New England Economic Review

Federal Reserve Bank of Boston

July/August 1994

Contents

The **New England Economic Review** is produced in the Research Department and is edited by Joan T. Poskanzer. Heather Schofield coordinates the design and production. The views expressed are those of the individual authors, and do not necessarily reflect official positions of the Federal Reserve Bank of Boston or the Federal Reserve System. The authors will be glad to receive comments on their articles. The Review is available without charge. Requests to be placed on the mailing list or for additional copies should be sent to the Research Library–D, Federal Reserve Bank of Boston, P.O. Box 2076, Boston, MA 02106-2076.

Contents

The Regional Impact of Health Care Reform—with a Focus on New England

Jane Sneddon Little
with Michael D. Jud

Senior Economist and Research Associate, respectively, Federal Reserve Bank of Boston. *The authors would like to thank colleagues Katharine Bradbury and Yolanda Kodrzycki; Susan T. Sherry, Director of State Health Issues, Families USA Foundation; and participants at this Bank's May 3, 1994 conference, "The Ongoing Revolution in Health Care: What It Means for the New England Economy," for helpful comments.*

The United States has begun the huge task of reforming its health care system. In fact, given the momentum of change in the private sector and at the state level, it seems clear that the U.S. health care system will never be the same again, with or without federal legislation. Thus, many people have already begun to consider the likely impact of health care reform on their state's economy even though a national reform package has yet to pass the Congress. Because New England is the U.S. region most dependent on employment in health care services, concerns about the impact of health care reform are particularly acute in this area.

Accordingly, this article will present a preliminary analysis of the regional impact of health care reform. Although such an effort may appear premature, given the state of the congressional debate, the bills making their way through the Congress generally represent a set of variations on themes set out in the Clinton Administration's proposal. Overall, the country's concerns seem clear enough and its financing options are limited enough to permit examining the regional impact of reform using the Clinton Administration's Health Security Act as an illustrative example.

After briefly reviewing the conditions that have brought health care to the top of the nation's political agenda, this article will provide a bare-bones sketch of the Administration's approach to reform, followed by a short description of health care's role in the New England economy. It will then explore the regional impact of addressing the Administration's major health care goals—providing universal access, and bringing our soaring health care costs under control. Because the Health Security Act mandates universal access by 1998, the resulting bulge in the demand for health care services dominates the short run. Not until early in the next century, according to U.S. Congressional Budget Office (CBO) projections, is the impact of cost control measures likely to offset the near-term spike in demand. Accordingly, this article will consider

both the short- and long-run impacts of reform on the region's health care industries, its (largely local) health care services, and other health-related industries, like medical equipment and insurance, that serve national markets. After a brief look at the impact of reform on the region's non-health industries, the article will then focus on the regional income shifts likely to accompany reform. On the basis of CBO estimates of national average insurance premiums and its projections of the federal outlays and revenues associated with reform, the study estimates the state subsidies and the redistribution of income among states that would result from implementing the Health Security Act.

The regional impact of health care reform will depend on how productively New England's state governments and wage earners invest the savings achieved.

The study concludes that reform under the Health Security Act or any other viable plan could lead to a not insignificant shift of economic resources and activity away from most New England states, in large part because this generally high-income region will help fund improved access and subsidized premium payments in other parts of the country.[1] Because the Administration plan relates each state's contribution to funding health reform to its current Medicaid efforts, the relative size and generosity of this region's Medicaid programs also contribute to this result. Indeed, examining health reform from a regional perspective highlights the proposals' treatment of Medicaid and suggests that building on the current inequities in that program produces some perverse results. Accordingly, the article argues that federal reformers should discontinue Medicaid as a separate program and suggests an alternative way of maintaining state government contributions to financing health care.

While the risks inherent in reform may be relatively large for New England, the partially offsetting savings and opportunities accruing to other sectors of the regional economy should also be above-average. Ultimately, thus, the regional impact of these changes depends on how productively New England's state governments and wage earners use the savings achieved through health care reform.

I. Why the Demand for Reform?

According to data published by the Organisation for Economic Cooperation and Development (OECD), the United States spends more on health care per capita and as a share of GDP than any other industrialized country (OECD 1993). As one might expect, rich countries tend to spend more per capita on health care than poor countries, as shown in Figure 1. Even so, the United States appears to be a clear outlier—we spend a lot more per capita on health care than our relative income would suggest, given the behavior of similar countries.[2] Moreover, according to survey data cited by the OECD (1993, pages 35–36), despite these above-average expenditures, Americans are much less satisfied with their health care system than are the citizens of most other industrialized countries. What is the source of our discontent?

Cost

Americans are concerned about the cost of U.S. health care and about the pace at which these costs have been rising. Health care expenditures are seen to be crowding out spending in other areas generally considered important. Workers suspect, with considerable justification, that the rising cost of health care benefits was partly responsible for the decline in their real wages during the 1980s.[3] And, health care is absorbing ever-rising shares of state and federal budgets, thereby undermining those governments' ability to invest in education, R&D, and public infrastructure. In the federal budget, Medicare and Medicaid, the social insurance programs providing health care

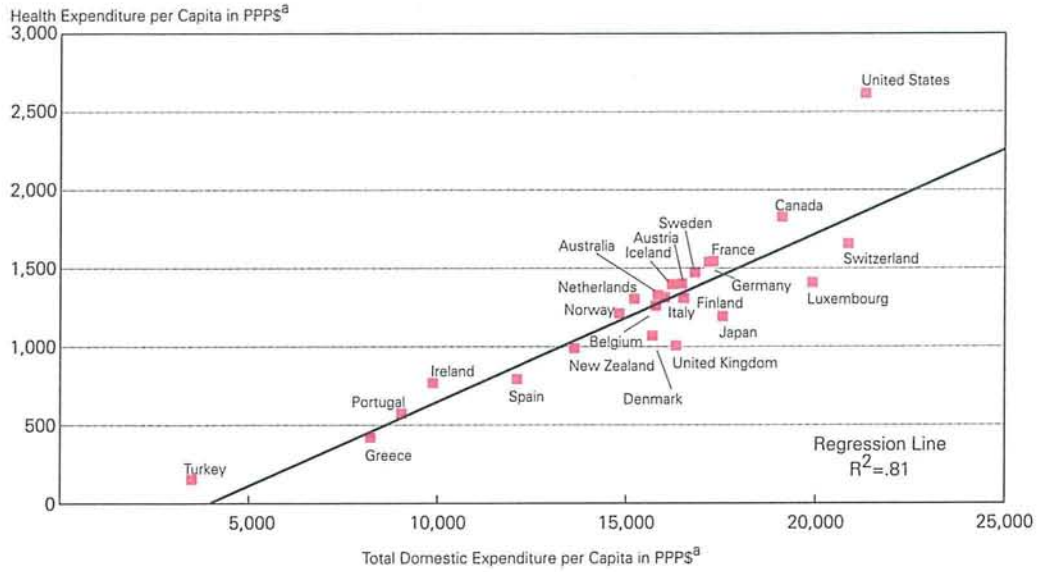
[1] Within New England and most other regions, the impact of health reform will vary considerably by state. Although discussing health reform at the regional level blurs these important distinctions, it does permit summarizing the data and conclusions.

[2] A recent article by Grubaugh and Santerre (1994) suggests that the United States may not be such a significant outlier if lifestyle variables like tobacco consumption and population density are considered. At the very least, this article's conclusions underscore the need to address social issues as well as any inefficiencies in the U.S. health care delivery system, if U.S. citizens are serious about restraining health care costs.

[3] In addition, many have been asked to pay for a rising share of their health care costs through increased deductibles, copayments and so forth.

Figure 1

Total Spending and Health Spending per Capita, 1990



[a]Dollars in purchasing power parity exchange rates. PPP exhange rates are those that equilibrate the domestic purchasing power of each currency.
Source: OECD, *OECD Health Systems: Volume 1: Facts and Trends 1960-1991.*

to the elderly and some of the poor, are absorbing ever-increasing shares of total outlays. These two programs accounted for 5 percent of federal outlays in 1970 and 12 percent in 1990, and are projected by the CBO to absorb 25 percent of the total budget by the year 2002 if rising health care costs are left unchecked. According to this same CBO analysis, if federal spending on Medicaid and Medicare could be held to its 1991 share of GDP, the resulting reduction in the federal deficit would permit lower interest rates, additional investment, and an increase in real GDP to a level 2 percent above that which can be expected in the absence of reform (U.S. Congressional Budget Office 1992).

Access

Despite the extraordinary cost of the U.S. health care system, the United States is one of only two industrialized countries not providing universal access to health insurance.[4] In 1992 over 38 million people, or 17 percent of the nonelderly population, had no health insurance. A majority of these people were employed; over one-quarter were children;[5] only 18 percent were unemployed adults (Employee Benefit Research Institute 1994). The great majority of these people had gone without insurance for the entire year.[6] Accordingly, considerably more than 17 percent of the nonelderly population had no insurance during part of 1992, and a much larger percentage feel threatened with a loss of access to nonemergency health care, should they become unemployed or fall seriously ill. The problem has grown more serious as governments and private industry have become alarmed about rising health care costs and have put pressure on insurance companies and health care providers to contain them. As a consequence, insurers and providers have sought to avoid individuals with known health risks, small group and individual policies have become very expensive, and the number of nonelderly individuals going without health insurance and often, thus, nonemergency health care, has grown by 15 percent since 1988.

[4] The other one is the Union of South Africa.

[5] Among children in families with no health insurance, 74 percent lived with an employed adult.

[6] These often cited numbers are often misrepresented. The questions in the Current Population Survey actually ask if an individual had any type of health insurance at any time during 1992; thus, a negative answer should indicate that the individual had no health insurance coverage for the entire year.

Outcomes

Despite the U.S. health care system's high cost and, undoubtedly, in part because of its growing access problem, U.S. citizens do not, on average, appear to achieve better health care outcomes than residents of other industrialized nations spending less. To be sure, many U.S. residents have access to the technically finest medical care in the world, and some observers would argue that this country directly or indirectly funds much of the world's medical R&D. Moreover, cross-country comparisons of health care outcomes are frequently misleading because a whole constellation of sociological and environmental differences can distort the results. Nevertheless, health care economists generally suggest that infant mortality rates provide one of the best available measures of relative health care outcomes. By this single measure, among 23 OECD countries, the United States ranked 20th in 1990— ahead of Greece, Portugal, and Turkey. On balance, in other words, it is not clear that the United States is getting good value for its health care dollars.

For all of the above reasons, health reform remains a national goal of major importance. By comparison, the impact of reform on individual regions has more limited significance. Nonetheless, understanding the impact of modifying such a large part of most state economies as health care is important for regional leaders seeking to plan ahead.

II. Summary of the Health Security Act

The Clinton Administration's health reform legislation has two primary goals: 1) to provide universal access to health insurance for a defined but reasonably generous range of medical services; and 2) to slow the growth of the nation's health care spending. In an effort to build on the nation's current employer-based system while pursuing the first goal, the Health Security Act requires all employers to pay for a share of their employees' health insurance premiums; it also requires all individuals and families—except Medicaid beneficiaries and others with very low incomes—to pay at least part of their health insurance premiums. For reasons of equity and practicality, the bill caps and subsidizes premium payments made by employers and low-income families. For employers with more than 75 employees, contributions are capped at 7.9 percent of payroll. Small, low-wage companies make premium payments capped according to a sliding scale that starts at 3.5 percent of payroll and rises to 7.9 percent. For families with incomes under $40,000, premium caps rise on a sliding scale from 0 to 3.9 percent of income.

To give health care consumers added market power and, thus, to improve cost control, the Health Security Act requires states to establish one or more health insurance purchasing alliances. Most people who work for firms with fewer than 5,000 employees and most nonworkers under the age of 65 would buy their insurance through these alliances. Medicaid programs for people under 65 would be partly dismantled. Among the nonelderly now eligible for Medicaid, only individuals receiving cash payments through the Aid to Families with Dependent Children (AFDC) or the Supplemental Security Income (SSI) programs would continue to receive Medicaid; the federal and state governments would purchase health insurance for these individuals through the alliances.[7] By contrast, the Medicare program would remain largely intact and outside the alliance system. Large firms and some multi-employer groups and cooperatives, many of whom now self-insure, could establish their own corporate alliances.

The alliances would negotiate, on behalf of their members, with networks of local providers to establish the premiums for a set of defined health plans. These premiums would be set by community rating and could not vary according to the perceived riskiness of the consumer. The alliances would offer their members a choice of health plans, including (lower cost) managed care plans and at least one (higher cost) fee-for-service plan. All plans would offer the standard package of benefits. Plans would have to accept all applicants (within the limits set by their capacity) and could not exclude anyone because of preexisting medical conditions.

In addition to establishing universal access, the Health Security Act expands or initiates a few federal programs. Important among these initiatives is a plan to cover prescription drugs for Medicare beneficiaries and a program to provide home and community care for severely disabled people.

Much of the funding to pay for these new programs and the federal subsidies used to cap employer and low-income family payments for insurance pre-

[7] Other Medicaid programs for the nonelderly will end, but states will be required to make ongoing maintenance-of-effort payments to the alliances equaling the state's current Medicaid obligations for the discontinued programs. These provisions penalize states with costly or broadly inclusive Medicaid programs in perpetuity.

miums would come from savings on existing Medicare and Medicaid programs plus some new revenue measures, like the increase in the excise tax on tobacco products. The Administration and the CBO also anticipate substantial increases in federal income and payroll tax receipts as wages and incomes rise as a result of savings from health care reform. As already mentioned, states would also be required to make inflation-adjusted maintenance-of-effort payments to the alliances for their share of current Medicaid programs discontinued by the Health Security Act.[8]

The Administration expects that increased competition among health plans (facilitated by the creation of the purchasing alliances and the standardized package of health benefits), increased use of managed care, and the use of capitated reimbursement systems for paying providers will slow the rise in national health care spending. In case these measures do not slow health care spending as expected, however, the Act provides a formula and enforcement mechanism capping the permitted annual rise in health insurance premiums. The CBO concludes that the Administration's approach is likely to prove effective in reducing the growth in health care spending.

III. The Role of Health Care in the New England Economy

This section will set the stage for a discussion of the regional impact of health reform by describing the role of the health care industries in the New England economy today. As Table 1 shows, New England is the U.S. region most dependent on health care employment. Defining health care to include private health care services, medical equipment, drugs, and health insurance, the health care industry accounted for 10.5 percent of the region's total nonagricultural employment in 1991, the most recent year for which these data are available.[9] After North Dakota and Pennsylvania, Rhode Island and Massachusetts are the two states most dependent on health care jobs. While the bulk of these jobs are in health care services, industries that export to national markets—drugs, medical equipment, and health insurance—account for almost 1 percent of regional employment. Among health service workers in New England, 44 percent work in hospitals, 22 percent in nursing facilities, and 14 percent in doctors' offices and clinics. Home health and medical laboratories account for 6 and less than 2 percent, respectively.

Within the group of health-related export industries, medical equipment looms most important. As the location quotients[10] shown in the table indicate, after Delaware, Minnesota, and Utah, Connecticut and Massachusetts have the greatest relative dependence on medical equipment. By contrast, and surprisingly perhaps, New England does not have an above-average dependence on employment in drugs or health insurance. Among the New England states, only Connecticut has an above-average dependence on pharmaceuticals; nationally, the states with the greatest concentration of pharmaceutical jobs are New Jersey, Delaware, and Indiana. While New England's strength in pharmaceuticals lies in its R&D activities, which are not labor intensive, the mature drug companies headquartered in New Jersey, Delaware, and Indiana have large production and marketing staffs. As for insurance, the region's greatest strengths are in the life and casualty areas. Accordingly, despite its role as a headquarters state for several major insurance companies, Connecticut has a barely above-average dependence on health insurance jobs.

To put New England's dependence on health care in perspective, it is worth noting that, in absolute terms, the region is considerably more dependent on health care than on defense. (See the memo item on Table 1.) Regionally, health care accounts for roughly twice as many jobs as defense; even in Connecticut, the most defense-dependent state in New England and one of the most defense-dependent states in the nation, the ratio of health care jobs to defense jobs is about 1.6 to 1.[11]

---

[8] In addition to the payments for nonelderly beneficiaries not receiving cash support through AFDC or SSI, the discontinued obligations covered by the maintenance-of-effort requirements include payments to the "disproportionate-share" hospitals (hospitals that provide a disproportionately large share of uncompensated care) associated with these individuals.

[9] This measure of health care employment is not complete. For example, it does not include employment at state hospitals because, among the New England states, these data are only available for Massachusetts. (Employment at Massachusetts state hospitals equaled 0.5 percent of total state employment in 1991.) Total health-related employment should also include individuals engaged in health-related research and education, but U.S. Bureau of Labor Statistics (BLS) data do not provide an adequately fine breakdown of research and education by discipline to permit identifying these workers.

[10] A location quotient is the ratio of an industry's share of total state employment to the industry's share of total U.S. employment. This ratio suggests a state's relative dependence on the industry in question.

[11] However, because the distribution of defense employment is highly concentrated, the region's relative dependence on defense is much greater.

Table 1

Private Health-Related Employment as a Percentage of Total Nonagricultural Employment, by State and by Region, 1991

Region/State	Health Care Services (80)		Medical Equipment (384, 385)		Drugs (283)	
	Percentage of Total State Employment	Location Quotient	Percentage of Total State Employment	Location Quotient	Percentage of Total State Employment	Location Quotient
United States	7.63	1.00	.28(d)	1.00	.23(d)	1.00
New England	9.53	1.25	.52(d)	1.87	.21(d)	.92
Connecticut	8.98	1.18	.66	2.34	.53	2.27
Maine	9.20	1.21	.13(d)	.45	.08	.35
Massachusetts	10.05	1.32	.59	2.10	.13	.57
New Hampshire	8.32	1.09	.48(d)	1.71	.02	.10
Rhode Island	10.20	1.34	.35	1.26	.08	.34
Vermont	8.91	1.17	.17	.59	(d)	.00
Middle Atlantic	8.76	1.15	.31	1.12	.61	2.60
New Jersey	7.81	1.02	.47	1.67	1.46	6.26
New York	8.42	1.10	.28	.98	.32	1.36
Pennsylvania	9.94	1.30	.27	.95	.48	2.05
East North Central	8.18	1.07	.26(d)	.92	.29	1.26
Illinois	7.76	1.02	.25	.91	.33	1.41
Indiana	7.62	1.00	.39(d)	1.40	.77	3.33
Michigan	8.22	1.08	.14	.50	.35	1.50
Ohio	8.79	1.15	.22	.80	.07	.31
Wisconsin	8.37	1.10	.40	1.44	.05	.23
West North Central	8.58	1.12	.35(d)	1.24	.19(d)	.79
Iowa	8.32	1.09	.04(d)	.13	.16	.68
Kansas	8.03	1.05	.16	.56	.12	.51
Minnesota	8.36	1.10	.76	2.72	.09	.38
Missouri	8.93	1.17	.22	.77	.35	1.51
Nebraska	7.78	1.02	.41	1.46	.23	.97
North Dakota	11.72	1.54	.05	.16	.00	.00
South Dakota	9.98	1.31	.49(d)	1.75	(d)	.00
South Atlantic	6.68	.88	.21(d)	.75	.16	.70
Delaware	6.98	.91	.82	2.91	.85	3.66
Florida	8.22	1.08	.31	1.12	.06	.25
Georgia	5.69	.75	.20	.72	.06	.25
Maryland	7.96	1.04	.12	.44	.16	.67
North Carolina	5.24	.69	.21	.73	.51	2.19
South Carolina	4.22	.55	.23	.83	.11	.49
Virginia	6.30	.83	.09	.32	.09	.40
West Virginia	9.62	1.26	.05(d)	.17	.08	.36
East South Central	7.35	.96	.16(d)	.59	.09	.37
Alabama	6.55	.86	.10(d)	.35	.00	.02
Kentucky	8.66	1.14	.15	.52	.01	.04
Mississippi	5.93	.78	.10(d)	.37	.16	.68
Tennessee	7.69	1.01	.25	.91	.17	.71
West South Central	7.34	.96	.18(d)	.65	.06	.26
Arkansas	7.95	1.04	.18(d)	.65	.02	.09
Louisiana	7.99	1.05	.02	.07	.03	.14
Oklahoma	7.26	.95	.15	.54	.02	.07
Texas	7.13	.93	.23	.80	.08	.34
Mountain	6.54	.86	.27(d)	.97	.06	.25
Arizona	6.99	.92	.11	.41	.06	.25
Colorado	6.82	.89	.46	1.65	.08	.36
Idaho	5.82	.76	.05	.17	.01	.04
Montana	9.02	1.18	.04	.15	.01	.05
Nevada	4.58	.60	.04	.15	.02	.09
New Mexico	6.48	.85	.22	.79	.03	.12
Utah	6.72	.88	.72	2.56	.11	.49
Wyoming	4.39	.58	(d)	.00	.03	.11
Pacific	6.57	.86	.34	1.22	.14	.60
Alaska	4.69	.61	.00	.00	.00	.00
California	6.46	.85	.40	1.42	.17	.75
Hawaii	5.74	.75	.01	.04	.00	.00
Oregon	7.09	.93	.19	.69	.03	.14
Washington	7.32	.96	.22	.78	.05	.21

Note: Total employment is total nonagricultural employment. SIC codes in parentheses. (d) indicates data withheld to avoid disclosing information for individual firms; thus, totals are understated. A location quotient is the ratio of an industry's share of total state employment to the industry's share of total U.S. employment.

[a]Total health-related export = medical equipment, drugs, and health insurance.

[b]Total health-related = health care services plus health-related export.

Source: U.S. Bureau of Labor Statistics, ES202; Defense Budget Project.

Table 1 (continued)

Private Health-Related Employment as a Percentage of Total Nonagricultural Employment, by State and by Region, 1991

Health Insurance (632)		Total Health-Related Export[a]		Total Health-Related[b]		Memo: Defense	
Percentage of Total State Employment	Location Quotient	Percentage of Total State Employment	Location Quotient	Percentage of Total State Employment	Location Quotient	Percentage of Total State Employment	Location Quotient
.24(d)	1.00	.75(d)	1.00	8.38(d)	1.00	4.45	1.00
.24	1.00	.98(d)	1.30	10.50(d)	1.25	5.17	1.16
.25	1.03	1.43	1.90	10.41	1.24	6.43	1.45
.23	.96	.44(d)	.58	9.64(d)	1.15	5.20	1.17
.21	.88	.93	1.24	10.98	1.31	5.13	1.15
.28	1.17	.78(d)	1.04	9.10(d)	1.09	3.33	.75
.42	1.73	.85	1.13	11.05	1.32	4.57	1.03
.13	.56	.30(d)	.40	9.21(d)	1.10	2.55	.57
.30	1.26	1.22	1.62	9.98	1.19	2.99	.67
.22	.92	2.15	2.85	9.95	1.19	3.40	.77
.28	1.15	.87	1.15	9.29	1.11	2.66	.60
.40	1.67	1.14	1.52	11.08	1.32	3.21	.72
.28	1.18	.83(d)	1.11	9.01(d)	1.07	2.59	.58
.28	1.17	.86	1.15	8.63	1.03	2.42	.54
.27	1.12	1.44(d)	1.91	9.05(d)	1.08	3.18	.71
.27	1.12	.76	1.01	8.98	1.07	2.05	.46
.20	.85	.50	.66	9.29	1.11	3.36	.76
.49	2.04	.95	1.26	9.31	1.11	1.63	.37
.37	1.53	.90(d)	1.19	9.48(d)	1.13	3.34	.75
.26	1.07	.45(d)	.60	8.77(d)	1.05	1.60	.36
.23	.96	.51	.67	8.53	1.02	4.57	1.03
.38	1.58	1.23	1.63	9.59	1.14	2.11	.47
.26	1.10	.83	1.11	9.76	1.16	4.71	1.06
1.14	4.72	1.77	2.35	9.55	1.14	3.04	.68
.46	1.92	.51	.67	12.22	1.46	5.34	1.20
.06	.23	.55(d)	.72	10.53(d)	1.26	3.35	.75
.18	.76	.56(d)	.74	7.24(d)	.86	5.95	1.34
.32	1.34	1.99	2.64	8.97	1.07	3.66	.82
.18	.76	.55	.74	8.78	1.05	3.98	.90
.08	.35	.34	.46	6.04	.72	5.24	1.18
.24	1.00	.52	.69	8.48	1.01	7.24	1.63
.11	.46	.83	1.10	6.07	.72	4.98	1.12
.33	1.37	.68	.90	4.89	.58	5.29	1.19
.19	.79	.37	.49	6.67	.80	11.81	2.65
.13	.53	.26(d)	.34	9.88(d)	1.18	1.92	.43
.24	.99	.49(d)	.65	7.84(d)	.93	3.48	.78
.22	.90	.32(d)	.42	6.87(d)	.82	3.25	.73
.19	.80	.35	.46	9.01	1.08	4.57	1.03
.18	.74	.44(d)	.58	6.37(d)	.76	5.49	1.23
.31	1.28	.73	.96	8.41	1.00	2.07	.47
.13	.53	.37(d)	.49	7.71(d)	.92	4.66	1.05
.16	.67	.36(d)	.48	8.32(d)	.99	2.82	.64
.12	.49	.17	.22	8.15	.97	4.11	.92
.17	.72	.34	.45	7.60	.91	6.17	1.39
.12	.49	.42	.56	7.55	.90	4.77	1.07
.20	.85	.53(d)	.71	7.07(d)	.84	5.09	1.14
.25	1.02	.42	.56	7.41	.88	5.27	1.18
.22	.92	.77	1.02	7.59	.91	6.28	1.41
.19	.81	.25	.33	6.07	.72	2.47	.56
.23	.95	.28	.38	9.30	1.11	2.84	.64
.11	.44	.17	.23	4.75	.57	2.38	.54
.17	.69	.41	.55	6.90	.82	6.67	1.50
.22	.90	1.05	1.39	7.77	.93	5.99	1.35
.13	.53	.15(d)	.20	4.55(d)	.54	3.79	.85
.23(d)	.94	.71(d)	.94	7.27(d)	.87	6.52	1.47
(d)	.00	.00(d)	.00	4.69(d)	.56	13.55	3.05
.22	.90	.79	1.05	7.25	.86	6.68	1.50
.28	1.17	.29	.39	6.03	.72	13.45	3.02
.30	1.23	.52	.69	7.61	.91	1.40	.31
.25	1.04	.52	.69	7.84	.93	6.14	1.38

In many ways, of course, these employment numbers do not do justice to the importance of New England's health care industries to the region. The region's world-famous teaching hospitals and medical schools form the nucleus of a high-tech cluster that attracts scholars, entrepreneurs, and research and investment money from all over the world.[12] Along with defense and other R&D-intensive activities, these industries contribute importantly to the sense of innovative dynamism by which this region defines itself and its future.

While the foregoing data underscore the importance of health care as a regional employer, from the consumer's perspective, the salient fact about New England health care is that it is the most expensive (although technically superb) medical care in the country. According to Health Care Finance Administration (HCFA) data on expenditures for hospital care, physicians' services, and prescription drugs in FY 1991, by state, New England's health care spending was 12.5 percent above the national average on a per capita basis. While Maine, New Hampshire and Vermont appear to have below average health care costs, Massachusetts has the highest per capita costs in the nation—28 percent above average (Table 2).

A word of caution is in order, however. These data should only be interpreted as rough indicators of relative health care costs for a number of reasons. First, the numbers are based on residence of provider, not on residence of recipient. Accordingly, the data are not adjusted for the impact of patients who cross state borders to obtain medical care (Levit, Lazenby, Cowan, and Letsch 1993). As is well known, hospitals in New England, particularly Massachusetts, attract patients from out of

Table 2
Selected Characteristics Affecting Relative Health Care Costs and Impact of Reform, by State and Region

Region/State	Relative Health Care Costs FY1991	Share of Nonelderly without Insurance Coverage 1992	Relative per Capita Income FY1991	Relative Pay per Worker, Total 1990	Share of Families with Income below Poverty Line 1992
United States	1.00	.17	1.00	1.00	.17
New England	1.13	.12	1.18	1.08	.12
Connecticut	1.11	.10	1.36	1.21	.09
Maine	.85	.13	.91	.86	.16
Massachusetts	1.28	.12	1.20	1.10	.12
New Hampshire	.92	.15	1.14	.96	.12
Rhode Island	1.02	.11	1.01	.92	.15
Vermont	.77	.11	.94	.85	.14
Middle Atlantic	1.10	.14	1.16	1.13	.15
New Jersey	1.01	.15	1.34	1.18	.13
New York	1.14	.16	1.18	1.20	.17
Pennsylvania	1.12	.11	1.01	.98	.15
East North Central	.97	.13	.98	1.02	.15
Illinois	.98	.15	1.09	1.09	.17
Indiana	.93	.13	.90	.93	.12
Michigan	.99	.12	.98	1.08	.16
Ohio	.99	.13	.93	.98	.14
Wisconsin	.94	.11	.94	.92	.14
West North Central	.99	.13	.94	.89	.15
Iowa	.88	.12	.91	.82	.14
Kansas	.92	.13	.96	.87	.14
Minnesota	1.05	.10	1.00	.98	.14
Missouri	1.06	.17	.94	.93	.17
Nebraska	.93	.11	.93	.79	.11
North Dakota	1.11	.11	.82	.74	.14
South Dakota	.93	.19	.84	.70	.19
South Atlantic	1.01	.20	.97	.91	.17
Delaware	1.08	.13	1.09	1.08	.11
Florida	1.09	.24	.99	.86	.19
Georgia	1.00	.22	.91	.93	.18
Maryland	1.02	.14	1.16	1.01	.14
North Carolina	.87	.16	.88	.85	.16
South Carolina	.83	.21	.81	.83	.21
Virginia	.92	.17	1.05	.94	.11
West Virginia	.96	.19	.75	.89	.23
East South Central	.96	.19	.81	.84	.21
Alabama	.98	.20	.81	.85	.19
Kentucky	.91	.17	.82	.84	.21
Mississippi	.77	.23	.70	.76	.26
Tennessee	1.07	.16	.86	.87	.20
West South Central	.93	.26	.86	.94	.20
Arkansas	.89	.24	.77	.77	.19
Louisiana	1.04	.26	.79	.89	.25
Oklahoma	.83	.26	.81	.88	.21
Texas	.93	.26	.90	.98	.18
Mountain	.87	.18	.89	.90	.16
Arizona	.91	.19	.87	.90	.18
Colorado	.96	.15	1.01	.98	.14
Idaho	.66	.19	.80	.83	.17
Montana	.77	.12	.82	.74	.15
Nevada	.94	.27	1.04	.93	.16
New Mexico	.84	.23	.77	.81	.22
Utah	.76	.13	.77	.86	.13
Wyoming	.69	.14	.89	.86	.13
Pacific	.99	.20	1.07	1.08	.18
Alaska	.96	.19	1.10	1.31	.13
California	1.02	.22	1.09	1.11	.19
Hawaii	1.01	.08	1.11	.95	.14
Oregon	.84	.16	.92	.91	.14
Washington	.90	.12	1.02	1.01	.14

Source: HCFA, Data on State Health Expenditures; U.S. Bureau of the Census, *Current Population Survey* and *County Business Patterns*; Employee Benefit Research Institute.

