 2
NEW ENGLAND'S GROSS PRODUCT BY MAJOR INDUSTRY
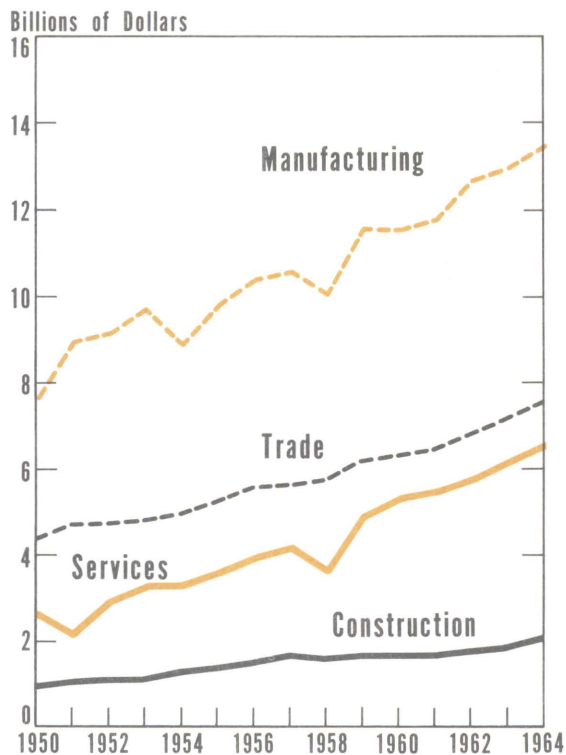
$2,779 in 1950 to $3,458 in 1964. The 1950 level was 17 percent above the national average. In 1964 however, the region's per capita product relative to the Nation had declined, being 14 percent above the national level of $3,019.

Real Product Per Manhour

Using the gross product estimates for manufacturing, converted to real product by price deflation, it is possible to compute the real product per manhour in manufacturing. In terms of the 1957–1959 level, output per manhour was 87.5 percent in 1950. In 1963 the index was 114.1. These index levels are very close to those for the Nation's manufacturing

sector. Nationally, output per manhour was 85.1, with 1957–1959 equal to 100, in 1950 and 115.4 in 1963. Thus, the movement of productivity in the region's manufacturing sector appears quite similar to that for the Nation as a whole. However, the level of output per manhour is lower in New England than in the Nation because of the region's concentration in labor-intensive, rather than capital-intensive, industries. In 1962, for instance, output per manhour in New England was about one-tenth below that of the Nation.

Validity of the Estimates

Not quite three-fifths of the total gross product was obtainable from published sources, the remaining two-fifths was estimated by the Bank. The estimates involve an assumption that the ratio of personal income originating in current production to gross national product in the Nation applies also to New England. It is an assumption that the structure within each industry group in New England is similar to that of the Nation. This is certainly not completely true, but the errors involved may be offsetting. There also may be some upward bias in the New England estimates in regard to capital consumption allowances by assuming a structure similar to that of the Nation. New England producers tend to use relatively less capital equipment than does industry nationally. However, the region's growth relative to the Nation is about the same for net product, where capital consumption allowances are excluded, as for gross product. Thus, the movement of output over time was not affected by the possible upward bias.

The procedure does take account of differences in the major-industry structure between the New England and national nonfarm private sectors. It does adjust for the region's relatively greater concentration in manufacturing and relatively less dependence upon the other sectors.

Some checks on the estimates are possible. One that can be made on the manufacturing gross product estimate is to compare it as an index, deflated for price changes, with the Bank's index of manufacturing production.