[12] For example, Massachusetts teaching hospitals and other research institutions received over $650 million in payments for direct research costs from the National Institutes of Health (NIH) in 1993 (Blumenthal 1994).

state and all over the world. However, adjusting for border crossing lowers Massachusetts' apparent per capita health care costs just slightly, according to the Final Report of the Task Force on the Health Care Industry of the Governor's Council on Economic Growth and Technology (Safran and Ruger 1994).[13]

More important in explaining the region's high health care costs is the fact that New England is the U.S. region with the largest fraction of its nonelderly population covered by health insurance. Health insurance coverage affects per capita health care costs because nationally the uninsured use only 58 to 64 percent as much health care as similar insured individuals (U.S. Congressional Budget Office 1993 and Sheils, Lewin, and Haught 1993). Moreover, this region also has above-average wages and the highest per capita income in the country. Because health care is labor intensive, the region's high wages feed directly into its high health care costs. In addition, the positive relationship between income and spending on health care already mentioned in an international context appears to apply across states as well. Not only do high-income people spend a higher share of their income on health care, but they also appear willing to spend more on health care for other citizens. High-income states and regions tend to have more generous Medicaid programs (measured by state Medicaid payments per capita and by share of a state's impoverished population covered by Medicaid) than do low-income regions (Little 1992).[14] A final reason for the region's high health care costs is its world-famous health care infrastructure. The region has more doctors (particularly specialists and researchers) per capita, and its citizens undergo more surgical operations and make more outpatient hospital visits per capita (and to expensive teaching hospitals to boot) than the average region (Levit, Lazenby, Cowan, and Letsch 1993).[15]

New England's high health care costs may be explained in part by the high percentage of the population covered by insurance and by the region's high per capita income.

How do these high health care costs affect the cost of doing business in New England? Probably only modestly. Although business executives sometimes complain about the competitive effects of high and rapidly rising health care costs, these expenses generally have a limited impact on their ability to compete or on their locational choices—especially over the mid to long term. Employers care about total compensation and unit labor costs, not about the cost of wages or individual benefits in isolation. Moreover, because the supply of labor does not change a lot in response to a change in real wages, employers are generally able to pass much of the increase in health insurance costs on to employees in the form of reduced real wages. Both nationally and regionally, in other words, and often with a lag, employees tend to pay for their own health insurance through reduced real wages or reduced employment.[16]

[13] An Urban Institute effort to adjust its HCFA-derived health care cost index for 26 states for the impact of border crossing, differences in insurance coverage, and uncompensated care resulted in changes of more than plus or minus 5 percentage points in six states, as compared with the unadjusted data for 1991. The biggest change, −13 percentage points, was for North Dakota. For the two New England states covered, Massachusetts' ratio fell 6 percentage points, while New Hampshire's rose 4 percentage points. (See Holahan and Liska 1994, Table 1.) Given the variance in insurance coverage across states, these results again suggest that, in most cases, the impact of border crossing is not very large.

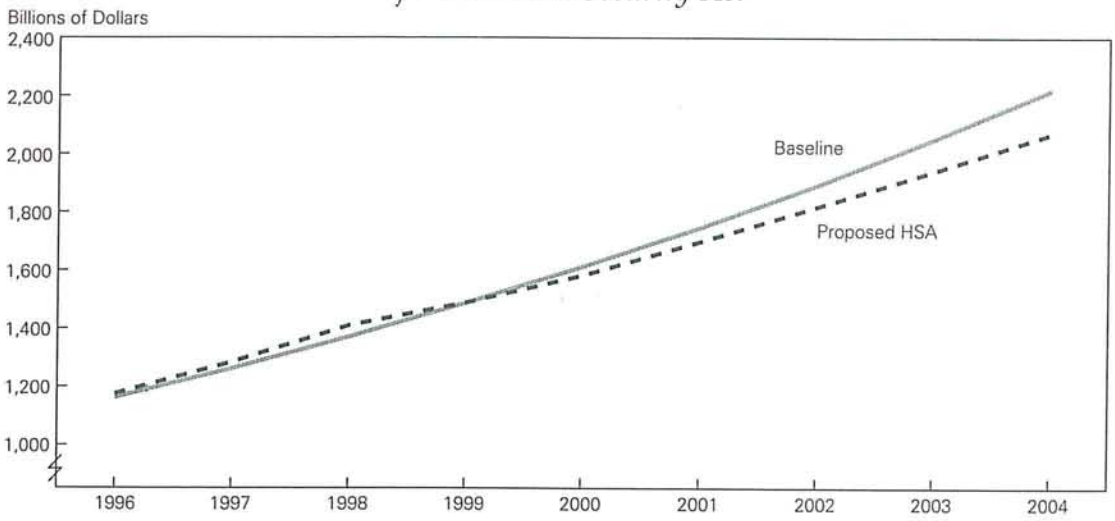
[14] The correlation between per capita personal income and per capita health care spending across states is 0.46, while the correlation between per capita income and Medicaid expenditures per capita is 0.32. In other words, the association between income and health care spending appears to be considerably weaker at the state level than internationally. But, of course, this country has developed public health care programs specifically designed to break the link between health care spending and income—Medicare and Medicaid. The correlation between state per capita income and state per capita Medicaid spending excluding the federal share (which varies inversely with income) is 0.69. Thus, the association between income and health care spending made (more largely) on state residents' initiative begins to approach international levels.

[15] In addition, while the region has a below-average number of hospital beds per capita, it records an average number of hospital admissions and an average number of inpatient days per capita. Length of stay is also average. (Levit, Lazenby, Cowan and Letsch 1993, Exhibit 8.) These data suggest that New England hospitals are achieving a better-than-average occupancy rate for hospital beds and, since above-average use of outpatient care has not brought inpatient care below the norm, above-average utilization of hospital facilities generally.

[16] In regions (unlike New England) where many people work for the minimum wage, the impact of rising health care costs may fall on employment rather than on real wages. Moreover, in periods of labor shortage, like the late 1980s in New England, the impact of rising health care costs may fall on employers or be passed through to customers.

Figure 2

National Health Expenditures Using CBO Baseline and CBO Projections for the Health Security Act



Source: Congressional Budget Office (1994).

Relative health care costs might also affect a state's competitive position through their impact on state tax rates. Health care costs feed into state budgets and tax rates through state spending on the Medicaid program. In recent years, Medicaid has been one of the largest and fastest-growing categories in most state budgets. Indeed, Medicaid has been cast as villain in state fiscal crises all across the country as citizens have faced a choice of raising taxes or cutting other desirable investments. Altogether then, if reform reduces New England's relative health care costs, the change may improve the region's competitive position to some limited extent.

IV. Impact of Reform on Regional Economies

Turning to the impact of reform on the regional economy, according to CBO analysis, with the passage of the Act, U.S. health care spending will quickly swell above CBO baseline projections[17] as universal access and other new programs, like Medicare payments for prescription drugs, begin. In time, however, the impact of cost control measures, like increased use of managed care, will prevail. As a result, the CBO projects that by the year 2004 U.S. health care spending will be $150 billion (or 7 percent) below its current baseline projections for that year, as shown in Figure 2.

It should be stressed that while the CBO foresees a slowdown in health care spending, it expects significant growth to continue, nonetheless. With the passage of the Act, U.S. health care spending is projected to rise 76 percent between 1996 and 2004, rather than 91 percent, as projected assuming no policy change. The following regional analysis is all relative to this baseline of rapidly rising national expenditures.

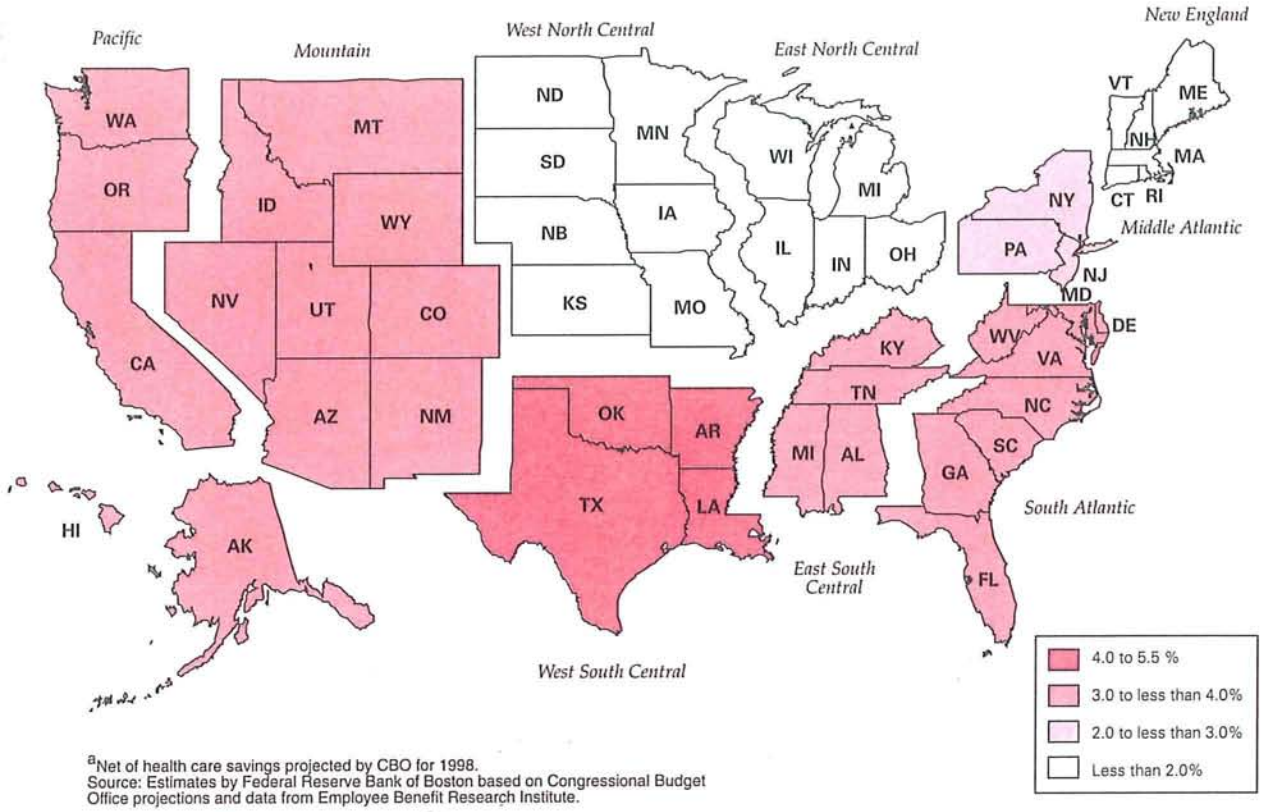
Health Care Services

Passage of the Administration proposal will produce an immediate increase in the real demand for health services in all states and regions—with a deceleration in health care spending from baseline expectations following at a later date. The relative size of the immediate increase will largely depend on the share of the state population that is currently uninsured or under-insured. The share of the non-elderly population without insurance coverage is lowest in New England, followed by the East and

[17] The CBO's baseline projections were made assuming no change in current policies and trends.

Map 1

Estimated Net[a] Increase in the Demand for Health Care due to Universal Access, by Region, 1998



[a]Net of health care savings projected by CBO for 1998.
Source: Estimates by Federal Reserve Bank of Boston based on Congressional Budget Office projections and data from Employee Benefit Research Institute.

West North Central regions (Table 2). Coverage is thinnest in the West South Central and in individual states, like Nevada, New Mexico, Mississippi, and California, scattered through the southern and western parts of the country. Accordingly, the real increase in demand for health care will be relatively great in the latter areas, while New England will most likely experience the smallest real increase in demand for health care.

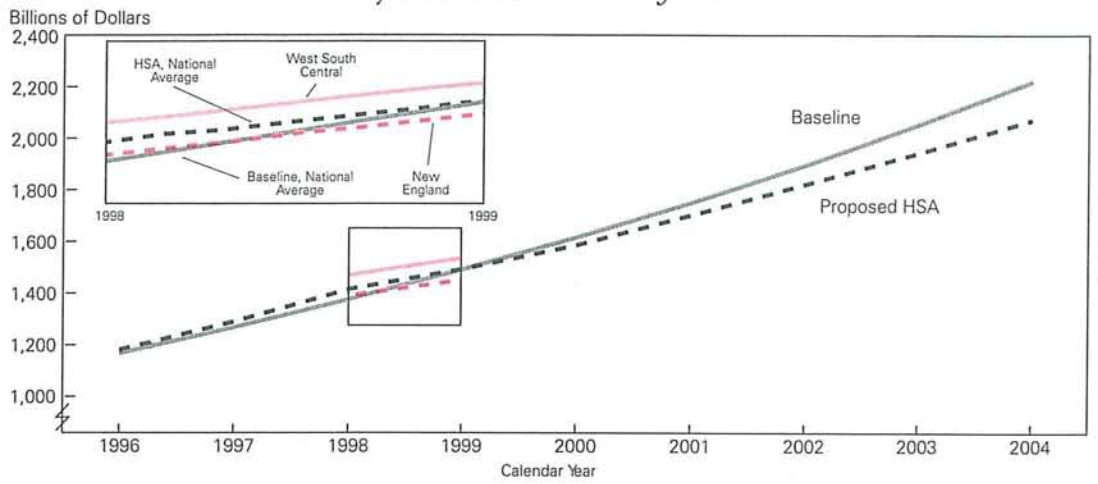
Map 1 shows a rough estimate of the initial impact of the Health Security Act on the demand for health care at the regional level, on the assumptions that the currently uninsured use just 64 percent of the health care absorbed by similar individuals with insurance coverage (U.S. Congressional Budget Office 1993) and that reform will rectify this discrepancy. Because New England has the broadest health insurance coverage of any region, its health care industries are likely to experience the smallest surge in demand—slightly less than 4 percent above current trends on a gross basis and just under 1 percent net of the health care savings the CBO projects for 1998. The East and West North Central and Mid Atlantic divisions are also likely to experience below average increases in demand for health care, while the largest gain (roughly 5.5 percent, net) will occur in the West South Central division.

Given the modest blip in demand here in New England, when increased competition and other cost control mechanisms take effect, this region's health care spending will likely be lower—relative to baseline expectations—than in the rest of the country (Figure 2A). In addition, increased emphasis on cost containment plus the likely growth of national hospital and insurance chains[18] could force New En-

[18] Not necessarily within New England. To date, some observers point out, for-profit hospital chains have made no inroads into the region.

Figure 2a

National Health Expenditures Using CBO Baseline and CBO Projections for the Health Security Act



Source: Congressional Budget Office (1994).

gland's relatively high-cost providers to bring their operations closer to national norms. Thus, New England providers may face a greater than average slowing in demand growth.

What do these developments mean for employment in New England's health care industries? As the charts in Figure 3 show, for the past several years, health care has been a powerful engine of job growth both nationally and regionally. With reform, the CBO projections suggest, health-related employment will continue to grow—but more slowly than once expected.[19] Indeed, incoming data indicate that some providers have already begun to cut employment—either in anticipation of reform or in response to the increased competition or use of managed care now occurring. Although the growth in total health service jobs shows little pause, employment in private hospital services has flattened out at the national level and in Vermont and has actually dipped in Massachusetts (Figure 4).[20] How deep are these cuts likely to go? In the case of Massachusetts, the final report of Governor Weld's Task Force projects that reducing that state's annual use of hospital bed days per capita to national average levels could lead to a 5 percent reduction in the state's hospital employment (Safran and Ruger 1994). Such layoffs would amount to about one-quarter of 1 percent of total state employment.[21] It should be remembered, however, that universal access may increase national average rates of hospital use at least slightly.

What occupational groups are likely to feel the brunt of cuts in hospital staffs? If the cuts are proportional to current staffing patterns, nurses and low-wage service workers would account for the bulk of

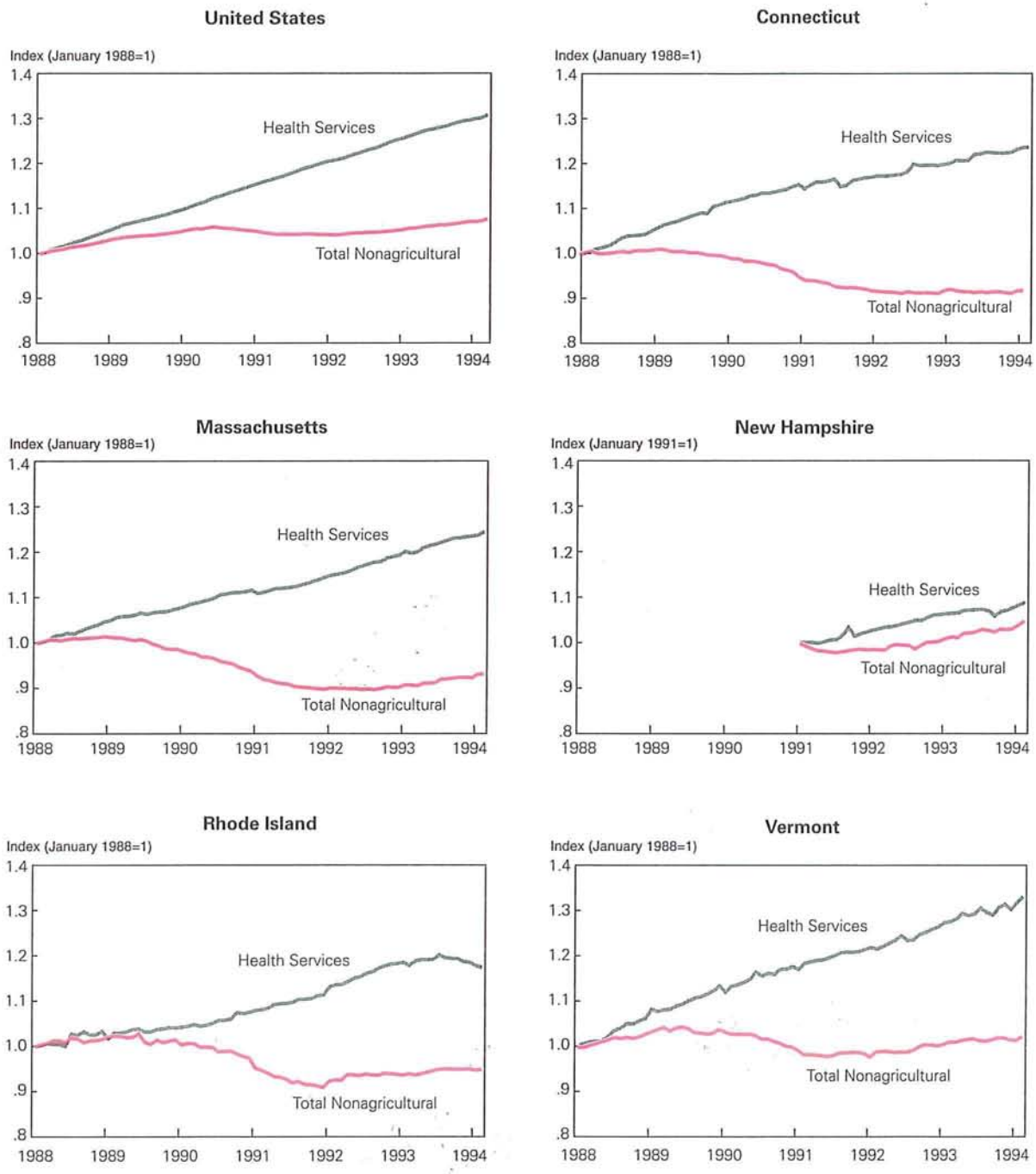
[19] In "Health Care Alternatives: Employment and Occupations in 2005," Pfleeger and Wallace (1994) project the growth in U.S. health-related employment between 1990 and 2005 assuming that real demand for the output of 10 health-related industries grows 2.0 percent annually (low-growth scenario) versus 3.2 percent annually (moderate-growth scenario), holding total GDP growth unchanged in both cases. Although the authors do not examine the impact of health reform per se, the low-growth scenario is probably applicable. Naturally, the 2 percent scenario reduces job growth in all health-related industries (except home health), as compared with the moderate-growth scenario. For example, low growth results in an increase in private hospital jobs of 13 percent over 15 years, compared to a rise of 42 percent assuming moderate growth.

[20] Moreover, employment at Massachusetts state hospitals has fallen by over 27 percent since mid-1990.

[21] The less easily achieved goal of reducing bed use to California's low level would result in layoffs amounting to about 1 percent of Massachusetts total nonagricultural employment (Safran and Ruger 1994). As will be discussed later, however, because a portion of the cuts in state health care spending represent savings for the state government and the private sector, job gains in non-health industries would offset job losses at the hospitals. The net decline in total state employment would probably be only half as great as the decline in hospital employment.

Figure 3

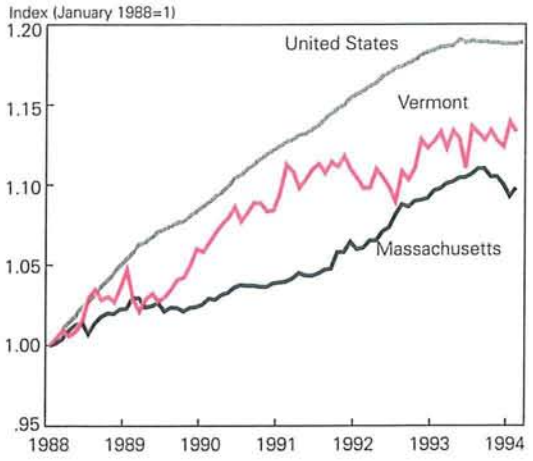
U.S. and New England Private Health Services Employment and Total Nonagricultural Employment, Seasonally Adjusted



Source: U.S. Bureau of Labor Statistics, '790 Data' Tape.

Figure 4

United States and Two New England States Private Hospital Services Employment, Seasonally Adjusted



Source: U.S. Bureau of Labor Statistics, '790 Data' Tape.

the cuts. According to American Hospital Association data, registered nurses (RNs), licensed practical nurses (LPNs) and ancillary nursing personnel account for 36 percent of all hospital employment. On a full-time-equivalent basis, physicians, administrators, and record keepers account for just 5 to 6 percent of the total, while technicians make up 15 percent. The remainder (over 40 percent) are low-skill, low-wage service workers performing the hospitals' hotel-keeping functions. Moreover, because cost control efforts will encourage a continuing shift in emphasis from inpatient to outpatient care, service workers and, to a lesser extent, nurses are likely to suffer disproportionate cuts, as compared with physicians and technicians. While increased use of state-of-the-art information systems and reduced insurance options (given a standard health care package) should permit reductions in the hospitals' administrative and record-keeping staff, the numbers involved are small.

Whatever the occupations most affected, the adjustment is unlikely to be entirely smooth, judging from previous experience.[22] However, some technical and nursing personnel might move into utilization and outcomes measurement and consulting, or into supervisory positions in home and community health. Similarly, retraining nurses to be nurse practioners might offer another useful approach to absorbing excess hospital staff and to meeting the Administration's goal of emphasizing primary rather than specialized care. Since it is not clear that the government will be able to persuade young doctors—let alone mature specialists—to serve as primary care physicians in underserved areas, increased use of nurse practitioners could be doubly rewarding. In this regard, the further development of national hospital or managed care chains may also encourage increased geographic mobility for health care professionals.

One area in which demand for health care staff, including some less skilled service workers,[23] will clearly rise is home and community care. After all, the U.S. population is aging, and one of the Health Security Act's primary initiatives is a new home and community care program for the disabled. Just as current data show a decline in employment in hospital services, they also indicate that a rapid expansion of home health employment is already under way. Recently, home health has been the fastest growing subdivision of health care services, soaring 46 percent in New England from 1990 to 1992 and accounting for over one-third of the rise in the region's total health services employment. This surge probably reflects a 1989 change in Medicare rules that permits a shift in focus for the Medicare home health benefit from short-term post-acute to long-term care (Bishop and Skwara 1993). Since news of the change in the Medicare regulations is still filtering out, it is not clear whether the current surge is a precursor of or a substitute for future growth in home health employment. Still, home health remains small in relation to hospital employment and could not quickly absorb large numbers of hospital staff.[24]

[22] With the advent of prospective payment systems for hospitals in the 1980s, administrators decided to cut costs by reducing the number of LPNs and replacing them with a smaller number of more highly trained RNs. The change contributed to a generalized shortage of RNs, while the dismissed LPNs did not find lower-paid positions and heavier case loads at long-term care institutions very attractive (Safran and Ruger 1994).

[23] Some observers fear that the less skilled service workers laid off from hospital jobs will have difficulty finding comparable jobs without significant retraining. Although nurses appear to have the most promising job prospects, most retraining programs are geared to them as well. (See Torres 1994.)

[24] If, as intended, health reform permits increased emphasis on primary and preventive care within the community, some less technically trained service workers might find a role in community outreach and health education efforts.

Other Health-Related Industries

Health-related industries, like drugs and medical equipment, that serve national markets, will also be directly affected by health care reform.[25] When drug or health insurance companies are important regional citizens (most notably in New Jersey and Delaware), they add to the area's overall dependence on health care; thus, a given change in the demand for health care nationally will have an above-average impact on their regional economies. Here in New England, the most recent available data (1991) indicate that drugs, medical equipment, and health insurance account for just under 1 percent of the region's nonfarm jobs; thus, the increase in these industries' regional employment following a 3 percent bulge in U.S. demand for health care will be barely noticeable.

Moreover, it is not entirely clear that these health-related industries will maintain their current share of total health care employment. Indeed, the national data shown in Figure 5 suggest that job growth in these industries has already slowed. To start with the equipment makers, improved access to health care is unlikely to lead to a big jump in demand for medical equipment. The U.S. health care system is already so well equipped that the move to universal access is most unlikely to lead to a spurt in capital spending. Indeed, in this ever more cost-conscious era, health care providers will be under tremendous pressure to find ways to consolidate facilities and to share existing capital equipment. Even in the area of current supplies, hospitals are beginning to consolidate purchasing and inventory management, as firms in other industries have already done. While the demand for new products that clearly reduce costs may continue strong, total demand for medical equipment will most likely grow more slowly than analysts envisioned only two years ago.

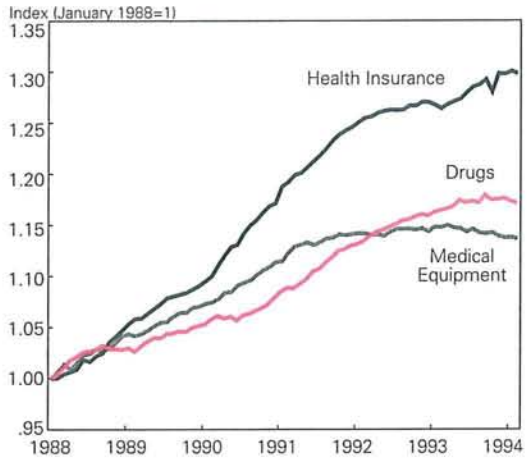
Improved access will presumably lead to an increase in the demand for pharmaceuticals, especially since the Health Security Act adds a prescription drug benefit to the Medicare program; however, the Clinton Administration also seems determined to prevent the drug companies from reaping any windfall profits. The Act contains provisions to regulate prices of drugs bought with public funds as well as prices of breakthrough drugs. In addition, the application of managed care concepts to prescription drugs is leading to mergers in the pharmaceutical industry. More particularly, the drug companies' performance on the stock markets this year suggests that the region's biotech companies will find raising money more difficult than in the recent past and that consolidation within the industry is likely.

As for insurance, the trend towards increased use of corporate self-insurance and managed care has already narrowed the scope for independent agents in the health care field. By contrast, large insurance companies have developed skills in "managing" managed care. Accordingly, they see a role for themselves in a health care system reformed according to the managed competition model. They will "manage" the managed competition, providing services to the approved health plans and the alliances. Indeed, the region's insurance companies would seem well positioned—particularly given their proximity to regional hospitals, and financial service and software companies—to develop a thriving export business in

Figure 5

U.S. Employment in Health-Related Export Industries

Seasonally Adjusted, Monthly Data



Source: U.S. Bureau of Labor Statistics, '790 Data' Tape.

[25] Some observers have suggested that regions like New England and the Mid Atlantic, where these industries loom important, will benefit disproportionately from the advent of universal access. In fact, however, because these export industries enlarge a region's health-related base, export activity per se does not magnify the impact of national changes in demand for health care on health care industries in these regions. Other things equal, a 3 percent increase in the demand for health care nationally will lead to a 3 percent increase in demand for the products of these export industries.

medical payments systems and in utilization and outcomes measurement and management. Still, it is not clear what impact the move to universal access to a standardized insurance product, as opposed to the move to managed competition, will have on the demand for exported insurance services. Informing, enrolling, and tracking the currently uninsured (who are more likely than the presently insured to be self-employed and unemployed) could require a different mix of local versus out-of-state workers.

With or without passage of reform legislation, the health care industry will clearly undergo the restructuring that many other industries have already experienced.

In sum, with or without passage of federal health reform legislation, the health care industry will clearly undergo the restructuring that many other industries have already experienced. Indeed, the national data shown in Figure 5 suggest that employment growth in these industries has already slowed. These developments should leave the industry more productive than before, but the industry will not serve as a regional engine of growth to the extent once expected.[26]

Impact on the Non-Health Sector

Turning to the non-health sector, since most New Englanders currently have insurance coverage, the move to universal access will require less adjustment here than elsewhere. Still, because the region also has the nation's highest health care costs, a federal mandate to buy health insurance could seem burdensome for some New Englanders. Because a gradual change is usually easier to digest than an abrupt one, state initiatives to increase insurance coverage ahead of national legislation are generally welcome.[27]

Who will feel the greatest impact of federal employer-worker mandates? The most affected will be low-wage workers,[28] particularly those in firms with more than 75 employees, since enterprises of this size will not be eligible for the extra subsidies available to small, low-wage firms. Because real wage developments generally offset the employer cost of insurance premiums, and because this flat per worker cost looms particularly large in relation to the lowest wages, workers on the bottom rung will bear the brunt of this real wage adjustment.[29] Furthermore, some analysts suggest that the Health Security Act will encourage the spin-off of low-wage functions, like cleaning and custodial services, into small firms entitled to the extra subsidy—with questionable effects on productivity, and, over time, thus, real income growth. Still, because low-income families will receive inflation-adjusted subsidies[30] for the family share of the premium payment, their real income, including the value of their health insurance, should rise with reform.

In the second phase of reform, once cost control efforts take hold, the slowdown in health care spending will produce savings for the non-health sector. The (gross) savings achieved within each state will be divided almost evenly between the federal government, on the one hand, and each state's governments

[26] In their low-growth scenario, Pfleeger and Wallace (1994) project job gains of 21 percent and 8 percent respectively for the medical instrument and supplies and the pharmaceutical industries, compared with 42 percent and 25 percent under the moderate-growth scenario. They project a negligible slowdown in job growth for insurance carriers and agents for the low-growth as compared with the moderate-growth scenario.

[27] On the other hand, because of the maintenance-of-effort provisions and other stipulations concerning Medicaid in the Health Security Act, state policymakers may want to be cautious about using newly extended Medicaid eligibility standards as a mechanism for achieving broader insurance coverage. Moreover, recent experience in New York state suggests that community rating without an employer or individual mandate may actually increase the number of uninsured (See Scism 1994, and, for a more positive view of New York state insurance reform, Pear 1994).

[28] At present, insurance coverage is relatively thin in agriculture, construction, retailing and nonfinancial services nationally, and firms and workers in these industries will be among those most directly affected by reform. By contrast, earnings of workers in manufacturing and other industries where health insurance benefits have been common are likely to benefit from these changes because these workers have borne the brunt of "cost-shifting" efforts, whereby providers have shifted part of the cost of serving uninsured and underinsured patients to the privately insured.

[29] Indeed, it seems possible that the somewhat puzzling growth in the apparent return to education in recent years partly reflects the disproportionate impact of increasingly costly health insurance on low wage rates (generally earned by less educated workers).

[30] The determinants of employer subsidies are not inflation adjusted; thus, the value of employer subsidies will decline over time.

and the private sector on the other.[31] Indeed, the CBO projects that state governments will save $63 billion (net of state Medicaid contributions to the alliances) in 2004 under the Health Security Act compared with their expected health care spending assuming no change from current trends. Similarly, the private sector is projected to spend $188 billion less on health care, net, in that year than it would have under baseline assumptions. Because these savings reflect reductions in projected expenditures, they will not appear as a pot of gold at the end of the health reform rainbow. Rather, these in-state savings are likely to materialize as increased real wages and reduced fiscal pressures on state governments.

This region's medical establishment will face above-average pressures to cut its way-above-average costs. Accordingly, New England will almost surely enjoy above-average savings from reform. In other regions, the savings will be less, and paying for improved access will absorb a relatively large share. Thus, workers and taxpayers in those regions will have smaller net savings to use for non-health care goals. Here in New England, assuming that we spend our savings on local goods and services with the same labor content as health care (a tall order, to be sure), roughly half of any employment loss in health care could be replaced with job gains in other industries.

Regional Income Shifts

As for the federal government, it will earn about one-third of the savings from health reform because it pays for public programs like Medicare and, on a shared basis with the states, Medicaid. In addition, as savings on health insurance allow wages and incomes to rise, the federal government will collect taxes on the increases, thus raising its share of the nation's health care savings to almost 45 percent. According to the CBO, until 2004 the federal government will use all of its savings (plus increased revenues from a rise in the tobacco tax) to pay for the premium subsidies and other new programs in the plan. The CBO projects that these (gross) subsidies will equal almost $200 billion, or roughly 2 percent of GDP, in 2004; thus, these premium payments are likely to entail a significant redistribution of income across states.

To explore the redistributional impact of reform, the authors first estimated the federal subsidy payments, by state. Each state's relative need for subsidies will reflect many characteristics, several of which were shown in Table 2. These characteristics include a state's relative health care costs, its relative wages and incomes, the size distribution of its firms, the income distribution of its population, and the number of workers per family. In addition, because the Health Security Act will require states to maintain their current level of support for health care, the relative generosity/expense of existing Medicaid programs is also a factor.[32] States with relatively generous/expensive Medicaid programs will be required to make relatively large maintenance of effort payments. In addition, a state with relatively inclusive Medicaid eligibility standards is likely to pay more per low-income resident, via its share of ongoing Medicaid obligations, than a state with exclusive eligibility requirements. For each low-income person retaining Medicaid eligibility under the Administration plan, a state will pay 25 to 50 percent of the (Medicaid) cost of insurance, depending on the state's per capita income. By contrast, if the same low-income person had never been deemed eligible for Medicaid (because the state had restrictive eligibility standards), the federal government would pay up to 100 percent of the needed subsidy under reform.

In the second phase of reform, once cost control efforts take hold, the slowdown in health care spending will produce savings for the non-health sector.

Tables 3 and 4 provide estimates of employer and family premium subsidies by state and region.[33] The authors made these estimates by applying the provisions of the Health Security Act to conditions prevail-

[31] In addition, states with health-related exports will suffer some income loss without any offsetting savings gain, because the savings from cutbacks of purchases of these products accrue to buyers in the importing state.

[32] Within limits imposed by federal legislation, the states have had considerable leeway in determining the eligibility requirements for and the benefits covered by their Medicaid program.

[33] Because the need for subsidies is determined and financing occurs at the state level, the regional numbers are not very meaningful; they are included in Tables 3 and 4 to permit abbreviated generalizations.

Table 3

Estimated Subsidies, Assuming FY1991 Variations in State Health Care Costs[a]

Millions of 1991 dollars, except where indicated

Region/State	Employer and Family Subsidies	Medicaid Maintenance-of-Effort	Net Subsidies	Per Capita (1991 Dollars): Employer and Family Subsidies	Medicaid Maintenance-of-Effort	Net Subsidies
United States[b]	80,653	−11,658	68,995	320	−46	274
New England	4,392	−937	3,455	333	−71	262
Connecticut	892	−372	521	271	−113	158
Maine	314	−70	244	254	−57	197
Massachusetts	2,512	−329	2,183	419	−55	364
New Hampshire	259	−54	205	234	−49	185
Rhode Island	306	−94	211	304	−94	211
Vermont	110	−18	91	193	−33	161
Middle Atlantic	14,084	−2,764	11,320	373	−73	300
New Jersey	1,830	−346	1,484	236	−45	191
New York	7,361	−2,036	5,325	408	−113	295
Pennsylvania	4,893	−382	4,511	409	−32	377
East North Central	11,493	−2,195	9,298	271	−52	219
Illinois	3,301	−663	2,638	286	−57	229
Indiana	1,403	−343	1,060	250	−61	189
Michigan	2,480	−319	2,161	265	−34	231
Ohio	3,057	−724	2,333	279	−66	213
Wisconsin	1,252	−145	1,107	253	−29	223
West North Central	5,993	−809	5,184	336	−45	291
Iowa	771	−97	674	276	−35	241
Kansas	646	−86	560	259	−35	224
Minnesota	1,649	−228	1,420	372	−51	320
Missouri	1,948	−306	1,641	378	−59	318
Nebraska	458	−52	407	288	−32	255
North Dakota	287	−20	267	452	−32	420
South Dakota	234	−19	215	333	−27	307
South Atlantic[c]	15,030	−1,624	13,406	338	−37	302
Delaware	223	−27	196	327	−40	288
Florida	5,379	−411	4,968	405	−31	374
Georgia	2,130	−200	1,930	322	−30	291
Maryland	1,314	−252	1,062	270	−52	218
North Carolina	1,515	−272	1,243	225	−40	185
South Carolina	781	−115	666	219	−32	187
Virginia	1,183	−236	947	188	−38	151
West Virginia	739	−51	688	410	−28	382
East South Central	5,509	−358	5,151	359	−23	336
Alabama	1,464	−77	1,387	358	−19	339
Kentucky	1,301	−91	1,210	350	−24	326
Mississippi	610	−41	569	235	−16	219
Tennessee	2,134	−149	1,985	431	−30	401
West South Central	8,589	−999	7,590	316	−37	280
Arkansas	766	−60	706	323	−25	298
Louisiana	1,895	−277	1,617	446	−65	380
Oklahoma	830	−128	702	261	−40	221
Texas	5,099	−534	4,565	294	−31	263
Mountain[d]	2,058	−313	1,745	200	−30	170
Arizona[e]	908	−29	879	242	−8	234
Colorado	800	−102	698	237	−30	207
Idaho	143	−37	106	138	−36	102
Montana	152	−15	138	189	−18	170
Nevada	327	−81	246	255	−63	192
New Mexico	417	−24	393	270	−16	254
Utah	171	−43	128	96	−24	72
Wyoming	46	−10	36	101	−22	78
Pacific	12,597	−1,630	10,967	315	−41	274
Alaska	111	−27	85	196	−47	148
California	10,689	−1,325	9,365	352	−44	308
Hawaii	254	−40	214	224	−35	188
Oregon	563	−103	459	193	−35	157
Washington	980	−135	845	195	−27	168

[a]Range from 0.66 to 1.28, where 1.00 = U.S. average (Table 2). [b]Includes District of Columbia and Arizona. [c]Includes District of Columbia. [d]Excludes Arizona. [e]Arizona does not participate in the Medicaid program; it operates an alternative program under a federal waiver.

Source: Calculated by authors using data from HCFA, diskettes with state health expenditures and Medicaid expenditures; U.S. Bureau of the Census, *Current Population Survey* and *County Business Patterns*; Congressional Budget Office (1994).

Table 4

Estimated Subsidies, Assuming a Narrowed Range of State Health Care Costs[a]

Millions of 1991 dollars, except where indicated

Region/State	Employer and Family Subsidies	Medicaid Maintenance-of-Effort	Net Subsidies	Per Capita (1991 Dollars): Employer and Family Subsidies	Per Capita (1991 Dollars): Medicaid Maintenance-of-Effort	Per Capita (1991 Dollars): Net Subsidies
United States[b]	80,162	−11,658	68,504	318	−46	272
New England	3,688	−937	2,750	279	−71	208
Connecticut	743	−372	371	226	−113	113
Maine	430	−70	361	349	−57	292
Massachusetts	1,731	−329	1,403	289	−55	234
New Hampshire	305	−54	250	276	−49	227
Rhode Island	295	−94	201	294	−94	200
Vermont	183	−18	165	323	−33	291
Middle Atlantic	12,088	−2,764	9,324	320	−73	247
New Jersey	1,812	−346	1,466	233	−45	189
New York	6,158	−2,036	4,122	341	−113	228
Pennsylvania	4,118	−382	3,736	344	−32	312
East North Central	12,131	−2,195	9,936	286	−52	234
Illinois	3,418	−663	2,755	296	−57	239
Indiana	1,646	−343	1,303	293	−61	232
Michigan	2,530	−319	2,211	270	−34	236
Ohio	3,113	−724	2,389	285	−66	218
Wisconsin	1,423	−145	1,278	287	−29	258
West North Central	6,077	−809	5,268	341	−45	296
Iowa	971	−97	874	347	−35	313
Kansas	753	−86	666	302	−35	267
Minnesota	1,528	−228	1,299	345	−51	293
Missouri	1,792	−306	1,485	347	−59	288
Nebraska	521	−52	469	327	−32	295
North Dakota	247	−20	226	388	−32	356
South Dakota	267	−19	248	379	−27	353
South Atlantic[c]	14,061	−1,624	12,437	317	−37	280
Delaware	195	−27	168	286	−40	246
Florida	4,739	−411	4,328	357	−31	326
Georgia	2,118	−200	1,918	320	−30	290
Maryland	1,265	−252	1,013	260	−52	208
North Carolina	1,956	−272	1,684	290	−40	250
South Carolina	1,098	−115	983	308	−32	276
Virginia	1,418	−236	1,181	226	−38	188
West Virginia	791	−51	740	439	−28	411
East South Central	5,899	−358	5,540	384	−23	361
Alabama	1,522	−77	1,445	372	−19	353
Kentucky	1,495	−91	1,404	403	−24	378
Mississippi	943	−41	902	364	−16	348
Tennessee	1,938	−149	1,790	391	−30	361
West South Central	9,632	−999	8,633	355	−37	318
Arkansas	926	−60	866	390	−25	365
Louisiana	1,791	−277	1,513	421	−65	356
Oklahoma	1,138	−128	1,010	358	−40	318
Texas	5,777	−534	5,243	333	−31	302
Mountain[d]	2,764	−313	2,450	269	−30	238
Arizona[e]	1,070	−29	1,041	285	−8	278
Colorado	862	−102	760	255	−30	225
Idaho	320	−37	283	308	−36	272
Montana	248	−15	233	306	−18	288
Nevada	365	−81	284	284	−63	221
New Mexico	541	−24	517	349	−16	334
Utah	320	−43	277	181	−24	157
Wyoming	108	−10	98	235	−22	213
Pacific	12,754	−1,630	11,124	319	−41	278
Alaska	120	−27	93	210	−47	163
California	10,383	−1,325	9,059	342	−44	298
Hawaii	251	−40	211	221	−35	186
Oregon	795	−103	692	272	−35	237
Washington	1,205	−135	1,069	240	−27	213

[a]Range from 0.90 to 1.10, where 1.00 = U.S. average. [b]Includes District of Columbia and Arizona. [c]Includes District of Columbia. [d]Excludes Arizona. [e]Arizona does not participate in the Medicaid program; it operates an alternative program under a federal waiver.

Source: Calculated by authors using data from HCFA, diskettes with state health expenditures and Medicaid expenditures; U.S. Bureau of the Census, *Current Population Survey* and *County Business Patterns*; Congressional Budget Office (1994).

ing in 1991 and 1992, using data obtained from the U.S. Bureau of the Census (the Current Population Survey supplemented by County Business Patterns) and from HCFA. CBO estimates of national average insurance premiums for the mandated insurance package in 1994 dollars were deflated to 1991 price levels.[34]

The estimation effort involved some assumptions that admittedly amount to short-cuts. For instance, in part because of data limitations, all firms with more than 1,000 employees (rather than the 5,000 specified in the legislation) were assumed to opt to form a corporate alliance. By contrast, the CBO estimated the share of firms nationally that would benefit by and thus choose this course. Similarly, we did not try to estimate the cost of the Act's early retirement provisions, partly in the belief that this expensive initiative is unlikely to survive the legislative process. It seems unlikely that these short-cuts would alter the thrust of the conclusions very significantly. Nevertheless, these estimates should only be regarded as preliminary and illustrative.

Tables 3 and 4 differ only in their assumptions about relative medical costs. In Table 3 the variation in state health care costs observed in FY 1992 remains unchanged with improved access. In Table 4, reform eliminates two-thirds of the current variation. (The index of relative per capita spending for hospital care, physician services, and prescription drugs for FY 1992 ranged from 0.69 to 1.28, not adjusted for border crossing. For Table 4, the range is reduced to 0.90 to 1.10.)[35] Because cross-state differences in insurance coverage, the generosity of Medicaid benefit packages, and style of medical practice undoubtedly explain much of the current variation in state health care costs, and because many of these differences will vanish with reform, the results displayed in Table 4 seem the more likely to the authors.

To start with Table 3, however—thus assuming no change in relative medical costs—all of the New England states but Massachusetts would receive below-average per capita subsidies, net the Medicaid effort payments. By contrast, Massachusetts would receive one of the highest per capita subsidies in the nation, largely because its high health care costs are even higher than its personal income.[36] Otherwise, the largest per capita subsidies would go, on average, to the East South Central and the South Atlantic regions.

On the other hand, if cross-state differences in per capita health care costs do narrow with reform, as assumed in Table 4, then the New England states would average the lowest per capita subsidies in the nation. (As states with below-average incomes, Maine and Vermont would be exceptions. If their below-average medical costs rose towards the national average, they would receive relatively big subsidies.) The largest per capita subsidies would flow, on average, to states in the East South Central and the West South Central divisions, but individual Plains, Mountain and South Atlantic states would also need relatively big subsidies.

These results reflect a fairly simple relationship. If a state's health care costs are high compared to its per capita income, the state is likely to need above-average subsidies, and vice versa. If the range of state health care costs narrows, relative income and its distribution get more weight. Thus, if New England's high medical costs are driven towards the norm, the region's high-income status dominates the results. However, the perverse impact of the Medicaid maintenance-of-effort payments also jumps out from the tables. Rhode Island pays considerably more, per capita, in effort payments than high-income New Hampshire. Similarly, low-income Louisiana makes higher per capita effort payments than higher-income Texas or even than high-income California.

As the final step in estimating the income shifts resulting from reform, the authors took as given CBO projections of how the federal government will fund its commitments under the Health Security Act in 2004. As Table 5 indicates, projected savings in the Medicaid and Medicare programs are expected to pro-

[34] CBO premium estimates are about 15 percent higher than those used by the Administration and virtually identical to those used by Lewin-VHI, Inc. (See U.S. CBO (1994, pages 30 and 36), and Lewin-VHI, Inc. (1993, Table 4, page 25). The CBO estimates shown are for 1994; the Lewin estimates in Table 4 are for 1998.) An analysis by the American Academy of Actuaries (reported by Telerate Matrix on April 21, 1994, page 31795) concludes that the premium targets prepared by the Clinton Administration may be underestimated by as much as 20 percent.

[35] Lewin-VHI, Inc. (1993, page 25) shows estimates of regional premium costs that range from 4 percent above to 10 percent below the national average in 1998.

[36] Massachusetts ranks seventh by size of estimated per capita subsidy. The other six states are North Dakota, Tennessee, West Virginia, Louisiana, Pennsylvania and Florida. Holahan and Liska's study (1994) also finds that all of these states (except Tennessee) will receive above-average subsidies, net of Medicaid maintenance-of-effort payments. Among the 26 states covered in their study, North Dakota, West Virginia and Massachusetts top the list. Holahan and Liska's estimates include subsidies for early retirees, which the estimates in this study do not. In addition, Holahan and Liska adjusted HCFA's state health care expenditure data for border crossing, insurance coverage, and uncompensated care but apparently did not use the County Business Pattern data on the distribution of firms, employment, and payroll by firm size to adjust the Current Population Survey data.

Table 5
CBO Estimates of Federal Outlays and Sources of Funds by Major Category, 2004
Billions of 2004 Dollars

Outlays	
Subsidies	$173
Drug benefit	28
Long-term care	40
Total, Outlays	$241
Revenues	
Medicare	
Employed beneficiary savings	$ 10
Program savings	77
Medicaid	
Discontinued coverage	48
Premium limits	45
Income and payroll tax	34
Tobacco tax	10
Department of Defense	4
Federal employees health benefits	8
Department of Veterans Affairs	5
Total, Revenues	$241

Source: Congressional Budget Office (1994).

vide the bulk of the funds required for the employer and family subsidies, the major item on the expenditure side of the ledger. The authors allocated the federal expenditures and receipts shown in Table 5 to states by criteria applicable in 1991–92.[37] For example, each state's contribution to federal savings in the ongoing part of Medicaid was determined by its share of federal Medicaid spending for nonelderly cash recipients in FY 1992. Premium subsidies were distributed according to our estimates in Tables 3 and 4.

Table 6 shows the results. Columns 1 to 3 assume current differences in state health care costs, while columns 4 to 6 assume that these differences narrow. As the table shows, health reform is likely to shift income from the Mid-Atlantic, East North Central, and New England regions to the rest of the country. If current differences in health care costs remain, Massachusetts would be the one New England state to receive a small net gain in income.

But, assuming a substantial reduction in cost differences, Massachusetts joins Connecticut, Maine, Rhode Island, and most of the Mid-Atlantic and East North Central states (plus a handful of other generally high-income states) in subsidizing health care for low-income people throughout the country. The regions likely to enjoy the largest income gains are the states of the East South Central and West North Central districts. It should be stressed, of course, that these transfers are in 2004 dollars and do not reflect tax increases; rather they are largely funds that would have been spent in one region (on Medicaid and Medicare) in the absence of reform but which, with passage of the Health Security Act, are likely to be spent on health insurance subsidies in another.

Columns 3 and 6 show state and regional average net contributions to health care reform, in dollars per thousand dollars of state personal income (projected to 2004 according to national trends for 1975 to 1993). As the table shows, the estimated transfer averages 0.3 to 0.7 percent of New England's regional income, while in Connecticut, Rhode Island and Maine (under different assumptions), the transfer could amount to more than 1 percent of state income. The associated job loss (from levels that would have occurred in the absence of reform) could approach projected defense-related layoffs in all of the New England states but Massachusetts and New Hampshire (Kosiak and Bitzinger 1993 and Kodrzycki 1994).[38] Potential income redistributions of this size warrant the notice of state planning officials.

Comparing the results for Rhode Island and New Hampshire again highlights the perverse effect of building on today's Medicaid program. New Hampshire enjoys a higher average per capita income than Rhode Island, yet Rhode Island is likely to suffer a larger loss of state income. And Louisiana, one of the country's lowest-income states, may wind up making a larger contribution to financing health reform nationally than either Texas or high-income California. As Figure 6 showing the relationship between per capita personal income and Medicaid spending per capita indicates, Louisiana, Rhode Island, and New York have all spent much more per capita on Medicaid than other states with similar income. By contrast, New Hampshire, Texas, California, and New Jersey are among the states spending less per capita on Medicaid than might be expected given their income. Clearly, building health reform on the remnants of the current Medicaid program has an adverse impact on the generous/profligate states.

[37] Appendix Tables 1 and 2 show these federal sources and uses of funds by state on a per capita basis under the alternative assumptions that state differences in health care costs 1) remain unchanged and 2) narrow significantly with reform.

[38] In Rhode Island the income redistribution associated with reform could lead to prospective job losses surpassing projected defense-related layoffs.

Table 6

Estimates of Net Income Shifts Accompanying Health Care Reform, 2004 (in 2004 Dollars)

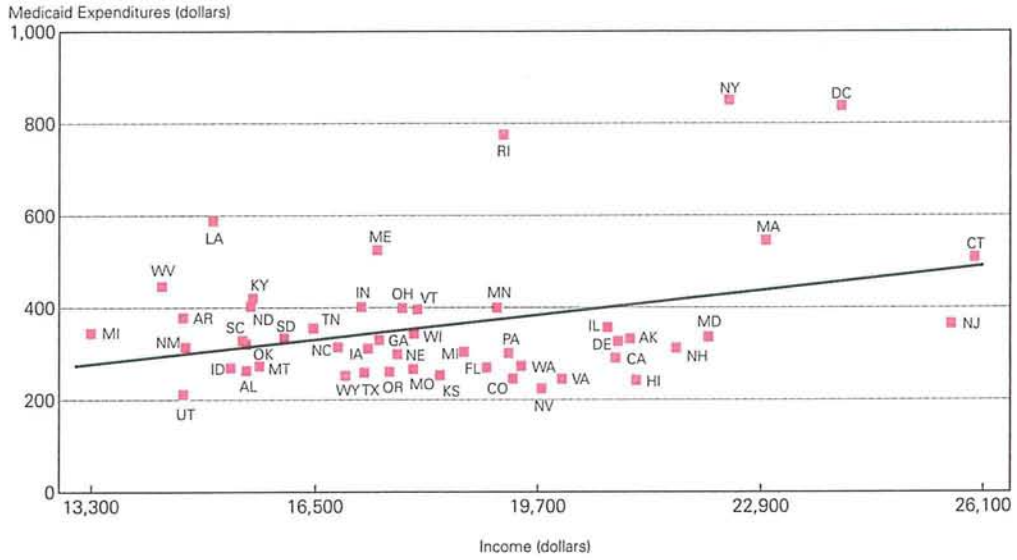
Region/State	Assuming FY1991 Variations in State Health Care Costs[a]			Assuming a Narrowed Range of State Health Care Costs[b]		
	Net Gain (Loss) from Health Care Reform (Billions of $) (1)	Per Capita (Dollars) (2)	Per $1,000 of Personal Income (Dollars) (3)	Net Gain (Loss) from Health Care Reform (Billions of $) (4)	Per Capita (Dollars) (5)	Per $1,000 of Personal Income (Dollars) (6)
United States[c]	0	0	0	0	0	0
New England	−1.625	−134	−3.4	−3.342	−276	−7.0
Connecticut	−1.293	−428	−9.4	−1.661	−550	−12.1
Maine	−.358	−316	−10.3	−.058	−51	−1.7
Massachusetts	.679	123	3.1	−1.252	−228	−5.6
New Hampshire	−.115	−114	−3.0	.004	4	.1
Rhode Island	−.415	−451	−13.4	−.438	−476	−14.1
Vermont	−.123	−237	−7.5	.064	124	3.9
Middle Atlantic	−3.478	−100	−2.6	−8.315	−240	−6.2
New Jersey	−1.648	−231	−5.1	−1.667	−234	−5.2
New York	−5.535	−334	−8.5	−8.478	−512	−13.0
Pennsylvania	3.706	338	10.0	1.830	167	4.9
East North Central	−5.698	−146	−4.5	−3.921	−101	−3.1
Illinois	−1.267	−120	−3.3	−.923	−87	−2.4
Indiana	−1.558	−303	−10.0	−.925	−180	−6.0
Michigan	−.529	−62	−1.9	−.364	−42	−1.3
Ohio	−2.394	−239	−7.6	−2.211	−220	−7.1
Wisconsin	.050	11	.3	.502	110	3.5
West North Central	2.396	147	4.6	2.701	165	5.2
Iowa	.013	5	.2	.529	206	6.8
Kansas	−.054	−23	−.7	.225	99	3.1
Minnesota	1.103	271	8.1	.823	202	6.0
Missouri	.816	172	5.5	.451	95	3.0
Nebraska	.177	121	3.9	.342	234	7.5
North Dakota	.242	415	15.2	.145	248	9.1
South Dakota	.100	154	5.5	.186	288	10.2
South Atlantic[d]	3.883	95	2.9	1.677	41	1.3
Delaware	.049	78	2.1	−.018	−29	−.8
Florida	5.149	423	12.7	3.622	297	8.9
Georgia	.350	58	1.9	.354	58	1.9
Maryland	−1.382	−310	−8.0	−1.486	−333	−8.6
North Carolina	−1.252	−203	−6.9	−.115	−19	−.6
South Carolina	−.896	−274	−10.1	−.085	−26	−1.0
Virginia	−1.725	−299	−8.5	−1.117	−194	−5.5
West Virginia	.194	118	4.7	.337	204	8.1
East South Central	1.554	110	4.1	2.631	187	6.9
Alabama	.875	233	8.6	1.046	279	10.2
Kentucky	−.183	−54	−2.0	.329	96	3.5
Mississippi	−.366	−154	−6.6	.486	204	8.7
Tennessee	1.227	270	9.3	.770	169	5.9
West South Central	−.686	−28	−1.0	2.084	84	2.9
Arkansas	−.011	−5	−.2	.406	187	7.3
Louisiana	−1.437	−368	−13.9	−1.671	−428	−16.2
Oklahoma	−.450	−154	−5.7	.341	117	4.3
Texas	1.212	76	2.5	3.008	189	6.3
Mountain[e]	−1.549	−164	−5.5	.264	28	.9
Arizona[f]	.897	261	9.0	1.321	384	13.2
Colorado	−.001	−0	−.0	.167	54	1.6
Idaho	−.357	−374	−13.9	.092	96	3.6
Montana	−.124	−167	−6.1	.119	161	5.8
Nevada	−.133	−113	−3.3	−.035	−30	−.9
New Mexico	−.076	−54	−2.1	.242	171	6.6
Utah	−.655	−403	−15.7	−.275	−169	−6.6
Wyoming	−.203	−481	−16.2	−.046	−110	−3.7
Pacific	4.306	117	3.3	4.899	133	3.7
Alaska	−.250	−479	−13.0	−.228	−436	−11.8
California	5.728	206	5.6	5.124	184	5.0
Hawaii	−.096	−93	−2.5	−.100	−96	−2.6
Oregon	−.385	−143	−4.6	.211	79	2.5
Washington	−.691	−150	−4.4	−.109	−24	−.7

[a]Range from 0.66 to 1.28, where 1.00 = U.S. average (Table 2). [b]Range from 0.90 to 1.10, where 1.00 = U.S. average. [c]Includes District of Columbia and Arizona. [d]Includes District of Columbia. [e]Excludes Arizona. [f]Arizona does not participate in the Medicaid program; it operates an alternative program under a federal waiver.

Source: Calculated by authors using data from HCFA, diskettes with state health expenditures and Medicaid expenditures; U.S. Bureau of the Census, *Current Population Survey*, and *Population Projections for the United States*; Internal Revenue Service, *Statistics of Income Bulletin*; U.S. Department of Defense, *Atlas/Data Abstract for the United States and Selected Areas*; The Tobacco Institute, *The Tax Burden on Tobacco*; Congressional Budget Office (1994).

Figure 6

Medicaid Expenditures and Income per Capita by State, 1991



Source: U.S. Health Care Financing Administration, data diskette.

But why retain Medicaid for AFDC and SSI beneficiaries once reform is in place? Why should AFDC and SSI recipients be treated differently from other low-income individuals? And why should states that are particularly successful in slowing medical inflation under reform be required to make maintenance-of-effort payments on the basis of previous spending patterns? Obviously, retaining elements of Medicaid provides a way to maintain the states' role in financing health care. An alternative approach might assign responsibility for financing a (fairly large) share of the employer and family subsidies to the states, with each individual state's share of the total determined by its relative per capita income.