The comparison shows them to move together, and to deviate by no more than 4 percentage points in any given year. In 1964, for example, the deflated index of manufacturing gross output was 118 in terms of 1957–1959 equalling 100. The Bank's manufacturing production index was 122 in that year. Given certain differences in concept, methods of aggregation, etc., the divergence of the two indexes is largely explained. Moreover, the comparison at the national level of real product and industrial production shows much the same type of divergences. In addition, the gross product estimates tend to follow fairly closely the movement of value-added data from the Census of Manufacturing and Mining. It does seem, therefore, that the gross product estimates presented here are reasonable approximations of the region's output.[1]

There is no direct check upon the gross regional product estimates. However, the movement of the ratios derived — gross product per capita, manufacturing investment to gross product, and gross output per manhour — lend plausibility to the estimates. These ratios move much like their national counterparts and are at levels consistent with other measures of the regional economy.

[1]The method of estimating New England's gross product is essentially that described by John W. Kendrick and C. Milton Jaycox in "The Concept and Estimation of Gross State Product," The Southern Economic Journal, (October 1965) pp. 153–168. A technical supplement is available from the Bank, giving the methods used and the resulting estimates.

Here's New England –

MANUFACTURING INDEXES (seasonally adjusted)	NEW ENGLAND			UNITED STATES		
1957–59 = 100	pMay '66	Apr. '66	May '65	May '66	Apr. '66	May '65
All Manufacturing	146	146	132	158	156	143
Nonelectrical Machinery	170	165	144	178	174	157
Electrical Machinery	171	171	145	185	184	157
Transportation Equipment	187	185	163	166	166	147
Textiles, Apparel, Leather	118	119	108	142	142	135
Textiles	117	120	107	142	142	132
Apparel	116	117	114	150	150	145
Leather and Shoes	113	113	104	114	116	111
Paper	133	131	128	153	150	141

		Percent Change from:			Percent Change from:	
BANKING AND CREDIT	May '66	Apr. '66	May '65	May '66	Apr. '66	May '65
Commercial and Industrial Loans ($ millions) (Weekly Reporting Member Banks)	2,435	+ 2	+21	53,311	+ 1	+18
Deposits ($ millions) (Weekly Reporting Member Banks)	6,540	+ 1	+11	164,053	0	+ 7
Check Payments ($ billions) (Selected Metropolitan Areas)*	222.4	0	+22	3,348.1	− 1	+17
Consumer Installment Credit Outstanding (index, seas. adj. 1957–59 = 100)	171.0	0	+ 9	208.7	+ 1	+12

DEPARTMENT STORE SALES						
(index, seas. adj. 1957–59 = 100)	127	+ 3	− 2	n.a.	n.a.	n.a.

EMPLOYMENT, PRICES, MAN-HOURS & EARNINGS						
Nonagricultural Employment (thousands)	4,144	+ 1	+ 4	63,070	+ 1	+ 5
Insured Unemployment (thousands) (excl. R.R. and temporary programs)	66	−20	−30	885	−18	−29
Consumer Prices (index, 1957–59 = 100)	114.1 (Mass.)	0	+ 2	112.6	0	+ 3
Production-Worker Man-Hours (index, 1957–59 = 100)	106.6	+ 1	+ 8	116.1	+ 1	+ 6
Weekly Earnings in Manufacturing ($)	104.70 (Mass.)	+ 1	+ 6	112.05	+ 1	+ 4

OTHER INDICATORS						
*Total Construction Contract Awards*** ($ thous.)	304,912	+11	+27	4,988,758	+14	+ 8
Residential	115,584	+15	+12	2,018,352	+13	− 1
Nonresidential	124,851	+ 6	+57	1,811,676	+12	+16
Public Works and Utilities	64,477	+12	+11	1,158,730	+22	+14
Electrical Energy Production (4 weeks ending May 21st 1966) (index, seas. adj. 1957–59 = 100)	166	+ 2	+10	175	− 1	+ 9
Business Failures (number)	59	− 2	−17	997	−10	−16
New Business Incorporations (number)	968	− 3	+ 3	17,036	− 2	+ 3

*Seasonally adjusted annual rate.
**3-mos. moving averages —Mar., April, May

p = preliminary   n.a. = not available