The results shown in Table 6—a not insignificant transfer of income from high-income regions with relatively generous/expensive public health care programs to low-income regions with relatively low-cost public programs—are hardly surprising. Indeed, except for the unnecessarily perverse impact of the provisions concerning Medicaid, similar results would probably occur under almost any viable reform program.[39] After all, funds to pay for health care for citizens who cannot afford to pay for themselves can only come from relatively high-income individuals, whether the direct source is the income tax, a payroll tax, a consumption tax, or cuts in existing publicly funded health care programs. As it turns out, per capita income, pay, nonfood retail sales, health care spending, and Medicaid spending tend to be quite highly correlated across states.

It would appear, thus, that the federal initiatives required by almost any health reform proposal will result in a shift of economic resources and activity away from New England and the rest of the Northeast. Accordingly, it becomes important to this region how state governments and the private sector here and elsewhere spend their share of the savings accruing from health care reform. In particular, state governments will want to invest the savings in ways that strengthen the region's economic base.

Americans are demanding health care reform in part because they have concerns about devoting a

[39] An earlier exercise by the authors, undertaken before the Health Security Act was filed, assumed that health reform would be financed by a payroll tax or a combination of income tax increases and a value-added tax (VAT). That effort also suggested that New England and the Mid Atlantic would subsidize health reform in the East and West South Central and the West North Central states.

disproportionately large share of national income to health care without getting good value for their money. Accordingly, they must believe that health care spending is crowding out other worthwhile investments like education, basic research in a variety of disciplines, and public infrastructure. New England has a comparative advantage in several of these activities. Thus, the ultimate impact of health care reform on New England depends on how we spend the savings we obtain. Because the "health reform dividend" will generally materialize as higher real wages and reduced state fiscal pressures, it will be as state taxpayers and policymakers that we will make most of the choices that will determine whether the region will recoup the income losses stemming from reform.

V. Conclusion

According to the CBO, the Health Security Act will result in a short-term swell in the demand for health care, followed by a modest slowdown in the growth in health care spending from previously projected rates. Because New England has the best insurance coverage in the country, the region's health care industry is likely to experience the nation's smallest rise in the demand for medical care. Given the nation's increased emphasis on controlling health care costs, the region's medical equipment and biotech industries are also unlikely to make significant gains from the advent of universal access. On the other hand, the move to employer-worker mandates should require fewer adjustments in New England than elsewhere in the country.[40]

Over the longer term, New England's relatively expensive health care industries are likely to experience above-average pressures to cut costs— whether these pressures stem from national legislation or from private sector developments already under way.[41] The flip side, of course, is that the health care sector's loss represents a gain to health care purchasers in the private sector and elsewhere. To the extent that New England's health care industries manage to achieve above-average cost reductions, New England state governments and New Englanders in the private sector will enjoy about half the savings.

And, there of course is the rub because, according to estimates made for this article, New England's contribution to the increase in federal revenues and program savings associated with health reform will be considerably larger than the region's receipt of federal monies for premium subsidies and other new health care programs.[42] Although the outcome varies considerably by state, and, importantly, according to the assumptions made concerning the behavior of cross-state differences in health care costs, the redistribution involved could equal over 1 percent of a state's personal income. This general conclusion pertains whether or not cross-state differences in health care costs are assumed to narrow with universal access, but it is reinforced in the likely event that reform does encourage some convergence.

The conclusion that New England and the rest of the Northeast will make net contributions to health care reform in other parts of the country is hardly surprising; it reflects the region's status as a high-income, high-pay area with relatively generous/expensive Medicaid and Medicare programs.[43] If additional deficit spending is ruled out, and cutting unrelated federal spending is difficult, funding for new health care programs can only come from individuals with money in their pockets or from cuts in public health care programs. Given the political realities of the day and the positive association between per capita income, pay, consumption, and health care spending, any reform program that involves subsidizing low-income families' health insurance will require a redistribution of income from the Northeast to less wealthy regions, especially those where health care costs are high relative to income.

Antithetical in many ways, the defense and health care industries have some things in common. After all, who could lament the end of the Cold War and the opportunity to cut defense spending? Yet the negative consequences for the New England economy are evident. Similarly, providing all U.S. citizens with access to appropriate health care and reducing inefficiencies in our health care system are important goals. Yet the employment consequences for New England could be significant. Although actual layoffs

[40] Likewise, the region may also experience relatively little disruption from the increased emphasis on managed care, since HMO participation is already high in New England.

[41] Of course, Maine, New Hampshire and Vermont have below-average health care costs, but the regional average is dominated by costs in the southern states.

[42] Some health reform bills currently before the Congress increase federal funding for medical education and research. Increased federal spending for these purposes would benefit New England and could help to offset the income shifts required for the premium subsidies.

[43] Nor, according to some observers, is this outcome entirely inappropriate, particularly since citizens in some lower-income states have probably made net contributions to funding this region's costly Medicaid programs in years past.

"feel" different from the loss of jobs that fail to materialize in the future, over time the impact is similar.

In a dynamic sense, moreover, reform could affect the region by reducing incentives to invest in health-related research. Even with some funding for basic research guaranteed, the returns on successful new products are likely to appear smaller than expected not long ago.[44] Historically—in defense, computers, communications, and health—this region has depended on a nexus of educational institutions and entrepreneurs performing the basic and applied research that spawns important new products. As other regions trying to mimic New England's success in this regard have found to their chagrin, the development of such dynamic networks is a cumulative process (Rosegrant and Lampe 1992). Thus, the continued health of the region's innovative clusters must remain a major goal for New England's leaders.

It is especially important to this region, then, that we "keep our eyes on the prize"—the savings that health reform promises over the long term. Although the regional income shifts linked to reform may slow growth in New England relative to other parts of the country, within the decade health reform will provide net savings to the nation. As part of the nation, New England will benefit from the additional investment and growth these savings permit. Recognizing the challenges in store, New England leaders and taxpayers must use our share of these savings in ways that promote the economic vitality of the region.

[44] Hopefully, the biotech industry may also have reached a point where new products can be developed more efficiently and at less cost.

Note: A technical appendix will be available in the fall on request to the Research Library—D, Federal Reserve Bank of Boston, P.O. Box 2076, Boston, MA 02106-2076.

Appendix Table 1

Estimated Federal Outlays and Revenues in 2004, Assuming FY1991 Variations in State Health Care Costs[a]

Billions of 2004 Dollars

	Outlays				Revenues	
Region/State	Subsidies	Drug Benefit	Long-Term Care	Total	Medicare, Employed Beneficiary Savings	Medicare, Program Savings
United States[b]	173.000	28.000	40.000	241.000	10.000	77.000
New England	8.663	1.577	2.303	12.542	.571	4.401
Connecticut	1.306	.398	.591	2.295	.134	1.094
Maine	.611	.146	.246	1.003	.054	.340
Massachusetts	5.473	.727	1.008	7.208	.270	2.232
New Hampshire	.513	.113	.152	.778	.049	.261
Rhode Island	.530	.134	.206	.870	.034	.343
Vermont	.229	.059	.101	.389	.031	.131
Middle Atlantic	28.385	4.635	6.770	39.790	1.580	14.386
New Jersey	3.720	.918	1.298	5.936	.302	2.504
New York	13.352	2.078	2.970	18.400	.681	6.756
Pennsylvania	11.312	1.638	2.503	15.453	.598	5.126
East North Central	23.314	4.743	6.662	34.719	1.534	13.627
Illinois	6.614	1.277	1.816	9.706	.444	3.612
Indiana	2.657	.624	.956	4.238	.148	1.625
Michigan	5.418	.996	1.391	7.805	.280	3.140
Ohio	5.849	1.263	1.708	8.820	.387	3.891
Wisconsin	2.776	.583	.792	4.150	.275	1.359
West North Central	12.999	2.186	2.755	17.940	.823	5.153
Iowa	1.690	.380	.485	2.556	.184	.845
Kansas	1.404	.305	.336	2.045	.141	.763
Minnesota	3.561	.489	.554	4.604	.186	.985
Missouri	4.115	.640	.841	5.597	.160	1.762
Nebraska	1.020	.198	.279	1.497	.078	.415
North Dakota	.668	.081	.130	.880	.026	.191
South Dakota	.540	.092	.129	.761	.048	.191
South Atlantic[c]	33.614	5.270	7.391	46.275	1.835	13.820
Delaware	.490	.073	.091	.655	.025	.206
Florida	12.456	2.144	3.350	17.950	.636	5.514
Georgia	4.839	.589	.922	6.350	.263	1.690
Maryland	2.662	.467	.582	3.711	.207	1.519
North Carolina	3.117	.728	1.062	4.907	.351	1.702
South Carolina	1.670	.359	.336	2.366	.101	.791
Virginia	2.375	.601	.589	3.566	.187	1.529
West Virginia	1.725	.239	.379	2.343	.048	.620
East South Central	12.915	1.722	2.590	17.227	.613	4.887
Alabama	3.477	.466	.638	4.581	.112	1.387
Kentucky	3.034	.416	.657	4.107	.165	1.176
Mississippi	1.426	.285	.453	2.165	.079	.754
Tennessee	4.977	.555	.842	6.374	.256	1.571
West South Central	19.032	2.657	3.832	25.521	1.003	7.570
Arkansas	1.770	.311	.448	2.530	.117	.821
Louisiana	4.056	.418	.591	5.065	.146	1.491
Oklahoma	1.760	.379	.526	2.665	.104	.972
Texas	11.446	1.548	2.267	15.261	.635	4.287
Mountain[d]	4.374	.954	1.364	6.693	.418	2.162
Arizona[e]	2.204	.438	.681	3.323	.199	1.121
Colorado	1.750	.300	.479	2.529	.138	.680
Idaho	.265	.109	.160	.534	.056	.225
Montana	.345	.095	.132	.572	.049	.225
Nevada	.618	.122	.154	.893	.034	.311
New Mexico	.986	.148	.199	1.333	.051	.332
Utah	.320	.137	.188	.645	.054	.285
Wyoming	.090	.043	.053	.186	.035	.103
Pacific	27.500	3.819	5.651	36.970	1.424	9.873
Alaska	.212	.021	.023	.256	.009	.061
California	23.481	2.810	4.289	30.581	1.016	7.752
Hawaii	.536	.114	.160	.810	.053	.191
Oregon	1.152	.354	.463	1.969	.112	.676
Washington	2.119	.520	.716	3.355	.233	1.193

[a]Range from 0.66 to 1.28, where 1.00 = U.S. average (Table 2). [b]Includes District of Columbia and Arizona. [c]Includes District of Columbia. [d]Excludes Arizona. [e]Arizona does not participate in the Medicaid program; it operates an alternative program under a federal waiver.

Source: Calculated by authors using data from HCFA, diskettes with state health expenditures and Medicaid expenditures; U.S. Bureau of the Census, *Current Population Survey*; Internal Revenue Service, *Statistics of Income Bulletin*; U.S. Department of Defense, *Atlas/Data Abstract for the United States and Selected Areas*; The Tobacco Institute, *The Tax Burden on Tobacco*; Congressional Budget Office (1994).

Appendix Table 1 continued

Estimated Federal Outlays and Revenues in 2004, Assuming FY1991 Variations in State Health Care Costs[a]

Billions of 2004 Dollars

Revenues							
Medicaid, Discontinued Coverage	Medicaid, Premium Limits	Income and Payroll Tax	Tobacco Tax	Department of Defense	Federal Employees Health Benefits	Department of Veterans Affairs	Total
48.000	45.000	34.000	10.000	4.000	8.000	5.000	241.000
3.069	2.650	2.235	.571	.100	.324	.246	14.167
1.122	.224	.732	.129	.021	.076	.054	3.587
.367	.315	.129	.058	.025	.048	.026	1.361
.993	1.511	1.002	.246	.035	.130	.109	6.529
.164	.114	.171	.068	.003	.038	.026	.893
.331	.350	.134	.044	.015	.015	.019	1.285
.091	.136	.067	.027	.001	.016	.013	.512
8.702	9.001	6.126	1.585	.245	.938	.704	43.267
1.046	1.427	1.532	.356	.065	.211	.142	7.584
6.150	5.846	2.992	.781	.079	.362	.289	23.936
1.506	1.728	1.603	.449	.102	.364	.273	11.748
8.792	7.148	5.640	1.722	.261	.855	.840	40.418
2.004	2.104	1.814	.432	.093	.262	.207	10.973
1.782	1.053	.666	.251	.040	.118	.113	5.796
1.141	1.790	1.232	.398	.033	.136	.185	8.334
3.219	1.375	1.334	.453	.086	.238	.229	11.214
.646	.825	.594	.188	.008	.101	.105	4.100
3.577	2.229	2.112	.692	.191	.409	.359	15.544
.508	.489	.307	.109	.004	.046	.052	2.543
.351	.292	.306	.089	.053	.053	.050	2.099
.791	.647	.579	.175	.007	.041	.089	3.501
1.378	.323	.603	.216	.064	.166	.109	4.781
.262	.223	.182	.057	.027	.045	.031	1.320
.144	.130	.063	.022	.022	.027	.012	.638
.143	.125	.070	.025	.014	.030	.015	.662
7.254	7.409	5.758	1.856	1.296	2.191	.972	42.392
.082	.113	.103	.036	.012	.016	.015	.606
1.485	1.865	1.862	.616	.203	.290	.330	12.801
.960	1.479	.776	.259	.186	.257	.130	6.000
.761	.746	.799	.174	.138	.653	.097	5.094
1.639	.967	.726	.287	.212	.142	.133	6.159
.921	.702	.338	.139	.107	.088	.075	3.262
.713	.630	.890	.253	.376	.570	.144	5.291
.514	.640	.155	.074	.004	.052	.042	2.148
2.840	4.095	1.474	.700	.250	.504	.310	15.673
.624	.711	.394	.169	.083	.143	.083	3.706
.741	1.366	.351	.216	.093	.105	.077	4.290
.494	.734	.187	.100	.044	.090	.049	2.530
.980	1.284	.542	.216	.030	.166	.101	5.147
6.687	5.041	3.081	1.038	.490	.808	.490	26.206
.546	.623	.195	.103	.021	.066	.048	2.540
2.446	1.595	.396	.173	.058	.133	.064	6.502
.885	.454	.313	.113	.095	.112	.067	3.115
2.809	2.369	2.177	.648	.316	.496	.310	14.049
1.688	1.515	1.189	.334	.242	.470	.224	8.242
.140	.163	.404	.124	.060	.125	.089	2.426
.357	.460	.453	.110	.098	.155	.079	2.530
.316	.099	.097	.035	.012	.030	.022	.891
.113	.128	.074	.026	.011	.053	.018	.696
.245	.075	.210	.071	.019	.029	.034	1.027
.202	.474	.137	.039	.047	.092	.035	1.409
.388	.210	.160	.038	.048	.089	.026	1.299
.067	.071	.057	.016	.009	.022	.010	.389
5.252	5.750	5.981	1.377	.864	1.375	.768	32.664
.081	.108	.108	.027	.051	.050	.011	.506
4.001	4.410	4.600	1.034	.564	.938	.536	24.853
.142	.089	.179	.024	.119	.088	.021	.907
.544	.369	.339	.117	.007	.111	.078	2.353
.483	.774	.756	.175	.123	.188	.121	4.046

Appendix Table 2

Estimated Federal Outlays and Revenues in 2004, Assuming a Narrowed Range of State Health Care Costs[a]

Billions of 2004 Dollars

	Outlays				Revenues	
Region/State	Subsidies	Drug Benefit	Long-Term Care	Total	Medicare, Employed Beneficiary Savings	Medicare, Program Savings
United States[b]	173.000	28.000	40.000	241.000	10.000	77.000
New England	6.946	1.577	2.303	10.826	.571	4.401
Connecticut	.937	.398	.591	1.926	.134	1.094
Maine	.911	.146	.246	1.303	.054	.340
Massachusetts	3.542	.727	1.008	5.276	.270	2.232
New Hampshire	.632	.113	.152	.897	.049	.261
Rhode Island	.507	.134	.206	.847	.034	.343
Vermont	.416	.059	.101	.576	.031	.131
Middle Atlantic	23.548	4.635	6.770	34.952	1.580	14.386
New Jersey	3.702	.918	1.298	5.917	.302	2.504
New York	10.410	2.078	2.970	15.458	.681	6.756
Pennsylvania	9.436	1.638	2.503	13.577	.598	5.126
East North Central	25.092	4.743	6.662	36.497	1.534	13.627
Illinois	6.957	1.277	1.816	10.050	.444	3.612
Indiana	3.291	.624	.956	4.871	.148	1.625
Michigan	5.583	.996	1.391	7.970	.280	3.140
Ohio	6.033	1.263	1.708	9.003	.387	3.891
Wisconsin	3.228	.583	.792	4.602	.275	1.359
West North Central	13.304	2.186	2.755	18.245	.823	5.153
Iowa	2.207	.380	.485	3.072	.184	.845
Kansas	1.683	.305	.336	2.324	.141	.763
Minnesota	3.281	.489	.554	4.324	.186	.985
Missouri	3.751	.640	.841	5.232	.160	1.762
Nebraska	1.185	.198	.279	1.662	.078	.415
North Dakota	.571	.081	.130	.783	.026	.191
South Dakota	.626	.092	.129	.847	.048	.191
South Atlantic[c]	31.409	5.270	7.391	44.069	1.835	13.820
Delaware	.423	.073	.091	.588	.025	.206
Florida	10.929	2.144	3.350	16.424	.636	5.514
Georgia	4.844	.589	.922	6.355	.263	1.690
Maryland	2.559	.467	.582	3.608	.207	1.519
North Carolina	4.254	.728	1.062	6.044	.351	1.702
South Carolina	2.481	.359	.336	3.177	.101	.791
Virginia	2.984	.601	.589	4.174	.187	1.529
West Virginia	1.868	.239	.379	2.486	.048	.620
East South Central	13.991	1.722	2.590	18.304	.613	4.887
Alabama	3.648	.466	.638	4.752	.112	1.387
Kentucky	3.546	.416	.657	4.619	.165	1.176
Mississippi	2.278	.285	.453	3.016	.079	.754
Tennessee	4.520	.555	.842	5.917	.256	1.571
West South Central	21.802	2.657	3.832	28.290	1.003	7.570
Arkansas	2.187	.311	.448	2.947	.117	.821
Louisiana	3.821	.418	.591	4.830	.146	1.491
Oklahoma	2.552	.379	.526	3.457	.104	.972
Texas	13.241	1.548	2.267	17.057	.635	4.287
Mountain[d]	6.188	.954	1.364	8.506	.418	2.162
Arizona[e]	2.628	.438	.681	3.747	.199	1.121
Colorado	1.918	.300	.479	2.698	.138	.680
Idaho	.714	.109	.160	.983	.056	.225
Montana	.588	.095	.132	.815	.049	.225
Nevada	.716	.122	.154	.992	.034	.311
New Mexico	1.305	.148	.199	1.652	.051	.332
Utah	.700	.137	.188	1.025	.054	.285
Wyoming	.247	.043	.053	.343	.035	.103
Pacific	28.093	3.819	5.651	37.563	1.424	9.873
Alaska	.234	.021	.023	.278	.009	.061
California	22.878	2.810	4.289	29.977	1.016	7.752
Hawaii	.533	.114	.160	.807	.053	.191
Oregon	1.747	.354	.463	2.564	.112	.676
Washington	2.701	.520	.716	3.937	.233	1.193

[a]Range from 0.90 to 1.10, where 1.00 = U.S. average. [b]Includes District of Columbia and Arizona. [c]Includes District of Columbia. [d]Excludes Arizona. [e]Arizona does not participate in the Medicaid program; it operates an alternative program under a federal waiver.

Source: Calculated by authors using data from HCFA, diskettes with state health expenditures and Medicaid expenditures; U.S. Bureau of the Census, *Current Population Survey*; Internal Revenue Service, *Statistics of Income Bulletin*; U.S. Department of Defense, *Atlas/Data Abstract for the United States and Selected Areas*; The Tobacco Institute, *The Tax Burden on Tobacco*; Congressional Budget Office (1994).

Appendix Table 2 continued

Estimated Federal Outlays and Revenues in 2004, Assuming a Narrowed Range of State Health Care Costs[a]

Billions of 2004 Dollars

Revenues							
Medicaid, Discontinued Coverage	Medicaid, Premium Limits	Income and Payroll Tax	Tobacco Tax	Department of Defense	Federal Employees Health Benefits	Department of Veterans Affairs	Total
48.000	45.000	34.000	10.000	4.000	8.000	5.000	241.000
3.069	2.650	2.235	.571	.100	.324	.246	14.167
1.122	.224	.732	.129	.021	.076	.054	3.587
.367	.315	.129	.058	.025	.048	.026	1.361
.993	1.511	1.002	.246	.035	.130	.109	6.529
.164	.114	.171	.068	.003	.038	.026	.893
.331	.350	.134	.044	.015	.015	.019	1.285
.091	.136	.067	.027	.001	.016	.013	.512
8.702	9.001	6.126	1.585	.245	.938	.704	43.267
1.046	1.427	1.532	.356	.065	.211	.142	7.584
6.150	5.846	2.992	.781	.079	.362	.289	23.936
1.506	1.728	1.603	.449	.102	.364	.273	11.748
8.792	7.148	5.640	1.722	.261	.855	.840	40.418
2.004	2.104	1.814	.432	.093	.262	.207	10.973
1.782	1.053	.666	.251	.040	.118	.113	5.796
1.141	1.790	1.232	.398	.033	.136	.185	8.334
3.219	1.375	1.334	.453	.086	.238	.229	11.214
.646	.825	.594	.188	.008	.101	.105	4.100
3.577	2.229	2.112	.692	.191	.409	.359	15.544
.508	.489	.307	.109	.004	.046	.052	2.543
.351	.292	.306	.089	.053	.053	.050	2.099
.791	.647	.579	.175	.007	.041	.089	3.501
1.378	.323	.603	.216	.064	.166	.109	4.781
.262	.223	.182	.057	.027	.045	.031	1.320
.144	.130	.063	.022	.022	.027	.012	.638
.143	.125	.070	.025	.014	.030	.015	.662
7.254	7.409	5.758	1.856	1.296	2.191	.972	42.392
.082	.113	.103	.036	.012	.016	.015	.606
1.485	1.865	1.862	.616	.203	.290	.330	12.801
.960	1.479	.776	.259	.186	.257	.130	6.000
.761	.746	.799	.174	.138	.653	.097	5.094
1.639	.967	.726	.287	.212	.142	.133	6.159
.921	.702	.338	.139	.107	.088	.075	3.262
.713	.630	.890	.253	.376	.570	.144	5.291
.514	.640	.155	.074	.004	.052	.042	2.148
2.840	4.095	1.474	.700	.250	.504	.310	15.673
.624	.711	.394	.169	.083	.143	.083	3.706
.741	1.366	.351	.216	.093	.105	.077	4.290
.494	.734	.187	.100	.044	.090	.049	2.530
.980	1.284	.542	.216	.030	.166	.101	5.147
6.687	5.041	3.081	1.038	.490	.808	.490	26.206
.546	.623	.195	.103	.021	.066	.048	2.540
2.446	1.595	.396	.173	.058	.133	.064	6.502
.885	.454	.313	.113	.095	.112	.067	3.115
2.809	2.369	2.177	.648	.316	.496	.310	14.049
1.688	1.515	1.189	.334	.242	.470	.224	8.242
.140	.163	.404	.124	.060	.125	.089	2.426
.357	.460	.453	.110	.098	.155	.079	2.530
.316	.099	.097	.035	.012	.030	.022	.891
.113	.128	.074	.026	.011	.053	.018	.696
.245	.075	.210	.071	.019	.029	.034	1.027
.202	.474	.137	.039	.047	.092	.035	1.409
.388	.210	.160	.038	.048	.089	.026	1.299
.067	.071	.057	.016	.009	.022	.010	.389
5.252	5.750	5.981	1.377	.864	1.375	.768	32.664
.081	.108	.108	.027	.051	.050	.011	.506
4.001	4.410	4.600	1.034	.564	.938	.536	24.853
.142	.089	.179	.024	.119	.088	.021	.907
.544	.369	.339	.117	.007	.111	.078	2.353
.483	.774	.756	.175	.123	.188	.121	4.046

References

Bishop, Christine and Kathleen Carley Skwara. 1993. "Recent Growth of Medicare Home Health." *Health Affairs*, Fall, pp. 95–107.

Blumenthal, David. 1994. "Maintaining the Region's Preeminence in Health Care Research." Panel discussion at a conference on "The Ongoing Revolution in Health Care: What It Means for the New England Economy," Federal Reserve Bank of Boston, May 3.

Duggan, Paula. 1993. "Regional Dimensions of the Crisis in Health Care Financing." Photocopy. Northeast-Midwest Institute, March.

Employee Benefit Research Institute. 1994. *Sources of Health Insurance and Characteristics of the Uninsured: Analysis of the March 1993 Current Population Survey*. Special Report and Issue Brief Number 145, January.

Grubaugh, Stephen G. and Rexford E. Santerre. 1994. "Comparing the Performance of Health Care Systems: An Alternative Approach." *Southern Economic Journal*, vol. 60 (April), pp. 1030–42.

Health Security Act. 103d Congress, 1st Session, H.R./S. ___: A Bill to ensure individual and family security through health care coverage for all Americans. . . .

Holahan, John and David Liska. 1994. *The Fiscal Impact of the Clinton Health Reform Proposal on States*. Washington, D.C., The Urban Institute, February 14.

Kodrzycki, Yolanda K. 1994. "Defense Industries: Briefing for Industrial College of the Armed Forces." Photocopy, Federal Reserve Bank of Boston, March 31.

Kosiak, Steven and Richard A. Bitzinger. 1993. *Potential Impact of Defense Spending Reductions on the Defense Related Labor Force by State*. Washington, D.C., Defense Budget Project, May.

Levit, Katherine R., Helen C. Lazenby, Cathy Cowan, and Suzanne W. Letsch. 1993. "Health Spending by State: New Estimates for Policy Making." *Health Affairs*, Fall, pp. 7–26.

Lewin-VHI, Inc. 1993. *The Financial Impact of The Health Security Act*. December 9.

Little, Jane Sneddon. 1992. "Lessons from Variations in State Medicaid Expenditures." Federal Reserve Bank of Boston, *New England Economic Review*, January/February, pp. 43–66.

National Center for Health Statistics. 1993. *Health United States, 1992*. Hyattsville, MD: U.S. Public Health Service.

Organisation for Economic Co-operation and Development. 1993. *OECD Health Systems: Facts and Trends, 1960–1991*. Health Policy Studies No. 3, Vol. I, Paris.

Pear, Robert. 1994. "Pooling Risks and Sharing Costs in Effort to Gain Stable Insurance Rates." *The New York Times*, May 22, p. 22.

Pfleeger, Janet and Brenda Wallace. 1994. "Health Care Alternatives: Employment and Occupations in 2005." *Monthly Labor Review*, April, pp. 29–37.

Rosegrant, Susan and David Lampe. 1992. *Route 128: Lessons from Boston's High- Tech Community*. Basic Books.

Safran, Dana Gelb and Jennifer Prah Ruger. 1994. *The Massachusetts Health Care Industry: Pathways to the Future*. Final Report of the Task Force on the Health Care Industry, Governor's Council on Economic Growth and Technology, chaired by Jerome H. Grossman, M.D. and Ferdinand Colloredo-Mansfeld. Boston, MA, April.

Scism, Leslie. 1994. "New York Finds Fewer People Have Health Insurance a Year After Reform." *The Wall Street Journal*, May 27, p. A3.

Sheils, John F., Lawrence S. Lewin, and Randall A. Haught. 1993. "Data Watch: Potential Public Expenditures Under Managed Competition." *Health Affairs*, vol. 12, Supplement, pp. 229–42.

Starr, Paul and Walter A. Zelman. 1993. "A Bridge to Compromise: Competition under a Budget." *Health Affairs*, vol. 12, Supplement, pp. 7–23.

Torres, Andres. 1994. "Comment on 'The Regional Impact of Health Reform,'" delivered at a conference on "The Ongoing Revolution in Health Care: What It Means for the New England Economy." Federal Reserve Bank of Boston, May 3.

U.S. Congressional Budget Office. 1992. *Projections of National Health Expenditures*. Washington, D.C.: U.S. Government Printing Office, October.

———. 1993. *Behavioral Assumptions for Estimating the Effects of Health Care Proposals*. Washington, D.C.: U.S. Government Printing Office, November.

———. 1994. *An Analysis of the Administration's Health Proposal*. Washington, D.C.: U.S. Government Printing Office, February.

Diversity, Uncertainty, and Accuracy of Inflation Forecasts

Stephen K. McNees with the assistance of Lauren K. Fine

Vice President and Economist and Research Assistant, respectively, Federal Reserve Bank of Boston. *The author gratefully acknowledges helpful comments from J. Joseph Beaulieu, Dean Croushore, Ray Fair, and his colleagues at the Federal Reserve Bank of Boston, in particular Stephen Blough.*

Early each year, numerous surveys of economic forecasts are published. This year, not only did the surveys in *Business Week*, *The Wall Street Journal*, and *Blue Chip* all show exactly the same central tendency (the consensus forecast), but the dispersion among the forecasts was extraordinarily small. Such conformity appears to lend reliability to the forecasts; after all, if no one expects an outcome much different, surely the consensus view is relatively certain.

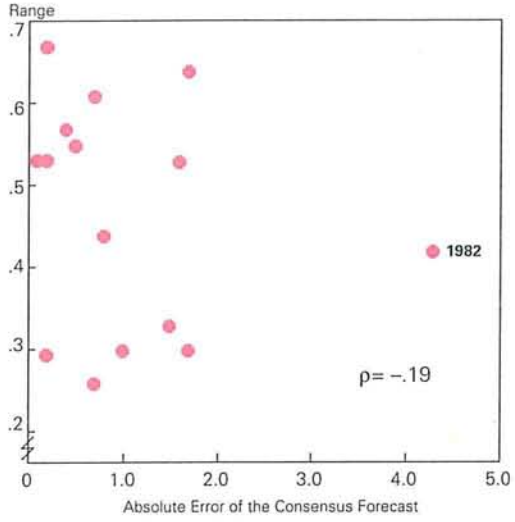
Unfortunately, this may be an instance where common sense is misleading. Figure 1a presents the range of the Blue Chip real GNP forecasts made each October (the month that Robert Eggert, the collector of these forecasts, emphasizes in his retrospective analyses) since 1977, along with the absolute value of the error of the Blue Chip consensus forecast. The figure clearly illustrates and a simple correlation confirms that little relation exists between the range of Blue Chip GNP forecasts and their eventual accuracy; indeed, the simple correlation between the two is negative 0.19. Comparable correlations for other variables (nominal GNP, the implicit GNP deflator, the unemployment rate, nonresidential fixed investment, and housing starts) also exhibit no significant relationship between the dispersion of the individual forecasts and the accuracy of the Blue Chip consensus forecast—the highest positive correlation is only 0.19 for nominal GNP and becomes negative 0.31 when the outlier forecast of 1982 made in October 1981 is dropped.

This lack of correlation should come as no surprise for at least two reasons. First, the Blue Chip survey group is not a fixed set; forecasters come and go and participation rates of forecasters vary over time. If the new entrants differ from the dropouts, the characteristics of the group would change. Figure 1b presents roughly the same information as Figure 1a for a subsample, 12 forecasters who forecasted all six variables every year—11 Blue Chip participants and one prominent forecasting group that does not regularly participate in the Blue Chip survey. In this case, the dispersion of the individual forecasts is measured by their

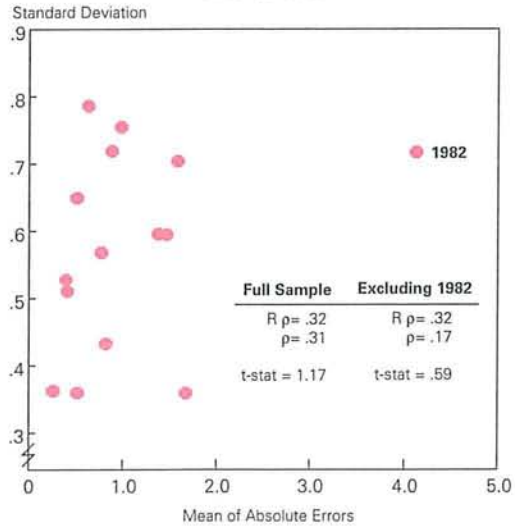
Figure 1

Dispersion and Accuracy

a. **Blue Chip Forecasts of Real GNP 1978 to 1992**



b. **12 Individuals' Forecasts of Real GNP 1978 to 1992**



standard deviation and their accuracy by the mean of their absolute errors. Even though the simple correlations are higher for this subsample of regular participants, the highest correlation among the six variables, 0.33 for nominal GNP, is still not close to statistical significance.

The lack of a significant correlation also reflects a conceptual problem. The foregoing analysis, like much of the literature, uses the dispersion of individual point estimate forecasts as the measure of forecast uncertainty. In fact, the dispersion of individual forecasters' point estimates may measure conformity but not necessarily uncertainty. (See Zarnowitz and Lambros 1987, especially their Figure 1.) It is entirely possible for all forecasters to share a common point estimate yet also acknowledge that they are highly uncertain that their forecast will prove to be reliable; this may well describe stock market and exchange rate forecasts. At the other extreme, one can easily imagine two dogged forecasters each expressing great confidence in the accuracy of their highly divergent point estimate forecasts. In short, uncertainty and the conformity of point estimate forecasts are logically distinct concepts, so that the type of evidence discussed so far does not directly address the relationship between forecast uncertainty and the accuracy of a point estimate forecast.

I. Why Forecast Uncertainty Is Important

Economic forecasts are nearly always expressed as a single number or "point estimate." A point estimate constitutes a very limited description of the entire array of possible (or even plausible) future outcomes. To a statistician, a distribution of the probabilities of alternative outcomes is poorly characterized by its central tendency alone.

Both forecasters and forecast users have suffered from the concentration on point estimates and the lack of attention to a fuller array of expected outcomes. The problems with point estimates are both substantive and practical. Forecasters are asked to predict a wide range of data, which range from highly volatile (random, or "unpredictable") to stable, "well-behaved" series. For example, the semiannual *Wall Street Journal* forecast survey asks for estimates of both exchange and interest rates and inflation and unemployment rates. Under the Efficient Markets Hypothesis, changes in the former are random or near-random series, whereas the latter show great persistence and can, in fact, be predicted much more accurately than by naive rules of thumb (McNees 1992, Table 4). My exchange rate forecast may be as good as any other yet no better than a coin flip; my inflation rate forecast need not be the best available to dominate simple rules of thumb.

Failure to communicate these differences in "forecastability" or, more precisely, failure to com-

municate some information about the expected uncertainty or reliability of a forecast not only undermines the utility of the forecast but also risks providing a distorted picture of the forecast's reliability to the forecast user. If you think that my stock market forecasts will be as good as my inflation rate forecasts, you will be likely to overestimate my ability to forecast stock prices. When you eventually learn of the limitations of my stock price forecasts, you will undervalue my inflation rate forecasts unless you realize that my inflation forecasts have relatively high reliability.

Forecasts are commonly used for risk management or contingency planning. No matter how accurate, a point estimate alone cannot convey how to incorporate uncertainty in decisionmaking.

II. Measures of Uncertainty

Forecasts inherently are linked to uncertainty; the reason to forecast is that the future is uncertain and unknowable. To say that the future is unpredictable is a non sequitur; the fact is that all future events are unknown, so that any discussion of the future—any plan—is essentially a forecast, subject to error.

Although the meaning of uncertainty is fairly clear, its measurement is problematic. According to my dictionary, "Uncertainty may range from a falling short of certainty to an almost complete lack of definite knowledge, especially about a [future] outcome or result." This observation not only illustrates the inexorable link between forecasts and uncertainty but suggests that the concept of uncertainty may not have a unique empirical counterpart; that is, it covers a range of different levels of uncertainty or a family of different orders of uncertainty, as will be discussed further below.

In practice, uncertainty has been measured in several different ways. In the academic literature, the most common method is to examine the variability of the residuals of a stochastic econometric model. This method has one obvious problem and one more subtle problem. The obvious problem is that one must assume that the specified model is the one actually used to form expectations. This assumption raises a host of standard issues: Does the model incorporate all relevant informational variables? Are they weighted appropriately? Do all individuals use the same model to formulate their expectations? More basically, even if we were prepared to assume that a particular model is the correct description of the universal expectations formation mechanism, one could question whether the historical residuals of that model are good measures of real-time, post-sample uncertainty. The problem is that the future residuals are a complicated combination of the effects of (largely) unanticipated events, partially anticipated events, and any "white noise," irreducible stochastic error.

A wholly unanticipated event clearly would affect the residual but, by definition, would not be a source of ex ante uncertainty—what you cannot conceive of cannot worry you. Real world examples of largely unanticipated events that probably had nontrivial impacts on macroeconomic forecasts in the past 25 years include the outbreak of wars (the Yom Kippur war, the revolution in Iran, the Iraqi invasion of Kuwait) as well as surprise shifts in economic policy (the 1971 Nixon wage-price freeze, the 1979 change in Federal Reserve operating procedures, the 1980 imposition of credit controls). The list of partially anticipated events is much longer; virtually any change in fiscal policy has been anticipated with varying degrees of uncertainty over time as proposals for legislation pass from the executive branch through both houses of Congress, a reconciliation process, and a Presidential veto or signature.

Failure to communicate information about the expected uncertainty of a forecast undermines its utility and risks providing a distorted picture of its reliability to the forecast user.

A particularly clear example is the Reagan personal income tax cuts. Reagan proposed the cuts in his 1980 campaign for President, raising the possibility of substantial tax rate reductions long before they went into effect. Over time, economic analysts' estimates of uncertainty with regard to tax rates diminished as the chances of Reagan's election and the prospects for congressional approval improved. While many models include present and future tax rates, none are well equipped to measure the political-economic evolution of uncertainty about future tax rates over time. Fiscal policy is by no means the

only example of partially anticipated events. The onset and resolution of major strikes, monetary policy changes, and the relaxation of temporary programs like wage and price controls or credit controls all fall into the category in which the uncertainty of a macroeconomic event evolves gradually toward zero over time. This learning process seems to be the essence of what we mean by uncertainty with regard to future events. It is difficult to see how partially anticipated events such as these, which were without close precedent in the sample period to which the models were fit, can be measured by the historical residuals of any macroeconometric model.

In light of the difficulty of modeling uncertainty, a plausible and easily obtainable measure of uncertainty has been the dispersion of individuals' forecasts. This procedure presumes that when different individuals have unusually great dispersion among their point estimate forecasts, then uncertainty is high. It should be clear that this measure is, at best, only a crude proxy for uncertainty. As previously noted, no logically necessary connection exists between a forecaster's degree of uncertainty and the degree of uniformity of the point estimates of different forecasters. It is perfectly possible for each forecaster to be wholly confident in his forecast yet for all forecasters to hold widely varying views. Similarly, all forecasters could easily agree that an exact number is the best single point estimate forecast but also that the degree of certainty of that forecast is extremely low—total conformity and high uncertainty.

III. Description of the Data

To our knowledge, the only systematic collection of real time or ex ante estimates of the uncertainty of macroeconomic forecasts is the Survey of Professional Forecasters, originated by Zarnowitz in 1968 (see Zarnowitz 1969) and maintained by the Federal Reserve Bank of Philadelphia since late 1990. (See Croushore 1993 for an excellent description of this data set.)

In addition to a point estimate forecast, each survey respondent is asked to provide two types of probability distributions: (1) the probability that real GDP will decline in the current quarter or in any of the next four quarters (these data are analyzed in Braun and Yaniv 1992), and (2) probability distributions of the expected year-over-year percent change in the GDP deflator (here called inflation uncertainty) and in nominal GNP (until 1981:III, when real GNP replaced nominal). Specifically, each respondent distributed probability across 15 intervals 1.0 percentage point in width.[1,2] This study analyzes the second type of probability distributions, those for the annual percent changes in the GDP deflator (from 1968 to 1993) and real GNP (1982 to 1993).

Because these distributions pertain to year-over-year realizations and the survey is conducted quarterly, four consecutive surveys provide four estimates of the same realization taken from four different forecast horizons. From 1968 through 1981, the first estimate for each year—the longest forecast horizon—was the first survey taken early in that year, shortly after the actual data for the final quarter of the preceding or base year became available. (Since 1981: III, the forecast horizon has been extended to two years overall, so that each year now is surveyed eight times.) The three subsequent surveys were taken well within the year and thus combine a forecast of the remainder of the year with partial, actual data for part of the year. Clearly, the amount of uncertainty varies considerably across horizons that embody varying amounts of actual data. This study focuses exclusively on the probability distribution with the four-quarter-ahead forecast horizon, the one that is not intermingled with partial, actual data. Thus, the maximum number of observations for an individual forecaster is 25, corresponding to the years 1969 through 1993.

Several authors have examined the probability distributions of the forecasts, including Lahiri and Teigland's 1987 paper concluding that the means of the distributions were not normal, and Lahiri, Teigland, and Zaporowski's 1988 study concluding that real interest rates decline when inflation uncertainty increases. The previous study most comparable to this one is by Zarnowitz and Lambros (1987).

Previous studies based on this data set have reported results for aggregations of the individual responses, such as the mean value in each survey. This choice was dictated in part by the paucity of data for individual forecasters available at the time. Aggre-

[1] In 1981:III, a redesign of the survey reduced the number of intervals to six and increased their width to 2.0 percentage points. In 1992:I, the width of the intervals was returned to 1.0 percentage points and their number increased to 10.

[2] Each survey contains extreme intervals that extend to plus or minus infinity; in order to calculate means and standard deviations, it was assumed that the width of these extreme intervals was the same as the intermediate intervals—that is, usually 1.0, but where appropriate 2.0, percentage points. This truncation of the extreme intervals does not appear to cause a distortion; the actual outcome never fell outside the range defined by these truncated extreme intervals.

gate data inevitably reflect the erratic response rate from the participating forecasters. When the survey started in 1968, more than 50 individual forecasters participated; the number of participants had declined to fewer than 20 by 1988; then, when the Philadelphia Fed revived the survey, the number of participants rose above 30 (Croushore 1993, p. 4). Over time, more than 300 different forecasters have participated in at least one of the surveys; however, about half have participated in only 10 or fewer surveys.

It is not clear whether the low and variable participation rates of these forecasters reflect a lack of interest in macroeconomic forecasting or these individuals simply found no incentive to share their forecasts with the survey. (All respondents are granted strict confidentiality.) Erratic participation would be a particular problem if it were systematically related to, for example, the perceived uncertainty of the forecast period. In any event, it seemed wise to exclude the infrequent participants, following Zarnowitz and Lambros (1987, pp. 602–3), who eliminated "occasional" forecasters who had participated in fewer than 24 percent of the 51 surveys through 1981:II in order to reduce "the variation in coverage over time." The criterion applied here is participation in at least 10 of the 25 possible forecasts.

The focus of this study is individual forecasters' inflation uncertainty measured by the probability distributions of the year-over-year GNP deflator forecasts made early each year, as soon as the previous year's fourth-quarter data became available. One hundred and fifty different respondents provided 905 such forecasts; excluding individuals who provided fewer than 10 left a sample of 33 forecasters and 394 probability distributions, which are described and assessed in the next section.

IV. Reliability of the Uncertainty Estimates

It was argued above that a realistic estimate of uncertainty is inherently individualistic or "subjective"; that neither a backward-looking time series model nor a conditional, structural model is likely to capture the major sources of uncertainty that arise in practice. Most uncertainty seems to arise from extra-model sources, such as a lack of information with respect to the future values of exogenous variables, or from the conviction (sometimes even the knowledge) that a change in the structure has occurred, so that the model's description of the past is unlikely to prevail in the future. For this reason, this study concentrates on the individual responses to surveys that simply ask professional forecasters to estimate, as best they can, the distribution of alternative future outcomes.

Although this emphasis on individuals rather than statistical models differs from that followed by most economists and statisticians (see Chatfield 1993), it is entirely consistent with the perspective of most psychologists. Hogarth (1980, pp. 11–12), for example, emphasizes that a probabilistic statement expresses our degree of knowledge and is not "a property of events in the environment." Precisely because uncertainty and probabilistic statements designed to reflect uncertainty are individualistic or subjective, it seems critically important to examine whether these data have any "validity"—whether they have intrinsic coherence and conform with reality. Because the "true" probability distribution of alternative outcomes cannot be observed in nonexperimental social sciences, no airtight validity check is available. Instead, we employ a battery of checks.

Most of these professional forecasters clearly possess an ability to anticipate the uncertainty of their forecasts.

At the crudest level, the data were screened to ensure that the probabilities provided summed to 100 percent. Five exceptions that could not be attributed to rounding were found; the two instances found in the subsample of 33 forecasters examined here were discarded.

At a slightly more substantive level, uncertainty should show some variation over time. It would be quite dubious to discover that the estimated level of uncertainty was the same in the mid 1980s as it was in the aftermath of Nixon's August 1971 New Economic Policy, the first OPEC oil embargo and price shock, the Fed's October 1979 change in operating procedures, Carter's credit controls, or Reagan's fiscal revolution.

In addition, even though uncertainty estimates are individual, they would be of little use if no conformity among individuals occurred over time. While uncertainty estimates need not be identical among

individuals, they must move broadly together in order to render meaning to statements like "These are highly uncertain times." (I do not recall anyone ever saying, "These are highly certain times.")

Table 1 illustrates both the variety and the conformity of the individual forecasters' inflation uncertainty estimates. On the one hand, conformity is far from total: In only two years (1985 and 1993) did all of these respondents record below-average levels of uncertainty. In 10 years, at least one forecaster attached the maximum uncertainty estimate to his forecast while another attached the minimum. On the other hand, seven of the 12 respondents for 1982 attached more uncertainty to inflation in that year than in any other year. Five of 19 found uncertainty highest in 1975. Ten of the 17 respondents in 1986 attached the lowest uncertainty to estimates in that year. All respondents felt uncertainty was below normal in 1985, with six ranking it lowest of the years in which they responded. The standard deviation for 10 of the respondents for 1986 was 0—or, in other words, 100 percent of the probability was assigned to one interval. Thus, while evidence of variability across individuals is ample, enough conformity is also to present suggest that generalizations about the prevailing degree of uncertainty are usually warranted. The mean of all respondents each year, shown in the last row of the table, reached a high in 1980 and a low in 1993.

Table 1
Individual Forecasters' Inflation Uncertainty Estimates
33 Forecasters, 1969 to 1993

		High		Low	
	$\overline{SD}$	SD_H	Year(s)	SD_L	Year(s)
	.41	.60	1982 and 1984	0	1986
	.57	.92	1989	.43	1976
	.62	.79	1970	.46	1972
	.62	1.58	1989	0	1986
	.62	1.00	1986	.45	1970 and 1973
	.62	1.01	1973	0	1986
	.62	1.00	1975	.32	1973
	.64	1.15	1975	0	1986
	.66	1.73	1975	0	1982 and 1985 to 1988
	.68	1.28	1977	0	1985 to 1986
	.69	1.37	1972	0	1985 to 1986
	.71	1.93	1983	0	1986
	.72	1.59	1982	0	1985 to 1986
	.74	1.31	1982	0	1984 and 1986
	.74	1.00	1971	.60	1993
	.78	2.67	1979	0	1988
	.81	1.57	1983	.59	1970 and 1974
	.82	1.40	1982	.30	1969
	.82	1.19	1975	.65	1980
	.87	1.39	1971	.54	1980
	.87	1.68	1980	.40	1969
	.88	1.31	1982	.70	1973
	.93	1.24	1971	.73	1970
	.96	1.95	1990	.40	1985
	1.01	1.61	1982	.64	1969
	1.03	2.39	1988	.30	1983 to 1984
	1.06	1.84	1979	.55	1972
	1.11	2.22	1982	.67	1976
	1.14	1.51	1981	.65	1973
	1.20	1.99	1975	.48	1973
	1.26	2.18	1984	0	1985
	1.51	2.09	1974	.98	1971
	1.52	2.57	1983	.30	1969
Mean	1.23	1.94	1980	.62	1993

Though illustrative, these facts do not take advantage of the fact that specific, quantitative confidence limits are available. For any given level of confidence, a binomial test can be used to determine whether each forecaster's estimated confidence interval was statistically significantly different from the actual outcome. For any given confidence limit, each forecaster has a corresponding forecast interval, within which the actual value either will (a hit) or will not (a miss) fall, a binomial outcome. If a forecaster has estimated or calibrated his uncertainty accurately (that is, he is neither overconfident nor overcautious), the actual value should fall within the forecaster's 90 percent forecast interval 90 percent of the time *for a large sample of forecasts*. Of course, with a limited sample, the observed percentage of hits could differ from 90 percent by statistical chance rather than because the forecaster is systematically overconfident or overcautious. The binomial distribution can be used to test whether deviations from the predicted 90 percent occur by chance or not. Specifically, let

N = the number of observations,
M = the number of actual outcomes within the forecast interval, or "hits," and
p = the theoretical probability of a hit.

Hence, the binomial distribution B(N,M,p) or

$$Prob\ (hits = m) = \binom{N}{M} p^M (1-p)^{N-M}$$

gives the probability of observing exactly M hits out of N trials when the true probability of a hit is p.

For example, suppose a forecaster has made N forecasts and the actual value has fallen within the specified 90 percent interval M times. The probability of observing M *or fewer* hits if the true probability of a hit is 0.9 is:

$$P^L(0.9) = \sum_{m=0}^{M} B(N,m,0.9).$$

If this quantity is small, it is unlikely that the forecaster has had so few hits by chance. Formally, if, for example, P^L is less than 0.05, we can reject at the 5 percent level the hypothesis that the forecaster's specified 90 percent confidence intervals are truly 90 percent confidence intervals, in favor of the alternative that the true probability of the interval covering the actual value is less than 90 percent. The forecaster is *significantly overconfident*—the actual value falls inside the specified 90 percent confidence intervals too rarely.

Conversely, the probability of observing M *or more* hits if the true probability of a hit is 0.9 is:

$$P^H(0.9) = \sum_{m=M}^{N} B(N,m,0.9).$$

If this quantity is small, it is unlikely that the forecaster has had so *many* hits by chance. If P^H is less than 0.05, we can again reject the hypothesis that the specified 90 percent confidence intervals are truly 90 percent confidence intervals, but this time in favor of the alternative that the true probability is *greater* than 90 percent. The forecaster is *significantly overcautious*.

Note that, since the total probability of all possible numbers of hits is 1,

$$P^H(p) = 1 - P^L(p) + B(N,M,p).$$

The above discussion is based on one-tailed tests. In this case, a two-tailed test seems appropriate, in that we wish to penalize not only the overconfident forecaster who tells us the risks are smaller than they actually are but also the overcautious forecaster who portrays the risks as greater than we need to fear. For a two-tailed test, at the 5 percent level, if either P^L or P^H is less than 0.025, the null is rejected in favor of the two-sided alternative.

Table 2
Calibration of Inflation Uncertainty Forecasts: Binomial Test Results
33 Forecasters, 1969 to 1993

	Overconfident	Neither	Overcautious
50% level	6%	94%	0
90% level	12%	88%	0
100% level	70%	30%	n.a.

Number of Forecasters	Description
19	Forecasters were neither overconfident nor overcautious at the 50 and 90 percent confidence levels but were overconfident at the 100 percent level.
10	Forecasters were neither overconfident nor overcautious at the 50, 90, and 100 percent confidence limits.
2	Forecasters were neither overconfident nor overcautious at the 50 percent limit but were overconfident at the 90 and 100 percent intervals.
2	Forecaster was overconfident at the 50, 90, and 100 percent confidence intervals.

n.a.—not applicable.

Table 2 gives the results of the binomial test for the accuracy of the individual forecasters' inflation uncertainty forecasts. The results show conclusively that these uncertainty estimates are "valid," that is, that they generally conform quite closely to reality. For example, at the 90 percent confidence limits, for 88 percent (29 of 33) of the forecasters one can reject the hypothesis that the forecaster was either overconfident or overcautious, at a 95 percent level of confidence. In addition, at the 50 percent confidence limits, 94 percent of the forecasters were neither overconfident nor overcautious. Only at the 100 percent confidence limit was evidence of overconfidence widespread—about 70 percent of the forecasters experienced at least one actual outcome outside their entire distribution.

The bottom portion of Table 2 also notes that 30 percent (10 of 33) of the forecasters showed no evidence of either overconfidence or overcaution at any of these three confidence limits. Only two showed overconfidence at all three confidence limits. Had these outliers been typical, one could easily

question whether this data set was worth investigating. The fact that only two of 33 forecasters did not provide realistic estimates of the reliability of their forecasts suggests that most of these professional forecasters do indeed possess some ability to anticipate the uncertainty of their forecasts.

An important exception to the general pattern of good calibration is, of course, the 100 percent confidence limits case where, for 70 percent (23 of 33) of the forecasters, the hypothesis that they are not overconfident was rejected. This fact may reflect a tendency to underestimate the (small) probability of highly unusual events. Even though we all "know" that "anything can happen," we often forget or ignore it in practice. This was certainly the case in 1973, a year when wage and price controls were relaxed, the first OPEC oil shock occurred, and a worldwide commodity price boom took place. Sixty-two percent (33 of 53) of the outcomes outside the 100 percent confidence interval took place in 1973 and 1974. Excluding these two years, 21 of the 33 forecasters showed no signs of overconfidence and the instances of overly optimistic 100 percent confidence were widely scattered over time.

It is tempting to think of 100 percent confidence limits as an unrepresentative, degenerate case. In fact, it serves as a useful reminder of the need to define uncertainty quite precisely. Possibly, individual forecasters could defend their overly optimistic 100 percent confidence limits ex post on the grounds that they had either explicitly or implicitly assumed no catastrophes. If explicitly asked, many might well have freely acknowledged that their uncertainty estimates were based on several implicit assumptions, such as no war in the Middle East, no dismantling of wage and price controls, no nuclear war, and the like. A skeptic could suggest that this amounts to a failure to understand what 100 percent confidence means; a more sympathetic and potentially more useful response is the recognition that there are differing, important levels of uncertainty. Even though it might be tedious to repeat before each forecast, all forecasts assume no nuclear war, no rapid global warming or Ice Age, no Black Plague epidemic, and so on ad infinitum. Yet some of these events do have a non-zero probability. Exactly where to draw the line between tediousness and rigorous precision—what is an appropriate, practical definition of uncertainty—is seldom discussed, though by no means obvious.

It is interesting to note that the tendency for most individuals to underestimate the 100 percent confidence limits does not appear in an analysis of the mean aggregate probability distribution of all respondents to each survey. The mean inflation uncertainty forecasts are well calibrated, neither overconfident nor overcautious, at the 50, 90, and 100 percent confidence limits. Even though most individual forecasters have been overconfident at the 100 percent level, at least one forecaster in each survey has assigned some probability to the interval in which the actual outcome fell. This is a clear illustration of how the aggregated, mean probability distribution can give a misleading picture of the underlying, constituent individual probability distributions.

V. Is Point Estimate Accuracy Related to Uncertainty?

Having established that most of the forecasters did in fact make plausible estimates of the uncertainty of their inflation forecasts, we return to the question that originally motivated this inquiry: Is uncertainty systematically related to the accuracy of point estimate forecasts? The relationship between inflation uncertainty (as measured by the standard deviation of the probability distribution of expected inflation) and accuracy (of the point estimate forecast) was examined by calculating both rank correlations and simple correlations over time between each forecaster's inflation uncertainty estimate and the accuracy of his point estimate forecast, as measured by either the absolute value forecast error or the squared value of the point estimate forecast error for the same year.

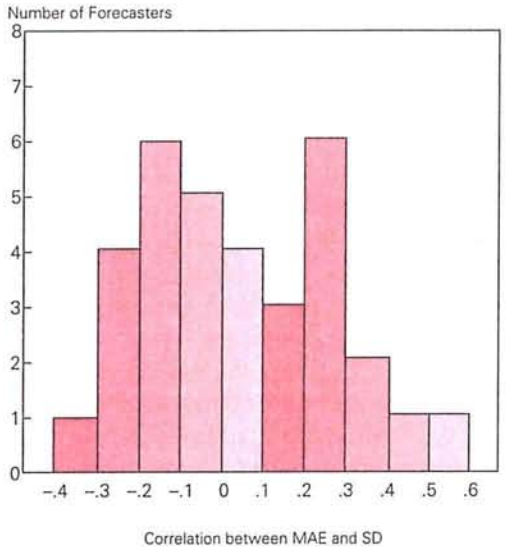
The results, summarized in Figure 2 and Table 3, show that little relationship exists between expected inflation uncertainty and the ex post accuracy of point estimate forecasts. The vast majority of these correlations were low and statistically insignificant. The more logical positive correlations far exceeded negative correlations for those few correlations that attained marginal significance. The closest resemblance to a positive relationship was for one forecaster whose rank correlation was 0.54, about 1.8 times its standard error, and whose simple correlation was 0.51 for absolute value of the forecast error and 0.40 for squared forecast error.

It is not entirely clear why uncertainty should be unrelated to forecast accuracy. One possible reconciliation of these apparently contradictory facts is that forecasters' point estimate forecasts represent the mode of their probability distribution and are fairly insensitive with respect to the width of the tails of the

Figure 2

Uncertainty and Accuracy of Inflation Forecasts

Frequency Distribution of Correlations



distribution. (In response to a survey conducted by the authors, two-thirds of the Survey of Professional Forecasters participants did describe their point estimate forecast as the *mode* of their probability distribution.) Forecasters have some ability to gauge when the tails of the distribution are fat and when they are thin, but this judgment has little impact on the mode or most likely single outcome. This would seem especially likely if the point estimate were determined independent of and logically prior to the entire distribution.

In any event, the importance of the results presented here is clearly limited by the small number of observations on which they are based. Further evidence may overturn them. Nevertheless, without contrary evidence, it would appear that estimating inflation uncertainty, even estimating it reliably, and selecting an accurate central tendency or point estimate forecast from that distribution are unrelated, disparate aspects of forecasting.

It would appear to be a mistake, however, to think that estimating uncertainty is unimportant simply because it is unrelated to the accuracy of the point estimate forecast. It seems more helpful to consider forecasting accuracy as having several distinct facets—including both point estimate accuracy and uncertainty reliability—which are not easily combined into one.

This conclusion is based on forecasts of the inflation rate, as measured by year-over-year percentage changes in the implicit GNP price deflator, the variable for which the most observations are available. Since 1981, the Survey of Professional Forecasters respondents have also provided estimates of probability ranges for real GNP. Eleven forecasters have provided eight or more real distributions analogous to the GNP deflator distributions discussed above.

As illustrated on Figure 3 and Table 4, this even more limited sample confirms the basic results derived from the inflation data: First, based on the binomial test, all 11 forecasters were well calibrated at the 50 percent confidence limit, and 10 of the 11 shared this characteristic at the 90 percent confidence limit. To the contrary, all 11 forecasters were overly confident at the 100 percent confidence limit. Once again, the aggregated, mean probability distribution was well calibrated at all levels, including the 100 percent confidence limit, reflecting the fact that at least one forecaster in each survey assigns some probability to the interval in which the actual outcome falls. As before, the general reliability of the estimated confidence intervals, except for the 100 percent level, provides justification for regarding the probability distributions as just as fundamentally important as the more widely publicized point estimates. Second, the overconfidence was heavily concentrated in a few years: Nearly one-half of the overconfident estimates of real GNP came in 1985, when the actual outcome fell outside the 100 percent confidence limits of eight of these 11 forecasters; virtually all of the remaining instances occurred in

Table 3

Correlations, Inflation Uncertainty, and Point Estimate Accuracy

33 Forecasters, 1969 to 1993

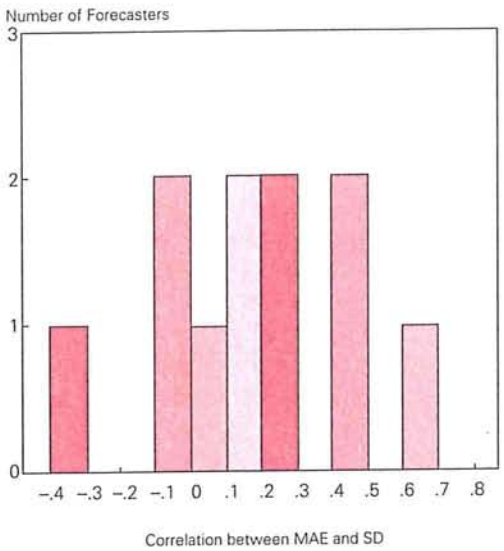
Level of Significance	$R\rho(U_t, \lvert e_t \rvert)$	$\rho(U_t, \lvert e_t \rvert)$	$\rho(U_t, e^2_t)$
"High" Positive[a]	2	1	0
"Moderate" Positive[b]	9	9	9
"Moderate" Negative[b]	6	6	3
No Statistical Significance	16	17	21

[a]Significant at the 5 or 10 percent level.
[b]Significant at the 20 or 50 percent level.

Figure 3

Uncertainty and Accuracy of Real GNP Forecasts

Frequency Distribution of Correlations



either 1982 or 1988. Finally, once again, with the exception of one forecaster for whom a statistically significant positive relationship was found, the amount of uncertainty was unrelated to the accuracy of the point estimate forecast, as measured by either its absolute or its squared error. Thus, the results for real GNP seem entirely consistent with the more extensive results for inflation.

VI. Are Accurate Point Estimate Forecasters Also Reliable Uncertainty Forecasters?

This paper opened with the observation that the probability distribution of alternative outcomes contains much more information than a point estimate forecast. Indeed, it is not even clear which, if any, of the standard measures of the central tendency of a probability distribution—the mean, the median, the mode, or some other measure—the point estimate forecast represents. Conceptually, forecast users could learn much more from the entire distribution than from a single point estimate. This conceptual advantage would be of little practical importance if estimated probability distributions (estimated uncertainty forecasts) were highly unreliable—if forecasters were systematically either wildly overconfident or overcautious. Yet the evidence presented in section IV above shows that, with minor exceptions, forecasters' uncertainty estimates are neither excessively bold nor excessively timid. Their uncertainty estimates were quite reliable, except perhaps for the 100 percent confidence intervals.

The absence of excessive confidence and caution is clearly a necessary condition for a good uncertainty estimate. Once this condition has been satisfied, the greater the confidence (the smaller the standard deviation of the probability distribution) that can be placed in a forecast distribution, the more helpful that forecast is to the ultimate forecast user. Thus, once the overconfident forecasters have been excluded, the smaller the standard deviation of the probability distribution, the better the forecaster's uncertainty estimate.

The previous section examined the relationship over time between individual forecasters' estimates of uncertainty and the accuracy of their point estimates. If all forecasters predicted all years, forecast users would prefer the forecaster whose standard deviations were smallest. Unfortunately, all forecasters in this data set include many "gap" years in which no uncertainty estimate is recorded. Some forecasters joined after the survey started, others dropped out, and many of the participants skipped a year occasionally. As we have seen, both forecast uncertainty and point estimate accuracy vary considerably from year to year. A simple unweighted standard deviation runs the risk of rewarding forecasters who participated in the relatively certain years and penalizing those who participated in the years of relatively high uncertainty. We have therefore weighted each forecaster's estimated standard deviation each year by

Table 4

Correlations, Real GNP Uncertainty, and Point Estimate Accuracy

11 Forecasters, 1982 to 1993

Level of Significance	$R\rho(U_t, \lvert e \rvert_t)$	$\rho(U_t, \lvert e \rvert_t)$	$\rho(U_t, e^2_t)$
"High" Positive[a]	1	1	1
"Moderate" Positive[b]	2	4	4
"Moderate" Negative[b]	0	1	1
No Statistical Significance	8	5	5

[a]Significant at the 5 or 10 percent level.
[b]Significant at the 20 or 50 percent level.

the average standard deviation of all forecasters who participated that year, in effect weighting each observation by its deviation from the mean for that year. The presence of data "gaps" also affects measures of point estimate accuracy. Thus, we also weight both the absolute error and the squared error by the average error of all forecasters who participated that year.

Once again, the results are so clear that they can easily be summarized; no relationship could be found across forecasters between the amount of uncertainty of their forecasts and the accuracy of their point estimates, as measured by either their mean absolute errors or their root mean squared errors. Both rank correlations and simple correlations are essentially zero, far from any significance in the statistical sense. Once again, point estimate accuracy and uncertainty accuracy are on skewed planes. One should not jump to the conclusion that uncertainty estimates are of no value simply because they do not predict point estimate accuracy. Indeed, one of the main premises of this inquiry is that the opposite conclusion would come closer to the truth; if a forecast can provide a reliable, well-calibrated expected distribution of outcomes, any measure of the relationship between its central tendency and the actual outcome may be of little interest.

VII. Summary and Conclusions

Uncertainty is a key concept in both economic theory and economic practice. Nonetheless, the premise of this article is that too little attention has been paid to defining and measuring the concept of uncertainty. This article has argued that many of the traditional measures of uncertainty are conceptually flawed and bear little empirical resemblance to actual uncertainty.

One of most fruitful empirical measures of macroeconomic uncertainty is the Survey of Professional Forecasters, started by Zarnowitz in 1968. Although the survey is conducted quarterly, it collects distributions of year-over-year changes and thus, for each forecast horizon, provides a single observation each year. The primary limitation of the survey is the uneven response rate; many forecasters participate only sporadically and even the regular participants skip occasionally. Their participation performance alone strongly suggests heterogeneity among the individual forecasters. The analysis in this study is confined to the individual forecasters with the highest participation rates.

Most forecasters had quite accurate estimates of the 50 and 90 percent confidence intervals of their inflation and real GNP uncertainty forecasts; few exhibited overconfidence and none showed overcautiousness. Virtually all of the individual forecasters were overly confident at the 100 percent level, a tendency not revealed in examining the mean probability distribution of all respondents to each survey. Somewhat surprisingly, an individual forecaster's uncertainty estimates are not highly correlated with the accuracy of his point estimates. This result emerges both for inflation forecasts and, with an even more limited sample, for real GNP forecasts. This result is consistent with the possibility that forecasters' point estimate forecasts are of the mode of the distribution, or some other measure of the central tendency not strongly related to its dispersion. In short, point estimate accuracy and uncertainty accuracy may well be two totally separate, disparate aspects of forecast accuracy.

Point estimate accuracy and uncertainty accuracy appear to exist as two totally separate, disparate aspects of forecast accuracy.

Even though both overconfidence and overcautiousness limit the usefulness of an estimate of uncertainty, among the estimates that do not exhibit overconfidence, smaller estimated uncertainty is preferable to larger estimated uncertainty. Once the overly confident forecasters are eliminated, the forecasters can be ranked by the size of their uncertainty estimates, and those with lesser uncertainty were found to provide more valuable information. These uncertainty rankings were not systematically related to the accuracy of point estimate forecasts ranked either by the absolute size of the error or by the squared error of the point estimate forecast.

The small sample on which these conclusions are based is an obvious limitation on their validity. Further evidence will be required to reach firm generalizations. The object of the paper has been to encourage both forecasters and forecast users to pay more attention to estimates of forecast uncertainty.

References

Armstrong, J. Scott. 1985. *Long-Range Forecasting from Crystal Ball to Computer*. New York: John Wiley & Sons.

Braun, Phillip A., and Ilan Yaniv. 1992. "A Case Study of Expert Judgement: Economists' Probabilities versus Base-Rate Model Forecasts." *Journal of Behavioral Decision Making*, vol. 5 (March), pp. 217–31.

Chatfield, Chris. 1993. "Calculating Interval Forecasts." *Journal of Business and Economic Statistics*, vol. 11 (April), pp. 121–44.

Croushore, Dean. 1993. "Introducing: The Survey of Professional Forecasters." Federal Reserve Bank of Philadelphia *Business Review*, November/December, pp. 3–15.

Eggert, Robert J., Editor. October Issues, 1977–93. *Blue Chip Economic Indicators*. New York: Management Resources, Inc.

Engle, Robert F. 1983. "Estimates of the Variance of U.S. Inflation Based upon the ARCH Model." *Journal of Money, Credit and Banking*, vol. 15 (August), pp. 286–301.

Hafer, R.W. and Scott E. Hein. 1985. "On the Accuracy of Time Series, Interest Rate and Survey Forecasts of Inflation." *Journal of Business*, vol. 58 (October), pp. 377–98.

Hogarth, Robin M. 1980. *Judgement and Choice: The Psychology of Decision*. New York: John Wiley & Sons.

Kendall, Maurice G. 1962. *Rank Correlation Methods*, 3rd ed. New York: Hafner Publishing Co.

Lahiri, Kajal and Christie Teigland. 1987. "On the Normality of Probability Distributions of Inflation and GNP Forecasts." *International Journal of Forecasting*, vol. 3, pp. 269–79.

Lahiri, Kajal, Christie Teigland and Mark Zaporowski. 1988. "Interest Rates and the Subjective Probability Distribution of Inflation Forecasts." *Journal of Money, Credit and Banking*, vol. 20 (May), pp. 233–48.

Lahiri, Kajal and Mark Zaporowski. 1987. "More Flexible Use of Survey Data on Expectations in Macroeconomic Models." *Journal of Business and Economic Statistics*, vol. 5 (January), pp. 69–76.

McNees, Stephen K. 1992. "How Large Are Economic Forecast Errors?" *New England Economic Review*, July/August, pp. 25–42.

Tversky, Amos, and Daniel Kahneman. 1974. "Judgement Under Uncertainty: Heuristics and Biases." *Science*, vol. 185 (September), pp. 1124–31.

Zarnowitz, Victor. 1969. "The New ASA–NBER Survey of Forecasts by Economic Statisticians." *American Statistician*, vol. 23, pp. 12–16.

———. 1985. "Rational Expectations and Economic Forecasts." *Journal of Business and Economic Statistics*, vol. 3 (October), pp. 293–311.

———. 1992. *Business Cycles: Theory, History, Indicators, and Forecasting*. Chicago: University of Chicago Press.

Zarnowitz, Victor and Phillip Braun. 1992. "Twenty-Two Years of the NBER-ASA Quarterly Economic Outlook Surveys: Aspects and Comparisons of Forecasting Performance." *National Bureau of Economic Research Working Paper* no. 3965, January.

Zarnowitz, Victor and Louis A. Lambros. 1987. "Consensus and Uncertainty in Economic Prediction." *Journal of Political Economy*, vol. 95 (June), pp. 591–621.

The Geographic Boundaries of New England's Middle-Lending Markets

Robert Tannenwald

Senior Economist, Federal Reserve Bank of Boston. *The author wishes to thank Rachel Cononi, Alissa Stangle, and Bill Gouveia for their able research assistance, as well as several New England banking officials for their comments and insights.*

Mid-sized companies—those with annual sales between $10 million and $250 million—produce a significant percentage of the nation's output. In 1987, their sales accounted for 28 percent of the total sales of all U.S. companies.[1] In light of the substantial contribution made by mid-sized firms to the economy, conditions impeding their performance should concern public policymakers. One such condition is insufficient access to short-term credit at competitive prices. The very existence and the severity of this problem are subject to considerable debate, however.

In general, enforcers of the nation's antitrust laws have devoted little attention to the competitiveness of short-term credit markets tapped by mid-sized firms (middle-lending markets). This inattention partially reflects doubt as to the existence of middle-lending markets, but also results from uncertainty about these markets' boundaries. Communications and transactions costs constrain the distances over which the buying and selling of credit to mid-sized firms take place. How these credit relationships cluster over space to form geographic markets has not been explored to any appreciable extent.

This article, the second in a series on middle-market lending, investigates the boundaries and concentration levels of middle-lending markets in New England.[2] It relies primarily on the results of a survey of mid-sized businesses conducted by the Federal Reserve Bank of Boston in 1992 (the Boston Fed survey), supplemented by interviews with CEOs and senior commercial lending officers at several of the region's largest banks. The article provides updated configurations of these markets that should provide new insights into the consequences of proposed bank mergers for an important group of commercial borrowers.

I. A Little Background

Horowitz (1977, p. 170) defines a market as

> a group of buyers and sellers that freely interact with each other in such fashion as to effect a unique price, net of transportation costs, at which a particular good . . . is exchanged.

To identify the members of such a group, analysts must first determine what good is being exchanged. Only then can they delineate the geographic areas in which buyers and sellers of the good interact to determine a unique price.

Do Middle-Lending Markets Exist?

The existence of middle-lending markets is not universally accepted. In particular, the Federal Reserve Board has relied upon a 1963 ruling by the U.S. Supreme Court in *United States v. Philadelphia National Bank* (374 U.S. 321). The Court maintained that the "cluster of products and services" provided by commercial banks constitutes an indivisible line of commerce. This view, known as the "cluster of services" doctrine, implied that subsets of products or services provided by commercial banks, such as the provision of short-term credit to mid-sized businesses, should not be considered separate products for the purpose of antitrust analysis.[3]

The U.S. Department of Justice, by contrast, has explicitly rejected the cluster of services doctrine. In analyses of bank merger cases, testimony before Congress, and other public statements, Justice Department officials have stated that commercial lending to small and mid-sized businesses should be considered a distinct market, separate from commercial banking as a whole. This viewpoint was reaffirmed in April 1994 by Robert Litan, Deputy Assistant Attorney General for Regulatory Policy.[4]

The debate concerning the existence of middle-lending markets is discussed in more detail in Tannenwald (1993). The following analysis assumes that middle-lending markets exist.

Previous Attempts to Map New England's Banking Markets

At first glance, a delineation of the geographic boundaries of markets for a particular banking service seems to require only the identification of those areas where the service's price is uniform. Market boundaries lie at those points where this price changes. Prices of many banking services, however, are difficult to observe. For example, lenders to mid-sized businesses tailor the terms of each loan to the characteristics of the borrower, such as profitability, size, and volume of debt outstanding. The terms of each loan involve many variables, such as interest rate, maturity, down payment, and collateral, so that measuring the price of any particular type of loan within a given geographic area is extremely difficult. Even if such a price were measurable, data needed to measure loan prices at different locations are not readily available. Finally, prices in credit markets are almost always in short-term disequilibrium, so that long-term equilibrium prices are rarely revealed.

In light of these empirical obstacles, analysts attempting to map markets for banking services have inferred their boundaries from observed geographic clusters of banks and banking relationships, assumptions about the geographic preferences of banks and their customers, and economic theory. A premise common to each mapping effort is that, other things equal, customers prefer to transact business with banks that are close by, and vice versa.

Delineation of Local Banking Markets by the Boston Fed. The Federal Reserve Bank of Boston maps banking markets in the First District and routinely updates their boundaries. Consistent with the Federal Reserve Board's cluster of services doctrine, the Boston Federal Reserve Bank maps only markets for commercial banking services as a whole. Nevertheless, by analyzing the underlying assumptions and the specifics of its methodology, one can gain insights into the principal issues that must be addressed in the mapping of middle-lending markets.

Two key assumptions underlie the Boston Fed's methodology: 1) depositors play a key role in determining prices for commercial banking services and, 2) in choosing where to bank, they usually consider depositories located near where they live or work. The transactions costs of conducting business with

---

[1] U.S. Bureau of the Census (1991, Table 5). The year 1987 is the latest for which sales data are available by company size. Sales data by company size are not available on a state-by-state basis.

[2] The first article (Tannenwald 1993) examined the dependence of New England's mid-sized businesses on the region's largest bank holding companies. This previous article commented on the competitiveness of middle-market lending in the region, based on the assumption that such lending took place within one region-wide geographic market. This article relaxes this assumption and evaluates it empirically.

[3] See Tannenwald (1993, pp. 36–37) for further discussion of the Board's defense of the cluster of services doctrine.

[4] See the text of an interview with Mr. Litan published in the *American Banker*, April 8, 1994, p. 2.

An Example Illustrating How Depositors in One Town Can Influence the Prices of Banking Services Throughout a Local Banking Market

"Centerville" MSA is a fictitious, economically integrated metropolitan area 40 miles in diameter consisting of a central city and six suburbs arranged in two concentric rings (see Map 1). Workers living in the central city work exclusively in the central city; workers living in the inner ring work either in their own town or in the central city. Workers living in an outer-ring town work either in their own town or commute to the neighboring inner-ring suburb.

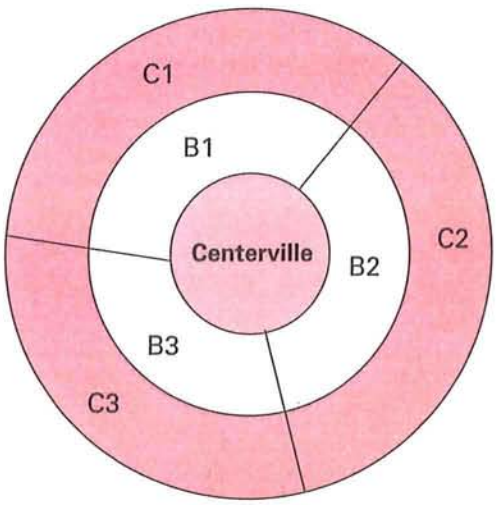
Suppose that banks in outer suburb C1 lower the interest rates they offer on deposits held in N.O.W. accounts. Some C1 commuters with a N.O.W. account in a C1 bank will switch their account to a bank in B1, where they work. Should B1 banks respond by lowering their interest rates, some B1 commuters with a N.O.W. account in a B1 bank will move their account to a bank in the central city. Should central city banks lower their interest rates, some residents of other suburbs who bank downtown will move their accounts to a bank in their town of residence. In this manner, a chain reaction of bank substitutions and price changes initiated by depositors residing in one town will affect demand conditions, and therefore prices of banking products, in all towns within the metropolitan area. The very threat of such a chain reaction will in many cases deter banks from offering interest rates on deposits that are "too low" relative to those offered by other banks in the same banking market.

banks in less convenient locations are assumed to be too high for them to be viable alternatives.

These assumptions, combined with elementary microeconomic theory, imply that geographic banking markets are economically integrated regions consisting of municipalities linked with each other mainly by commuters. The Boston Fed has identified 94 such banking markets in New England (Map 2). These areas generally consist of a central city and rings of surrounding suburbs. Many of them conform closely to Ranally Metro Areas (RMAs), defined by Rand McNally & Company, or to Metropolitan Statistical Areas (MSAs) defined by the U.S. Office of Management and Budget. Some of them are quite large. For example, the Boston banking market extends into southern New Hampshire to the north and almost as far as Cape Cod to the southeast.

Map 1

Centerville MSA



Because of the economic ties linking the municipalities in each of these markets, depositors and banks located in any one community can directly or indirectly influence the prices of banking services in all other communities within the market. As the example in the accompanying box illustrates, they can exert this influence by initiating a chain reaction of responses to price changes, by both depositors and banks, that ultimately spreads throughout the market. This occurs even if the depositors in one community do not consider all banks within the market to be viable alternatives. Thus, depositors in Nashua, New Hampshire, living on the northern border of the Boston market can indirectly influence the price of banking services offered by banks in Plymouth, Massachusetts, more than 60 miles away.

In order to specify the geographic boundaries of banking markets, Boston Fed analysts employ the "15 and 20 percent rule":

1) For each municipality abutting a central city, they compute from Census data the percentage of the municipality's workers commuting into the central city. If this percentage exceeds 20 percent, the municipality is presumed to be in the same banking market as the central city. If this percentage is greater than 15 percent but less than or equal to 20 percent, then the municipality may be in the same banking market, depending on the strength of other evidence that it is economically integrated with the central city. If this percentage is less than or equal to 15 percent, the municipality is presumed not to be in the same banking market as the central city, unless it has strong alternative economic ties with the central city.[5]

2) Analysts then move outward to the next ring of municipalities. They compute the percentage of each municipality's workers commuting to either the central city or a suburb closer to the central city. They use the same 15-percent and 20-percent benchmarks to determine whether the municipality belongs in the banking market.

As rings of communities further and further away from the central city are examined, analysts eventually find towns whose workers tend not to commute or who commute to municipalities further away from the central city. These communities are presumed to belong in another banking market.[6]

Dunham's Regional Banking Markets. Dunham (1986) attempted to discern the geographic boundaries of New England's middle-lending markets, which she called "regional banking markets." She adopted the widely held view that such credit is the central component of a cluster of complementary services, often referred to as "primary banking services," uniquely demanded by mid-sized firms. In addition to short-term credit, this cluster also often includes, but is not limited to, deposit services, financial planning, cash management, the provision of specialized credit, and international banking services. The reasons why mid-sized firms are believed to have a unique need for this particular set of services are discussed in Tannenwald (1993) and Dunham (1986).

In order to generate hypotheses concerning the configuration of regional banking markets, Dunham analyzed the banking relationships of a sample of 278 mid-sized nonfinancial firms (annual sales between $10 million and $150 million) drawn mostly from Standard & Poor's 1984 *Register of Corporations, Directors, and Executives*. Each year, Standard & Poor's asks each firm in its *Register* to name its "primary bank."

Dunham identified all of the "bank organizations"—bank holding companies and independent banks—represented in the list of primary banks named by the firms in her sample. Twenty-two banking organizations were represented among those primary banks listed by more than one firm. Most of these organizations were bank holding companies headquartered in the metropolitan areas of either New York, Hartford, Providence, or Boston (the "Big Four"). Only three of these 22 banking organizations had less than $1 billion in deposits, consistent with the widespread belief that only large depository institutions have the capacity to provide mid-sized firms with the primary banking services they require (see Dunham 1986 and Tannenwald 1993). Dunham concluded that these 22 banking organizations were the main competitors in the provision of primary banking services to New England's mid-sized firms.

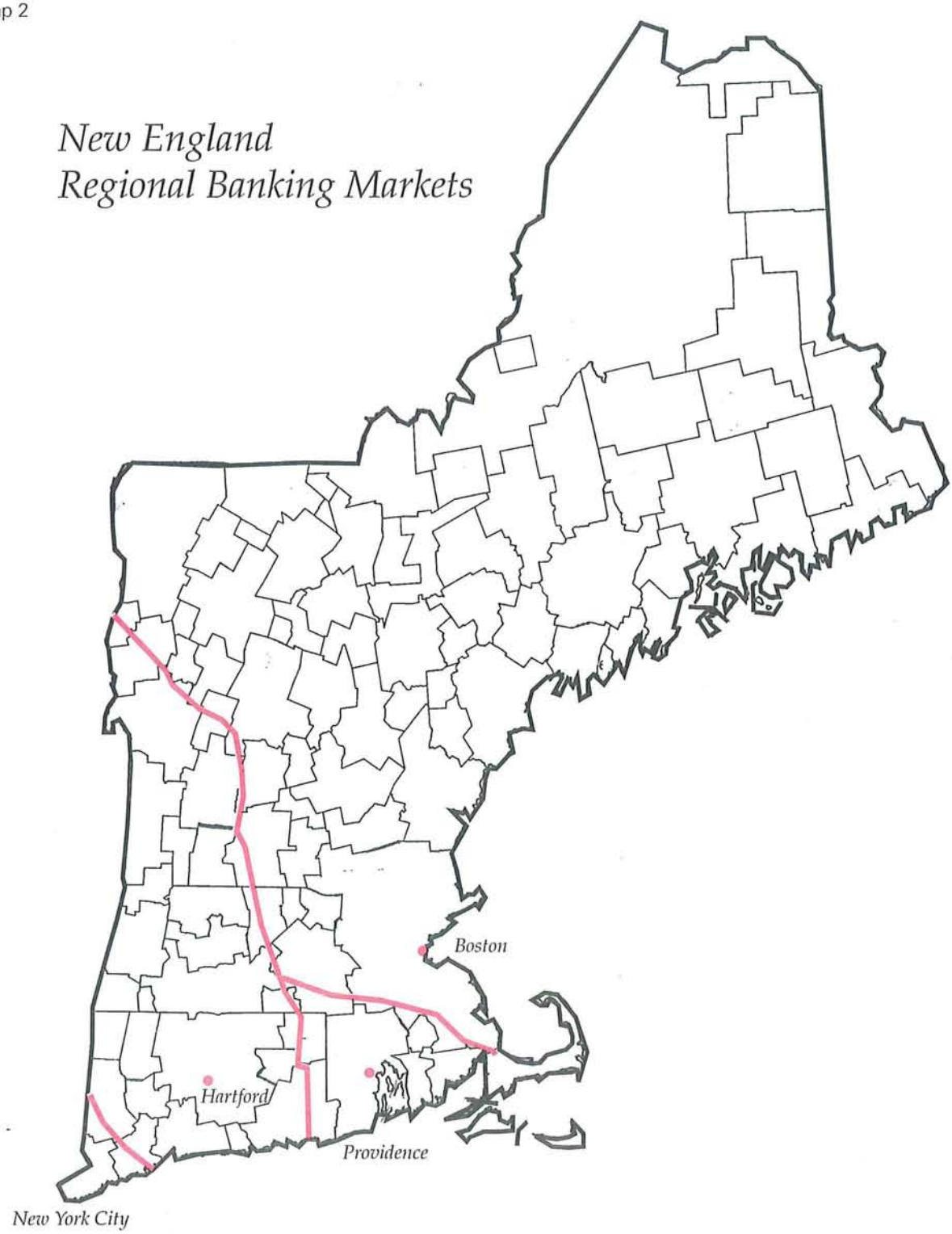
In sorting these primary banking relationships into discrete geographic markets, Dunham embraced the view, supported by a 1985 study (Peter Merrill Associates, Inc. 1985), that the typical middle-market firm prefers to deal directly with the lead bank of a bank holding company rather than one of its subsidiaries. Mid-sized firms allegedly do so because their requests for loans, especially large ones, must be approved at the bank holding company level. Dunham concluded that, in choosing a primary bank, most of the region's mid-sized firms narrowed the field to organizations headquartered in one of the Big Four.

Dunham reasoned that the biggest factor in selecting one of these banking organizations was geographic distance, given its importance in determining communications and transactions costs. Consequently, she hypothesized the existence of four middle-lending markets within New England, each organized around one of the Big Four financial centers. She defined the Boston geographic market as all points within the region located closer to Boston than any of the other three cities. In a similar fashion she defined the geographic boundaries of markets organized around Providence, Hartford, and New York City (Map 2).

[5] Evidence of such ties is gleaned from a variety of sources. Some examples include the extent of advertising by businesses in one town in the newspapers of other towns, the geographic circulation of newspapers, the broadcasting radiuses of radio and TV stations, geographic shopping patterns, and the clientele of hospitals and other large medical facilities.

[6] This method does not always satisfactorily delineate the boundaries of banking markets in rural areas. Alternative benchmarks, such as county seats and agricultural distribution centers, sometimes must be used in these cases.

Map 2



Note: Fine lines indicate boundaries of local banking markets; heavy solid lines indicate boundaries of regional banking markets.
Source: Reproduced from Dunham (1986). Map of local banking markets taken from Sansons and Storm (1993).

Table 1
Primary Banking Relationships of Middle-Market Firms, 1984

Region in Which Firm Is Located	Region in Which Bank Is Located (1) NYC (part)	(2) Boston	(3) Hartford	(4) Providence	(5) Other	(6) Total	(7) Percent in Own Region
(1) NYC (part)	**16**	0	11	0	0	27	59.3
(2) Boston	9	**143**	2	5	1	160	89.4
(3) Hartford	10	11	**42**	0	3	66	63.6
(4) Providence	1	5	2	**17**	0	25	68.0
(5) Total	36	159	57	22	4	278	78.4

Note: Percentage of markets where percentage of firms choosing an in-market bank exceeds 80 percent: 25%. Percentage of markets where percentage of firms choosing an in-market bank is less than 70 percent: 75%.
Source: Dunham (1986).

Dunham's analysis implies that if a Boston-based banking organization raised the price of short-term credit offered to mid-sized firms located within the Boston regional market, it could not be undercut by banking organizations headquartered in one of the other three financial centers. The costs of transacting business over long distances would deter banking organizations headquartered in Providence, Hartford, or New York from doing so. According to this view, such costs also deter firms located in the Boston market from entering into a primary banking relationship with an out-of-market banking organization.

Dunham found that almost four-fifths of the firms in her sample were headquartered in the same market as their primary bank (Table 1). She interpreted this correlation as evidence of "strong ties of these firms to banks headquartered in the nearest major financial center" (Dunham 1986, p. 12). However, the correlation between bank and firm location was much weaker in the Hartford market, the Providence market, and the New England portion of the New York City market, raising doubts about the accuracy of her boundaries. In addition, she found that one-sixth of all firms located in her Hartford market identified a depository headquartered in the Boston market as their primary bank. The comparable fraction for firms in the Providence market was one-fifth. If Massachusetts-based depositories had such a large presence in both the Hartford and Providence markets, perhaps these depositories exerted a significant influence on the price of primary bank services in those markets. If so, a more accurate delineation of market boundaries would have put most of New England into a single regional market.

II. Evidence from Existing Data That the Boundaries of New England's Middle-Lending Markets Have Changed since 1984

Whether Dunham's boundaries were accurate in 1984, a good case can be made that New England's geographic middle-lending markets have changed during the past 10 years. This case rests on two trends evident in bank data. First, large commercial banks and large thrifts that actively participate in commercial lending markets have expanded geographically and increased assets since 1984. Consequently, New England's mid-sized businesses may no longer have to shop in one of the Big Four in order to find a bank large enough to satisfy their short-term credit needs. Second, those institutions that are subsidiaries of one of the region's large bank holding companies have gained substantial authority to rule on commercial loan applications independent of their parent bank. Consequently, mid-sized businesses may feel less compelled to deal directly with the lead bank of a bank holding company.

The Geographic Dispersion of Large Depository Institutions in New England

In 1984, all but two of the commercial banks with more than $1 billion in deposits doing business in New England were located in the Big Four. The two that were not, both located in eastern Connecticut,[7] had combined deposits totaling less than $2.5 billion.

[7] These two banks were Union Trust, New Haven, and Colonial Bank, Waterbury.

A commercial bank holding company, headquartered in Worcester, Massachusetts, held $1.2 billion in total deposits. This bank holding company consisted of seven commercial bank affiliates, none of which had deposits in excess of $500 million. One thrift institution, located in Bridgeport, Connecticut, with deposits totalling $3 billion, was somewhat commercially active.[8] Consequently, most of New England's mid-sized firms had to go either to one of the Big Four or out of the region in order to find a bank large enough to satisfy their primary banking needs.

At the end of 1992, New England had six commercial banks with deposits exceeding $1 billion headquartered outside of the Big Four, with combined deposits of almost $11 billion.[9] More important, the headquarters of these banks were (and still are) geographically dispersed throughout the region. Three of them, Fleet Bank of Maine, Key Bank of Maine, and Casco Northern Bank, are headquartered in Portland, Maine; two, Bank of Boston Connecticut and Chase Manhattan Bank of Connecticut, are headquartered in eastern Connecticut; and one, Fleet Bank of New Hampshire, is headquartered in southern New Hampshire.

Burlington, Vermont, is the headquarters location of Banknorth Group, a bank holding company controlling deposits of $1.4 billion. (The largest bank controlled by Banknorth Group, however, Howard Bank, has only $500 million in deposits.) Also headquartered in Burlington is Chittenden Trust Company, a commercial bank with total deposits just under $1 billion.

Large, commercially active thrift institutions have also become more numerous, expanded geographically, and increased assets since 1984. At the end of 1992, 10 thrifts with more than $1 billion in deposits were headquartered outside of the Big Four. Five of them were headquartered in eastern Connecticut, two in Massachusetts, two in southern New Hampshire, and one in Portland, Maine.[10] The combined deposits of these nine institutions totalled $20.8 billion.

Are These Depositories Independent Enough to Be Viable Alternatives for Mid-Sized Businesses?

All six of New England's $1 billion-plus commercial banks located outside of the Big Four are subsidiaries of either Fleet Financial Group, Bank of Boston Corporation, Chase Manhattan Corporation, or Keycorp. The region's second largest thrift, First New Hampshire Bank, is a subsidiary of the Bank of Ireland, headquartered in Dublin, Ireland. Are these seven depository institutions sufficiently independent to supplant their parent banks as providers of primary banking services to mid-sized firms? If not, these firms probably still prefer parent banks over subsidiaries, other things equal, and the boundaries of the region's middle-lending markets probably have changed very little over the past decade.

In order to evaluate the degree of independence enjoyed by subsidiaries of large bank holding companies, the author interviewed several CEOs and senior lending officers at large New England bank holding companies.[11] They stated that the subsidiaries of their bank holding companies have substantial authority to choose their commercial customers and to decide how much they lend to each and on what terms. Each bank holding company gives the lending officers at its subsidiaries a ceiling on the amount of money that the subsidiary can lend to any particular borrower. According to the interviewees, the ceiling is high enough to accommodate most of the short-term credit needs of mid-sized firms below a certain size. According to some, this limit is $50 million; according to others, it is closer to $100 million. Only the larger mid-sized firms are likely to need loans large enough to require clearance at the bank holding company level.

Subsidiaries of bank holding companies now have substantial authority to choose their commercial customers and to decide how much they lend to each and on what terms.

[8] People's Bank. The source of all 1984 deposit data cited in the text is Heaton (1984).

[9] The source of all deposit data for the end of 1992 is Sansons and Storm (1993).

[10] The 10 thrifts headquartered outside of the Big Four are People's Bank, Bridgeport, CT; First NH Bank, Manchester, NH; Centerbank, Waterbury, CT; New Bedford Institution for Savings, New Bedford, MA; People's Heritage Savings Bank, Portland, ME; First Federal Bank, Waterbury, CT; New Haven Savings Bank, New Haven, CT; New Dartmouth Bank, Manchester, NH; Worcester County Institution for Savings, Worcester, MA; and Derby Savings Bank, Derby, CT.

[11] Their names and affiliations are not revealed here to protect their confidentiality.

Hypotheses Concerning How the Boundaries of Middle-Lending Markets Have Changed

The increase in the number, geographic dispersion, and operational independence of New England's large depositories suggests that the region's mid-sized businesses are now served by eight financial centers. In addition to Boston, Providence, and Hartford, these centers now include Burlington, Vermont; Portland, Maine; Manchester-Nashua, New Hampshire; Waterbury, Connecticut; and Bridgeport, Connecticut. Each of these eight urban centers except Burlington is home to the headquarters of at least two large depositories (total deposits in excess of $1 billion).

The increase in number, geographic dispersion, and operational independence of New England's large depositories suggests that the region's mid-sized businesses are now served by eight financial centers instead of four.

According to this "financial center" hypothesis, each of these cities serves as the focal point of a new middle-lending market (Map 3). Following Dunham's methodology, every point within each market is closer to one of the financial centers than it is to the other seven. For example, each point within the Bridgeport, Connecticut market is closer to Bridgeport than to any of the other seven centers. In contrast to Dunham's conclusions, no part of New England would lie within New York City's middle-lending market because every point in eastern Connecticut would lie closer to Bridgeport, Waterbury, or Hartford.

The financial center hypothesis rests on two additional assumptions. The first is the standard one that the cost of transactions between a business and its bank increases proportionately with the distance between the two. It implies that, other things equal, the typical mid-sized firm prefers to borrow from a bank whose headquarters is close rather than far away.

According to the second assumption, the typical mid-sized firm strongly prefers to do most of its business with the headquarters branch of its primary bank, as opposed to the branch closest to it, in order to assure timely consideration of its loan applications. However, as discussed above, if the firm's primary bank is a subsidiary of a bank holding company, the firm no longer feels compelled to deal directly with the parent bank's management. This assumption implies, for example, that a mid-sized firm located in Bangor, Maine and banking with Fleet Bank of Maine prefers to conduct most of its business with the bank's headquarters office in Portland, rather than with one of the bank's branches in Bangor. However, the firm feels no need to conduct the bulk of its business with Fleet Financial Group's headquarters, in Providence.

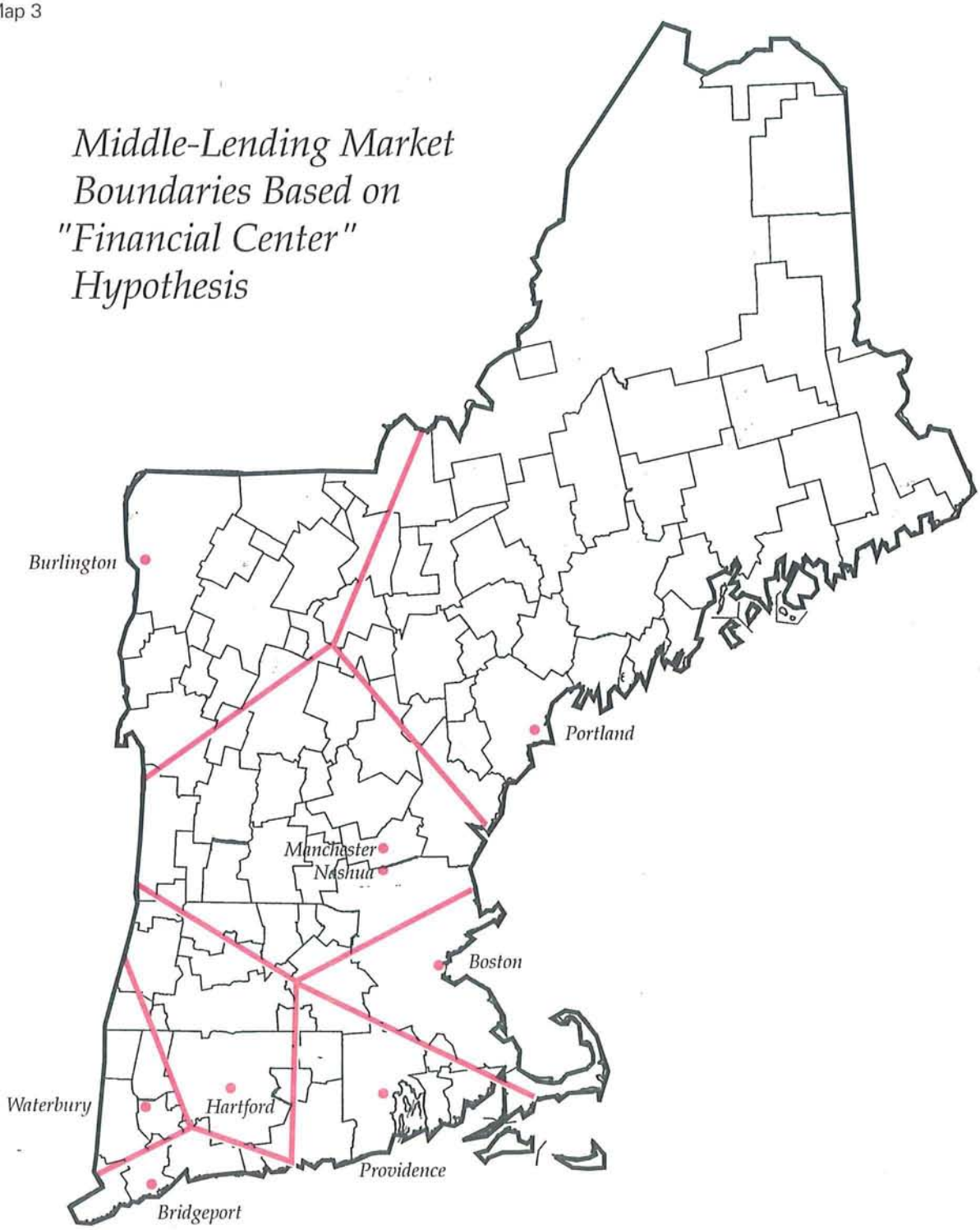
The assumption that mid-sized firms strongly prefer to conduct their business with the headquarters branch of their primary bank may be invalid. Most of New England's large depositories, even those headquartered outside of Boston, Hartford, and Providence, have an extensive system of branches throughout the state in which they are headquartered. Many of these branches are equipped to deliver services to businesses, such as receiving deposits and dispensing cash, that cannot be provided electronically. At the same time, many services usually provided exclusively by a headquarters branch, such as cash management, can be delivered electronically over long distances.

Under current law, a depository generally can operate full-service branches only in the state in which it is headquartered. Consequently, today's typical mid-sized business may prefer to bank with an in-state institution operating nearby branches over an out-of-state institution without nearby branches but with a closer headquarters site. If so, then the boundaries of New England's middle-lending markets may coincide with state boundaries (the "state-by-state" hypothesis), not the boundaries shown in Map 3.

III. New Evidence on the Geographic Boundaries of Middle-Lending Markets: Results of the Boston Fed Middle-Market Survey

In order to test these, as well as other, hypotheses concerning how the boundaries of New England's mid-sized firms may have changed since Dunham performed her analysis, the author analyzed data from the Boston Fed's 1992 middle-market survey. As

Map 3



Source: Author's calculations and map of local banking markets taken from Sansons and Storm (1993).

described in Tannenwald (1993), the firms participating in the survey were asked, among other things, to identify their principal supplier of short-term credit. The survey included telephone interviews of 1,051 businesses in New England whose 1992 annual sales ranged from $10 million to $250 million per year. The characteristics of the sample of firms interviewed, the manner in which the sample was selected, the questions posed during the interviews, and a complete tabulation of the survey results are presented in Tannenwald (1993 and 1994 forthcoming).

Of the 1,051 respondents, 363 did not identify a bank as their primary source of short-term credit because they had no short-term credit, because they obtained it primarily from a nonbank source, or because they were subsidiaries of a multicorporate entity and received their credit primarily from their parent company. Of the remaining 688 firms, 125 were subsidiaries of multicorporate entities that obtained most of their short-term credit from a bank, as opposed to their parent company. For the purposes of this article, these firms were eliminated from the sample because their primary credit source, even though a bank, was usually determined by their parent company, which often was not a mid-sized market firm and almost always had a different location. The remaining 563 firms constituted the subsample used to test hypotheses concerning the current geographic boundaries of New England's middle-lending markets.

Two tables based on the survey data were constructed to determine whether the financial center hypothesis or the state-by-state hypothesis is more accurate. Table 2 assumes that the geographic boundaries of New England's middle-lending markets are those implied by the financial center hypothesis.

Table 2
Primary Banking Relationships of Middle-Market Firms, by "Financial Center" Market[a]

	Market in Which Firm's Primary Bank Is Headquartered											
Market in Which Firm Is Located	(1) Boston, MA	(2) Bridge-port, CT	(3) Burling-ton, VT	(4) Hartford, CT	(5) Manchester/ Nashua, NH	(6) Portland, ME	(7) Provi-dence, RI	(8) Water-bury, CT	(9) New York, NY	(10) Other	(11) Total	(12) Percent in Own Market
(1) Boston, MA	**223**	0	0	1	5	0	5	0	15	11	260	85.8
	(85.8)	(0.0)	(0.0)	(0.4)	(1.9)	(0.0)	(1.9)	(0.0)	(5.8)	(4.2)	(100.0)	
(2) Bridgeport, CT	0	**22**	0	2	1	0	1	0	5	2	33	66.7
	(0.0)	**(66.7)**	(0.0)	(6.1)	(3.0)	(0.0)	(3.0)	(0.0)	(15.2)	(6.1)	(100.1)	
(3) Burlington, VT	5	0	**12**	0	1	0	1	0	1	0	20	60.0
	(25.0)	(0.0)	**(60.0)**	(0.0)	(5.0)	(0.0)	(5.0)	(0.0)	(5.0)	(0.0)	(100.0)	
(4) Hartford, CT	9	1	0	**46**	0	0	1	0	5	1	63	73.0
	(14.3)	(1.6)	(0.0)	**(73.0)**	(0.0)	(0.0)	(1.6)	(0.0)	(7.9)	(1.6)	(100.0)	
(5) Manchester/ Nashua, NH	23	0	1	0	**31**	1	1	0	5	3	65	47.7
	(35.4)	(0.0)	(15.0)	(0.0)	**(47.7)**	(1.5)	(1.5)	(0.0)	(7.7)	(4.6)	(99.9)	
(6) Portland, ME	2	0	0	0	3	**29**	1	0	0	5	40	72.5
	(5.0)	(0.0)	(0.0)	(0.0)	(7.5)	**(72.5)**	(2.5)	(0.0)	(0.0)	(12.5)	(100.0)	
(7) Providence, RI	11	0	0	1	1	0	**48**	0	4	1	66	72.7
	(16.7)	(0.0)	(0.0)	(1.5)	(1.5)	(0.0)	**(72.7)**	(0.0)	(6.1)	(1.5)	(100.0)	
(8) Waterbury, CT	1	1	0	1	0	0	0	**10**	2	1	16	62.5
	(6.3)	(6.3)	(0.0)	(6.3)	(0.0)	(0.0)	(0.0)	**(62.5)**	(12.5)	(6.3)	(100.2)	
(9) Total	274	24	13	51	42	30	58	10	37	24	563	74.8
	(48.7)	(4.3)	(2.3)	(9.1)	(7.5)	(5.2)	(10.3)	(1.8)	(6.6)	(4.3)	(100.1)	

[a]Markets correspond to those delineated in Map 3.

Note: First row of numbers for each market shows number of firms. Numbers in parentheses are percentages. (Percentages may not sum to 100.0 because of rounding.)

Percentage of markets where percentage of firms choosing an in-market bank exceeds 80 percent: 12.5%. Percentage of markets where percentage of firms choosing an in-market bank is less than 70 percent: 50%.

Source: Author's calculations and Federal Reserve Bank of Boston Middle-Market Survey.

Table 3
Primary Banking Relationships of Middle-Market Firms, by State Banking Market

Market in Which Firm Is Located	Market in Which Primary Bank Is Headquartered (1) Connecticut	(2) Maine	(3) Massachusetts	(4) New Hampshire	(5) Rhode Island	(6) Vermont	(7) New York	(8) Other	(9) Total	(10) Percent in Own Market
(1) Connecticut	**76**	0	5	0	2	1	11	4	99	76.8
	(76.8)	(0.0)	(5.1)	(0.0)	(2.0)	(1.0)	(11.1)	(4.0)	(100.0)	
(2) Maine	0	**29**	2	3	0	0	0	5	39	74.4
	(0.0)	**(74.4)**	(5.1)	(7.7)	(0.0)	(0.0)	(0.0)	(12.8)	(100.0)	
(3) Massachusetts	0	0	**276**	2	6	1	20	12	317	87.1
	(0.0)	(0.0)	**(87.1)**	(0.6)	(1.9)	(0.3)	(6.3)	(3.8)	(100.0)	
(4) New Hampshire	0	1	12	**23**	1	1	3	2	43	53.5
	(0.0)	(2.3)	(27.9)	**(53.5)**	(2.3)	(2.3)	(7.0)	(4.7)	(100.0)	
(5) Rhode Island	0	0	0	0	**37**	0	1	1	39	94.9
	(0.0)	(0.0)	(0.0)	(0.0)	**(94.9)**	(0.0)	(2.6)	(2.6)	(100.0)	
(6) Vermont	0	0	5	0	2	**17**	2	0	26	65.4
	(0.0)	(0.0)	(19.2)	(0.0)	(7.7)	**(65.4)**	(7.7)	(0.0)	(100.0)	
(7) Total	76	30	300	28	48	20	37	24	563	81.3
	(13.5)	(5.3)	(53.3)	(4.9)	(8.5)	(3.6)	(6.6)	(4.3)	(100.0)	

Note: First row of numbers for each market shows number of firms. Numbers in parentheses are percentages.
Percentage of markets where percentage of firms choosing an in-market bank exceeds 80 percent: 33.3%. Percentage of markets where percentage of firms choosing an in-market bank is less than 70 percent: 33.3%.
Source: Author's calculations and Federal Reserve Bank of Boston Middle-Market Survey.

Each row distributes firms located in a given market by the market in which the headquarters of their primary bank is located. For example, row 1 of Table 2 presents the market-by-market distribution of the primary banks of all firms located in the Boston market.[12] Table 3 presents the same analysis under the assumptions that each state is a separate geographic market. The diagonals of each table in bold print indicate the number and percentage of firms located in each market whose primary bank is headquartered in that market.

The state-by-state market configuration gives a closer "topographic fit" than the financial center configuration. In Table 3, 81 percent of respondents are assigned to the bold diagonal boxes, compared to 75 percent in Table 2. More important, the percentage of markets in which in-market banks have a market share above 80 percent is higher in Table 3, and the percentage of markets in which in-market banks have a market share below 70 percent is lower.

Alternative Hypotheses

While the state-by-state hypothesis provides a better fit than the financial center hypothesis, alternative hypotheses may provide fits superior to both. In particular, geographic markets may differ for various size groups within the middle-market range. Smaller middle-market firms may be more likely than their larger counterparts to be satisfied with in-state banks, because the amount of short-term credit and the range of services that they require are on average smaller. Most of the bank CEOs and senior commercial lending officers interviewed by the author agreed with this hypothesis.

In order to test this possibility, the author divided his sample of mid-sized businesses into two size segments, those with annual sales between $10 million and $50 million (the "small" segment) and those with annual sales over $50 million and below $250 million (the "large" segment).[13] Table 4 analyzes

[12] Each column indicates the number of times depositories located in a given geographic market are identified as primary banks, broken down by the location of the identifying firm. For example, Table 2, column 1, row 2 indicates the number of times that a depository located in the Boston market is identified as a primary bank by firms located in the Bridgeport, Connecticut market.

[13] Comments by the bank CEOs and commercial lending officers interviewed suggested that the demarcation between the small and large segments should fall somewhere in the $50 million–$100 million dollar range. If the demarcation point were

Table 4
Primary Banking Relationships of Small-Segment Middle-Market Firms,[a] by State Banking Market

Market in Which Firm Is Located	Market in Which Primary Bank Is Headquartered									
	(1) Connecticut	(2) Maine	(3) Massachusetts	(4) New Hampshire	(5) Rhode Island	(6) Vermont	(7) New York	(8) Other	(9) Total	(10) Percent in Own Market
(1) Connecticut	**62**	0	3	0	2	1	6	1	75	82.7
	(82.7)	(0.0)	(4.0)	(0.0)	(2.7)	(1.3)	(8.0)	(1.3)	(101.0)	
(2) Maine	0	**22**	0	3	0	0	0	3	28	78.6
	(0.0)	**(78.6)**	(0.0)	(10.7)	(0.0)	(0.0)	(0.0)	(10.7)	(100.0)	
(3) Massachusetts	0	0	**169**	2	2	0	10	10	193	87.6
	(0.0)	(0.0)	**(87.6)**	(1.0)	(1.0)	(0.0)	(5.2)	(5.2)	(100.0)	
(4) New Hampshire	0	1	5	**21**	1	1	1	1	31	67.7
	(0.0)	(3.2)	(16.1)	**(67.7)**	(3.2)	(3.2)	(3.2)	(3.2)	(99.8)	
(5) Rhode Island	0	0	0	0	**26**	0	0	0	26	100.0
	(0.0)	(0.0)	(0.0)	(0.0)	**(100.0)**	(0.0)	(0.0)	(0.0)	(100.0)	
(6) Vermont	0	0	1	0	2	**15**	1	0	19	79.0
	(0.0)	(0.0)	(5.3)	(0.0)	(10.5)	**(79.0)**	(5.3)	(0.0)	(100.1)	
(7) Total	62	23	178	26	33	17	18	15	372	84.7
	(16.7)	(6.2)	(47.9)	(7.0)	(8.9)	(4.6)	(4.8)	(4.0)	(100.1)	

[a]Small-segment middle-market firms are defined as those firms with reported annual sales in 1991 greater than $10 million and less than or equal to $50 million.

Note: First row of numbers for each market shows number of firms. Numbers in parentheses are percentages. (Percentages may not sum to 100.0 because of rounding.)

Percentage of markets where percentage of firms choosing an in-market bank exceeds 80 percent: 50%. Percentage of markets where percentage of firms choosing an in-market bank is less than 70 percent: 16.7%.

Source: Author's calculations and Federal Reserve Bank of Boston Middle-Market Survey.

the extent to which small-segment businesses located within a particular state choose a depository headquartered within that state as their primary bank. Table 5 performs the same analysis for the large-segment firms.

The smaller firms are, in fact, considerably more likely to rely on an in-state bank than are their larger counterparts. Almost 85 percent of the small-segment businesses chose an in-state bank. The percentage was greater than 75 percent in five of the six New England states; in New Hampshire it was 68 percent (Table 4).[14] By contrast, only 75 percent of large-segment banks chose an in-state bank (Table 5). The topographic fit was especially poor in New Hampshire and Vermont, where only 17 percent and 29 percent of large-segment firms, respectively, chose an in-state bank.

A possibly more accurate set of market boundaries for the small segment would combine Massachusetts and New Hampshire into a single market. Over 16 percent of New Hampshire firms in this segment listed a Massachusetts-based bank as their most important source of short-term credit. Unfortunately, no clear-cut standard exists for determining the point at which banks from one area do so much lending in another area that the two areas should be considered part of the same geographic market. One possibly relevant set of guidelines is the 15 and 20 percent rule used by the Boston Fed in delineating the boundaries of local banking markets (Section I,

$100 million, there would be very few observations for each state in the $100 million–$250 million range. As discussed later in this article, small sample size is still a problem in the large segment, even with a lower bound of over $50 million.

[14] Note that three of Maine's 28 small-segment middle-market firms use a New Hampshire bank as their primary source of credit (Table 4, row 2, column 4). In each case the bank is First New Hampshire of Manchester, NH. In 1992, First New Hampshire acquired First Maine Bank, Portland, ME, and then promptly closed it down (Sansons and Storm 1993). First New Hampshire maintained several of First Maine Bank's former borrowers, servicing them out of Manchester. Were it not for this set of circumstances, the percentage of small-segment Maine firms banking with an in-state depository probably would have been well over 80 percent.

Table 5
Primary Banking Relationships of Large-Segment Middle-Market Firms,[a] by State Banking Market

Market in Which Firm Is Located	Market in Which Primary Bank Is Headquartered (1) Connecticut	(2) Maine	(3) Massachusetts	(4) New Hampshire	(5) Rhode Island	(6) Vermont	(7) New York	(8) Other	(9) Total	(10) Percent in Own Market
(1) Connecticut	**14**	0	2	0	0	0	5	3	24	58.3
	(58.3)	(0.0)	(8.3)	(0.0)	(0.0)	(0.0)	(20.8)	(12.5)	(99.9)	
(2) Maine	0	**7**	2	0	0	0	0	2	11	63.6
	(0.0)	**(63.6)**	(18.2)	(0.0)	(0.0)	(0.0)	(0.0)	(18.2)	(100.0)	
(3) Massachusetts	0	0	**107**	0	4	1	10	2	124	86.3
	(0.0)	(0.0)	**(86.3)**	(0.0)	(3.2)	(0.8)	(8.1)	(1.6)	(100.0)	
(4) New Hampshire	0	0	7	**2**	0	0	2	1	12	16.7
	(0.0)	(0.0)	(58.3)	**(16.7)**	(0.0)	(0.0)	(16.7)	(8.3)	(100.0)	
(5) Rhode Island	0	0	0	0	**11**	0	1	1	13	84.6
	(0.0)	(0.0)	(0.0)	(0.0)	**(84.6)**	(0.0)	(7.7)	(7.7)	(100.0)	
(6) Vermont	0	0	4	0	0	**2**	1	0	7	28.6
	(0.0)	(0.0)	(57.1)	(0.0)	(0.0)	**(28.6)**	(14.3)	(0.0)	(100.0)	
(7) Total	14	7	122	2	15	3	19	9	191	74.9
	(7.3)	(3.7)	(63.9)	(1.1)	(7.9)	(1.6)	(10.0)	(4.7)	(100.2)	

[a]Large-segment middle-market firms are defined as those firms with reported annual sales in 1991 greater than $50 million and less than or equal to $250 million.

Note: First row of numbers for each market shows number of firms. Numbers in parentheses are percentages. (Percentages may not sum to 100.0 because of rounding.)

Percentage of markets where percentage of firms choosing an in-market bank exceeds 80 percent: 33.3%. Percentage of markets where percentage of firms choosing an in-market bank is less than 70 percent: 66.7%.

Source: Author's calculations and Federal Reserve Bank of Boston Middle-Market Survey.

above). The percentage of New Hampshire firms in the smaller middle-market segment listing a Massachusetts depository as their primary bank falls within the "gray" 15 and 20 percent range. Consequently, according to this rule, one should consider Massachusetts and New Hampshire as one lending market if supplementary evidence corroborates strong economic links between the two states.

In support of the hypothesis that New Hampshire is not an autonomous middle-lending market, the CEO of a New Hampshire bank interviewed by the author pointed out that a large percentage of the state's residents are migrants from other states, especially Massachusetts. As a result, they are familiar with out-of-state financial institutions and feel relatively comfortable doing business with them. The CEO also pointed out that a large portion of New Hampshire's population resides within an hour's drive of Boston.

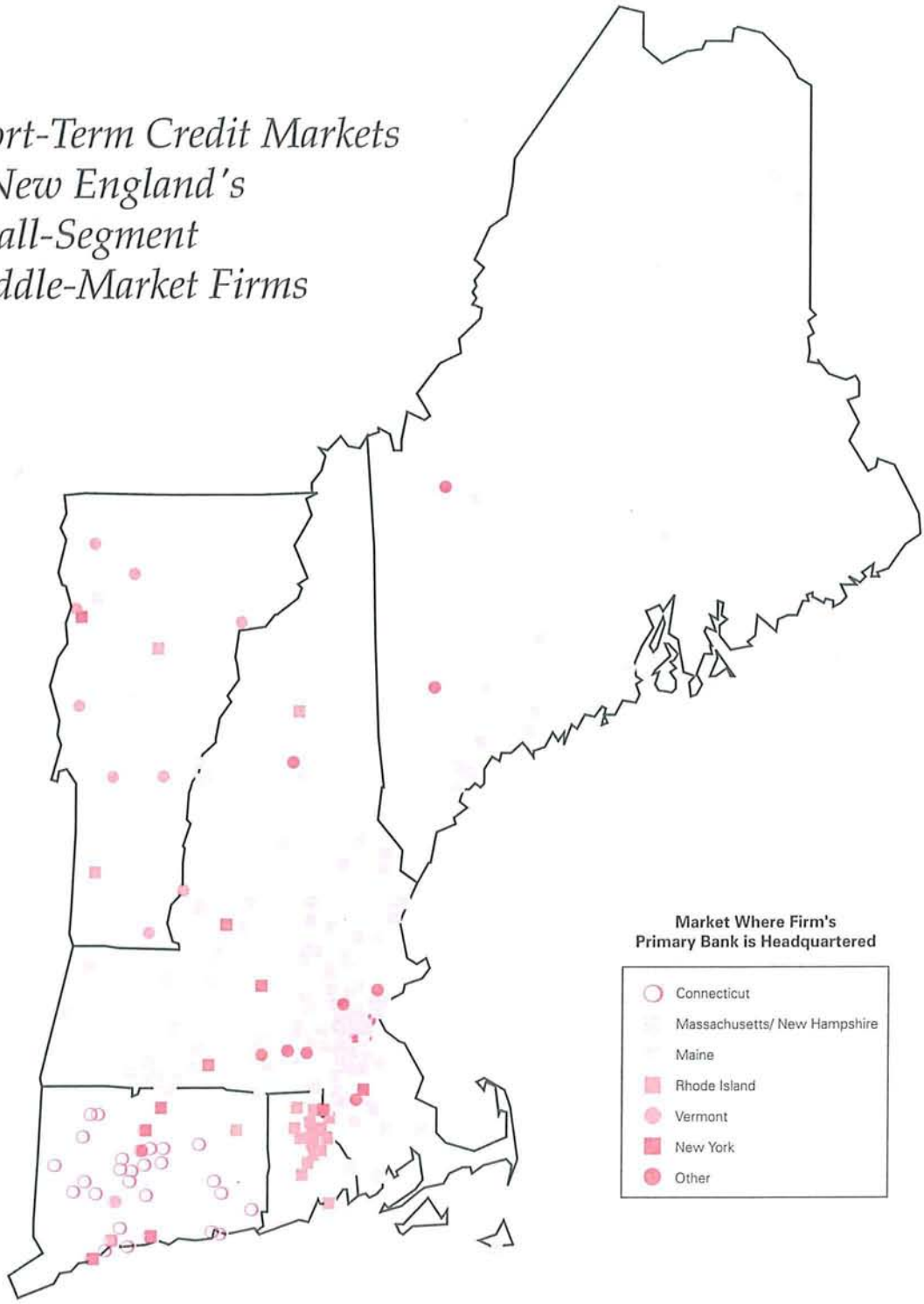
Interstate migration data collected by the U.S. Census Bureau confirm that a large percentage of New Hampshire residents are migrants. The latest available statistics show that more than one in six of New Hampshire's residents in 1980 lived in another state in 1975. More than 1 in 14 lived in Massachusetts (U.S. Bureau of the Census 1985).

Combining Massachusetts and New Hampshire into a single, small-segment middle-lending market improves the "topographic fit" between market delineations and actual geographic clusters of banking relationships (Map 4). As shown in Table 6, with this configuration 87 percent of all small-segment firms rely on an in-state bank as their primary source of short-term credit. This percentage exceeds 78 percent in all five markets.

Alternative configurations providing a better topographic fit than state boundaries can be drawn for large-segment geographic lending markets as well. One such configuration, presented in Map 5 and Table 7, consists of three such markets: Rhode Island, Maine-Massachusetts-New Hampshire-Vermont, and Connecticut (which is part of the New

Map 4

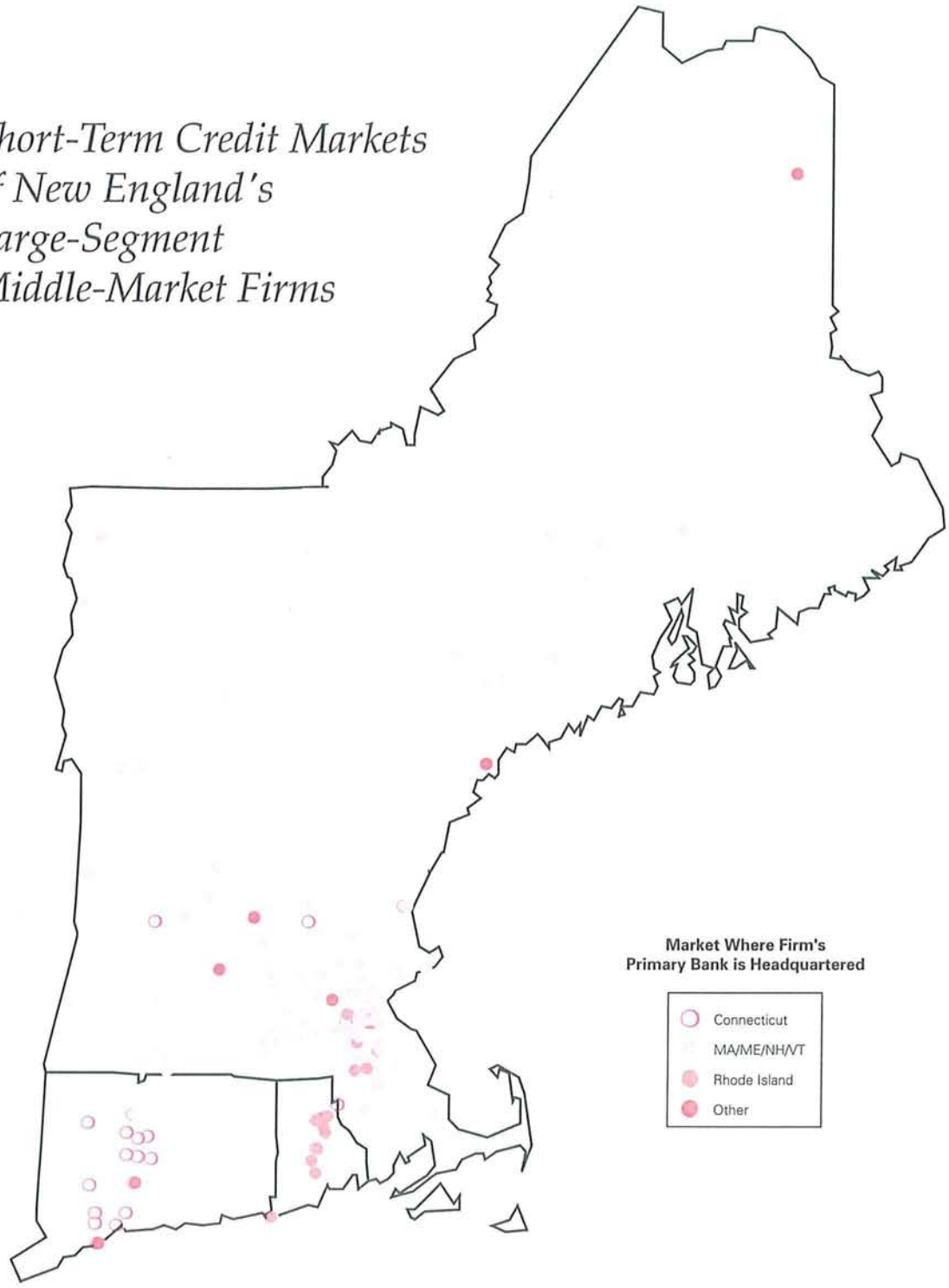
Short-Term Credit Markets of New England's Small-Segment Middle-Market Firms



Note: Dots represent headquarters of firms in sample of Boston Fed Middle-Market Survey with $10 million to $50 million in 1991 sales.
Source: Boston Fed Middle-Market Survey.

Map 5

Short-Term Credit Markets of New England's Large-Segment Middle-Market Firms



Note: Dots represent headquarters of firms in sample of Boston Fed Middle-Market Survey with $50 million to $250 million in 1991 sales.
Source: Boston Fed Middle-Market Survey.

Table 6

Primary Banking Relationships of Small-Segment Middle-Market Firms,[a] by Modified State Banking Market

Market in Which Firm Is Located	Market in Which Primary Bank Is Headquartered (1) Connecticut	(2) Maine	(3) Massachusetts/ New Hampshire	(4) Rhode Island	(5) Vermont	(6) New York	(7) Other	(8) Total	(9) Percent in Own Market
(1) Connecticut	**62**	0	3	2	1	6	1	75	82.7
	(82.7)	(0.0)	(4.0)	(2.7)	(1.3)	(8.0)	(1.3)	(100.0)	
(2) Maine	0	**22**	3	0	0	0	3	28	78.6
	(0.0)	**(78.6)**	(10.7)	(0.0)	(0.0)	(0.0)	(10.7)	(100.0)	
(3) Massachusetts/ New Hampshire	0	1	**197**	3	1	11	11	224	87.9
	(0.0)	(0.5)	**(87.9)**	(1.3)	(0.5)	(4.9)	(4.9)	(100.1)	
(4) Rhode Island	0	0	0	**26**	0	0	0	26	100.0
	(0.0)	(0.0)	(0.0)	**(100.0)**	(0.0)	(0.0)	(0.0)	(100.0)	
(5) Vermont	0	0	1	2	**15**	1	0	19	79.0
	(0.0)	(0.0)	(5.3)	(10.5)	**(79.0)**	(5.3)	(0.0)	(100.1)	
(6) Total	62	23	204	33	17	18	15	372	86.6
	(16.7)	(6.2)	(54.8)	(8.9)	(4.6)	(4.8)	(4.0)	(100.0)	

[a]Small-segment middle-market firms are defined as those firms with reported annual sales in 1991 greater than $10 million and less than or equal to $50 million.

Note: First row of numbers for each market shows number of firms. Numbers in parentheses are percentages. (Percentages may not sum to 100.0 because of rounding.)

Percentage of markets where percentage of firms choosing an in-market bank exceeds 80 percent: 60%. Percentage of markets where percentage of firms choosing an in-market bank is less than 70 percent: 0%.

Source: Author's calculations and Federal Reserve Bank of Boston Middle-Market Survey.

Table 7

Primary Banking Relationships of Large-Segment Middle-Market Firms,[a] by Modified State Banking Market

Market in Which Firm Is Located	Market in Which Primary Bank Is Located (1) Connecticut/ New York	(2) Maine/ Massachusetts/ New Hampshire/ Vermont	(3) Rhode Island	(4) Other	(5) Total	(6) Percent in Own Market
(1) Connecticut	**19**	2	0	3	24	79.2
	(79.2)	(8.3)	(0.0)	(12.5)	(100.0)	
(2) Maine/ Massachusetts/ New Hampshire/ Vermont	13	**132**	4	5	154	85.7
	(8.4)	**(85.7)**	(2.6)	(3.25)	(99.95)	
(3) Rhode Island	1	0	**11**	1	13	84.6
	(7.7)	(0.0)	**(84.6)**	(7.7)		
(4) Total	33	134	15	9	191	84.8
	(17.3)	(70.2)	(7.9)	(4.7)	(100.1)	

[a]Large-segment middle-market firms are defined as those firms with reported annual sales in 1991 greater than $50 million and less than or equal to $250 million.

Note: First row of numbers for each market shows number of firms. Numbers in parentheses are percentages. (Percentages may not sum to 100.0 because of rounding.)

Percentage of markets where percentage of firms choosing an in-market bank exceeds 80 percent: 66.7%. Percentage of markets where percentage of firms choosing an in-market bank is less than 70 percent: 0%.

Source: Author's calculations and Federal Reserve Bank of Boston Middle-Market Survey.

Evidence Used in Identifying Boundaries of Large-Segment Markets

Evidence from both the Boston Fed middle-market survey and Standard & Poor's *1994 Register of Corporations, Directors, and Executives* was used to identify the boundaries of the region's large-segment middle-lending markets. Both sources of data suggest that Rhode Island is a separate market. Among the 13 large-segment Rhode Island firms in the survey sample, 11 bank with an in-state depository.[15] However, four of the firms are hospitals, which are more likely than other enterprises to bank with an in-state institution because of their exceptionally close community ties. Nevertheless, 12 of the 13 independent Rhode Island firms in Standard & Poor's *Register* with annual sales between $50 million and $250 million (none of which are hospitals) identified a Rhode Island depository as their primary bank.

Connecticut apparently belongs in the same market as New York City. A high percentage (21 percent) of the large-segment Connecticut survey subsample identified a depository headquartered in New York City as their primary bank.

Since more than one-half of the survey sample's large-segment firms in both New Hampshire and Vermont bank with a Massachusetts-based bank, these three states were combined into another single market (Massachusetts-New Hampshire-Vermont). Maine was added to this three-state market because two, or 18 percent, of the 11 large-segment firms in the state's subsample reported a Massachusetts-based bank as their primary bank. This percentage falls within the "gray" 15 and 20 percent range, suggesting that corroborating evidence of strong economic ties is needed to link Maine conclusively to the other three states. A similar case could be made for assigning New Hampshire to the same large-segment market as New York City and Connecticut, since two of the 12 large-segment firms in the New Hampshire subsample, or 17 percent, reported banking with a depository headquartered in New York City. (As a result, New Hampshire would be assigned simultaneously to two markets.) Because the large-segment samples for Maine and New Hampshire are so small, conclusions about these states' geographic large-segment market affiliations are fraught with uncertainty, however.

Maine was assigned to the MA-NH-VT market to form a ME-MA-NH-VT market. New Hampshire was not assigned to the New York City-Connecticut market, however. These decisions were made partially on the basis of geography: the most densely populated areas of Maine are closer to the financial centers of Massachusetts, New Hampshire, and Vermont (Boston; Burlington, VT.; Manchester, NH; and Nashua, NH) than the most densely populated areas of New Hampshire are to New York City. Standard & Poor's *Register* listed 26 independent corporations in New Hampshire with annual sales between $50 million and $250 million. Of these, only one, or 4 percent, listed a depository headquartered in New York City as its primary bank. The *Register* listed 18 such corporations located in Maine. Of these, five, or 28 percent, reported a Massachusetts-based depository as their primary bank.

York City market).Evidence used in identifying these three markets is discussed in the accompanying box. Given this configuration, 85 percent of all large-segment firms bank with an institution headquartered within their market. Market-specific deviations from this average are small; the percentage of firms banking with an in-market depository ranges from 79 percent in Connecticut to 86 percent in Maine-Massachusetts-New Hampshire-Vermont.

[15] One of the out-of-state depositories is headquartered in New York, the other in Virginia.

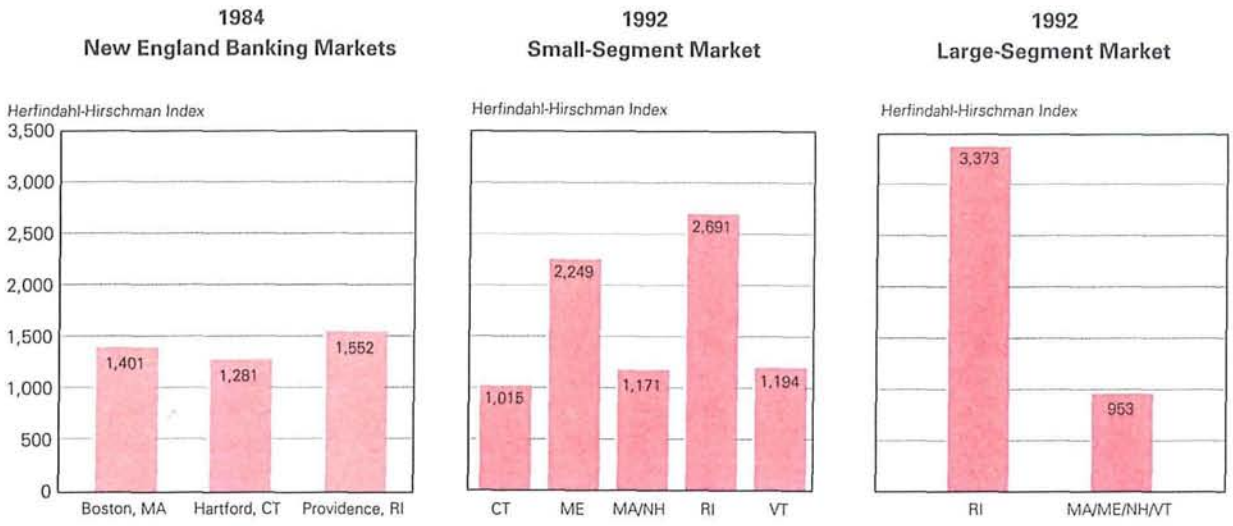
IV. Concentration of Middle-Lending Markets

Dunham (1986) used the Herfindahl-Hirschman Index (HHI) to measure the concentration of her Boston, Providence, and Hartford middle-lending markets.[16] According to Justice Department guide-

[16] The first step in the computation of a market's Herfindahl-Hirschman Index of concentration is to compute the market share of each participant, expressed as a percentage. The Index value equals the sum of the squared percentage shares. Dunham could

Figure 1

Middle-Lending Market Concentration Ratios, 1984 and 1992



Note: Below 1,000, a market is considered unconcentrated; 1,000 to 1,800, moderately concentrated; over 1,800, highly concentrated.
Sources: Dunham (1986); and author's calculations based on Federal Reserve Bank of Boston Middle-Market Survey.

lines, markets with HHI values over 1800 are considered highly concentrated, those with values between 1000 and 1800 moderately concentrated, and those with values less than 1000 are considered unconcentrated (Sansons and Storm 1993). Dunham computed an HHI for each market based on each lender's share of middle market customers. Her results, displayed in the first bar chart in Figure 1, indicate that her three New England markets were moderately concentrated in 1984.

HHI indices for the five small-segment markets identified in this article are also shown in Figure 1. Three markets—Connecticut, Vermont, and Massachusetts-New Hampshire—are somewhat less concentrated than Dunham's but still fall within the moderately concentrated range. These three markets contain over 85 percent of all small-segment firms. The other two small-segment markets, Maine and Rhode Island, are highly concentrated. The HHIs for the two large-segment middle-lending markets that lie wholly within New England are also shown. Rhode Island, which contains 8 percent of the firms in these two markets, is highly concentrated, while the ME-MA-NH-VT market is unconcentrated.

Thus, most of New England's mid-sized firms apparently are located in middle-lending markets where sufficient numbers of lenders exist to ensure the availability of short-term credit on competitive terms. Firms located in the small-segment market in Maine and both the small-segment and large-segment markets in Rhode Island are more vulnerable to uncompetitive terms.

Since the local banking markets of Maine and Rhode Island also tend to be highly concentrated, any merger likely to increase the concentration levels of these three middle-lending markets significantly would probably raise competitive concerns at the local-market level as well.[17] However, parties to a proposed merger of large banks often can alleviate the anticompetitive impact of their transaction on local banking markets by selling off bank branches. This strategy is less likely to be successful in mitigat-

not measure the concentration of her New York City market because she had information only on those banks in this market located in Connecticut.

[17] At the end of 1992, 25 of Maine's 29 local banking markets were highly concentrated, assuming that all depositories, thrifts as well as commercial banks, were market participants (thrifts weighted at 100 percent). Both of Rhode Island's local banking markets were highly concentrated. See Sansons and Storm (1993).

ing anticompetitive impacts on middle-lending markets. If branches are sold to small competitors, the number of viable lenders for mid-sized businesses that need the resources of large depositories does not increase, and the degree of concentration in middle-lending markets is not changed. Consequently, modifying mergers to satisfy antitrust concerns at the local level might fail to mitigate concerns about their anticompetitive impact on middle-lending markets.

V. Summary and Conclusion

This article attempts to identify the geographic boundaries of New England's middle-lending markets and to evaluate their concentration levels. It relies primarily on evidence gleaned from a survey of mid-sized businesses conducted by the Boston Fed in 1992. This evidence suggests that the boundaries of New England's middle-lending markets have changed during the past 10 years, as large depositories capable of satisfying the credit needs of mid-sized firms have become more numerous and more geographically dispersed. Such businesses no longer feel compelled to bank with a depository headquartered in New York City, Hartford, Providence, or Boston. Viable alternatives outside these financial centers are now more plentiful, especially for firms with annual sales between $10 million and $50 million.

The Boston Fed Survey suggests that the credit markets tapped by mid-sized firms in this range have different characteristics than those tapped by firms with annual sales over $50 million and below $250 million. Market boundaries for the smaller range (small-segment firms) conform closely to state boundaries, although Massachusetts and New Hampshire seem to comprise a single market. By contrast, only two lending markets for mid-sized firms in the higher range (large-segment firms) lie wholly within New England, one coterminous with Rhode Island, the other consisting of Maine, New Hampshire, Massachusetts, and Vermont. For large-segment firms, Connecticut is part of the same market as New York City.

Most of New England's mid-sized firms are located in middle-lending markets that are only moderately concentrated. All of Rhode Island's firms and Maine's small-segment firms, which together account for approximately 10 percent of the region's mid-sized businesses, are located in markets that are highly concentrated.

Further analysis is needed to confirm the existence of middle-lending markets, to identify their boundaries, and to evaluate their competitiveness. These issues should continue to be investigated, as they raise important public policy concerns.

References

Dunham, Constance. 1986. "Regional Banking Competition." *New England Economic Review*, July/August, pp. 3–19.

Heaton, Gary. 1984. *1983 Banking Structure in New England*. Federal Reserve Bank of Boston, Research Report 68, November.

Horowitz, Ira. 1977. "On Defining the Geographic Market in Section 7 Cases." *Proceedings of a Conference on Bank Structure and Competition*. Federal Reserve Bank of Chicago, pp. 169–82.

"Justice Aide Tells What Will Flag Merger Plans for Antitrust Probes." *American Banker*, April 8, 1994.

Peter Merrill Associates, Inc. 1985. *The Massachusetts Middle Market: A Study of Financial Services Supply and Demand*. Prepared for the Massachusetts Bankers Association. Boston. June.

Sansons, Megan and Anthony Storm. 1993. *Banking Structure in New England, 1990–93*. Federal Reserve Bank of Boston, Research Report 73, September.

Standard & Poor's Register of Corporations, Directors and Executives. 1984 and 1994. New York: McGraw-Hill.

Tannenwald, Robert. 1993. "How Dependent Are New England's Mid-Sized Firms on the Region's Largest Bank Holding Companies?" *New England Economic Review*, July/August, pp. 35–48.

———. Forthcoming 1994. *The Boston Fed's Middle-Market Survey: Methodology and Questionnaire*. Federal Reserve Bank of Boston Working Paper.

U.S. Bureau of the Census. 1985. *1980 Census of the Population: Geographical Mobility for States and the Nation*. Volume 2, Subject Reports. Report PL80-2-2A. Washington, D.C.: Government Printing Office, September.

———. 1991. *1987 Enterprise Statistics: Company Summary*. Report ES87-3. Washington, D.C.: Government Printing Office. June.

New England Economic Indicators

Each issue of the monthly publication *New England Economic Indicators* presents tabulations of the most recent data on New England and United States employment, construction, sales, prices, income, and financial activity. Requests to be added to the mailing list should be sent to Research Library—D, Federal Reserve Bank of Boston, P.O. Box 2076, Boston, MA 02106–2076, or call (617) 973-3397. There is no charge for this publication.

All data published in the *New England Economic Indicators* can also be accessed via modem, at the New England Electronic Economic Data Center at the University of Maine. The Center provides the latest figures available in the Federal Reserve Bank of Boston's *Indicators* data base. The service also offers historical data ranging as far back as 1969. The system allows users to read the data on-screen or to download historical series in LOTUS print file format. There is no charge (other than the telephone call) for this service. To access the system, use your modem and call (207) 581-1867 for a 2,400 baud modem or (207) 581-1860 for a 9,600 baud modem. Set software to: full duplex; 8 bit; no parity; 1 stop bit. The data can also be acquired over Internet by the FTP Command. The Internet address is NEEEDC.UMESBS.MAINE.EDU, and the user logon is ANONYMOUS.

For information about computer access, please call Jim Breece at the University of Maine: (207) 581-1863. For information about the data, please call Catherine Jew at (617) 973-3187.

50 Years after Bretton Woods: What Is the Future for the International Monetary System? An Overview

Rachel E. Cononi and Rebecca Hellerstein

Research Assistants, Federal Reserve Bank of Boston. *This article summarizes a session of the annual meeting of the Eastern Economic Association, March 18, 1994.* *The authors thank Jane Sneddon Little for helpful comments.*

This Eastern Economic Association roundtable discussion, held on March 18, 1994 at the Federal Reserve Bank of Boston, examined the future of the international monetary system in light of the aims of the Bretton Woods agreement of 1944. The title of the roundtable captures the central concern of each speaker: To what extent can the ideals of the founders of the Bretton Woods system be implemented today, given the changes in underlying economic conditions since that time?

Each speaker offered a distinct response to that question, drawn from the unique perspective of his background. J. Dewey Daane, a professor at Vanderbilt University, offered a historical perspective as he introduced the panel. Charles Taylor, Executive Director of the Group of Thirty and Project Director of the Bretton Woods Commission, gave some of his personal views on directions the International Monetary Fund and the monetary system might take. Richard Erb, Deputy Managing Director of the International Monetary Fund, explained the current process of international monetary collaboration among its members known as IMF surveillance. Scott E. Pardee, Chairman of the securities firm Yamaichi International (America) Inc., argued that the international monetary system functions effectively only when market participants can ally themselves confidently with the stated monetary policies of national governments. And Stefan Schoenberg, Executive Director for Germany at the IMF, emphasized that currency competition in today's world is basically policy competition. Moderator for the panel was Richard F. Syron, President of the Federal Reserve Bank of Boston.

Introductory Remarks: A Historical Perspective

J. Dewey Daane introduced the roundtable, noting that while the focus of the discussion to follow clearly would be on "where we go from

The Bretton Woods Payments System: A Brief History

The establishment of a new and more stable system of multilateral trade and payments was one of the most important tasks facing world leaders at the close of the second World War. Delegates from 44 nations gathered at Bretton Woods, New Hampshire in July 1944 with a common vision—to devise a monetary system that would encourage international cooperation. They were driven to reform the international monetary system by fears of a return to the dramatic slumps and booms that scarred the interwar years. During the Great Depression, the system of gold convertibility that had been in place since 1880 came to a grinding halt. The years that followed were characterized by fluctuating exchange rates, competitive devaluations, and increasing use of restrictive trade practices.

The Bretton Woods delegates designed a framework for a new payments system intended to promote economic recovery and the expansion of trade. The conferees laid the foundation for their new monetary regime in the Articles of Agreement of the International Monetary Fund, which provided for a system based on pegged but adjustable exchange rates and an institution, the International Monetary Fund (IMF), that would administer the system, operate as a central bank for central banks, and assist countries experiencing periodic balance of payments difficulties. The Fund Agreement provided for a system of international credits, available to member countries to finance temporary balance of payments difficulties; currency convertibility, at least for current account transactions; and the prohibition of discriminatory currency practices.

The new monetary regime did not become fully operational until 1958 when, after an extended period of postwar reconstruction, European currencies became fully convertible. The strengthening of European currencies in the late 1950s mirrored the increasing weakness of the U.S. dollar, however. The dollar's weakening, accompanied by repeated challenges to the international monetary system, gradually led to an erosion of confidence in the system.

By the early 1960s, the U.S. dollar had become overvalued relative to gold and other currencies. Government persistence in maintaining fixed exchange rates in the face of fundamental payments imbalances led to heavy speculation. Disequilibria built up, resulting in a series of currency crises that progressively undermined the fixed-rate system. Indeed, one fundamental weakness in the key currency system established at Bretton Woods was that it required the United States to run balance of payments deficits in order to supply other countries with needed liquidity through increased foreign exchange reserves. Supplying this liquidity while maintaining a fixed exchange rate resulted in U.S. gold reserves becoming increasingly inadequate to guarantee dollar convertibility at $35 per ounce, further eroding international confidence in the Bretton Woods system.

A variety of solutions were proposed regarding the reform of the international liquidity mechanism, but decisive action was not taken until March 1968, when the IMF created Special Drawing Rights (SDRs), a new reserve asset to substitute for dollars. By 1969, however, the international economy was experiencing severe strains and the convertibility of the dollar was increasingly in doubt. In addition, lowered barriers to capital flows accelerated the speed with which dollars could be transferred from the United States to Europe. With enormous pools of capital becoming increasingly mobile, the maintenance of fixed exchange rates became ever more difficult. In August 1971, U.S. President Richard M. Nixon shocked the world with his announcement to set the dollar loose from gold.

Nixon's startling announcement prompted the Smithsonian Agreement of December 1971, a last-ditch attempt by the ministers and governors of the Group of Ten to save the Bretton Woods system. The agreement prescribed devaluation of the dollar against gold, a multilateral realignment of exchange rates, and expansion of the narrow bands of fluctuation around the newly fixed values. In addition, the EC Snake, a technical mechanism for aligning currency movements within the European Economic Community, was created. Despite these measures, the revised system fell apart after little more than a year.

In April 1973, the exchange rates of all major industrial countries began to float against the dollar. During this time the IMF's Committee of Twenty attempted to reconstruct international monetary institutions on the basis of pegged exchange rates. Their efforts collapsed, however, in 1974.

The regime that eventually emerged was based on managed, flexible exchange rates. In January 1976, the Second Amendment to the Fund Agreement ratified the international laissez-faire system that had taken hold after the demise of the Bretton Woods payments system. According to the amendment, the stability of exchange rates was to be sought through the stability of underlying monetary and fiscal policies rather than by pegging; floating rates were to be subject to a process of surveillance by the IMF; the roles of gold and the dollar were to be reduced, with the SDR eventually becoming the principal reserve asset; and finally, the fixed official price of gold was abolished.

Since then, the international monetary system has evolved still further in order to keep pace with economic, political, and technological changes. As a result, we have witnessed a gradual departure from a regime of fixed exchange rates to a system of managed but relatively flexible exchange rates. Some would argue that this flexible regime has contributed to higher inflation and slower growth in GDP in the OECD countries over the past two decades, underlining the need for further multilateral cooperation. Though discussions on reform of the current system have been constant, a consensus has yet to be reached.

here," an inextricable link to the Bretton Woods experience remained, in spirit and reality. One must, in his view, answer the question "Did the Bretton Woods System succeed or fail?" by responding "Both."

The success of Bretton Woods enabled and reinforced an unprecedented expansion in world trade and payments over more than a quarter century. The Bretton Woods agreement led to the elimination of exchange controls and other restrictions in trade and payments and to the restoration of convertibility of currencies among major countries. It also established short-term credit facilities that proved to be an important source of assistance to countries in temporary balance-of-payments difficulties. These facilities still play an important role in today's system.

Daane cautioned that the same instruments that have been developed to cover risk and add liquidity and stability can also be used to speculate, leading instead to increased instability.

The Bretton Woods system failed, however, in three important respects, all relevant today. First, it failed to achieve an adequate adjustment process whereby countries would take the necessary measures, both external (for example, exchange rate actions) and domestic (mainly fiscal and monetary actions), to correct serious imbalances in their balance of payments positions. The Bretton Woods system failed in this because of its inability to ensure that countries would take these necessary corrective steps, an essential element in any effective international monetary system. Second, it failed to provide for the secular growth in world monetary reserves needed to accompany a growing world economy and a relatively fixed-rate system. Bretton Woods initially provided for expansion of borrowed reserves, but not for flexible additions to owned reserves. And third, Bretton Woods failed to provide means to cope with speculative capital movements, which time after time provoked an international monetary crisis.

Drawing on his personal role in the work of the Committee of Twenty (The Committee on Reform of the International Monetary System and Related Issues) to develop a blueprint for reform in the early 1970s, Daane described the four facets of an effective system from the perspective of that Committee: 1) a smoothly functioning adjustment process; 2) adequate liquidity, in terms of both borrowed and owned reserves; 3) a system that could deal with speculative capital flows; 4) a system that could accommodate the needs of developing countries. The Committee did not discard the idea of an exchange rate regime based on stable but adjustable par values, but it recognized that floating rates might provide a useful technique in particular situations.

Daane asserted that the history of the Bretton Woods agreement and the attempts at its reform contains lessons that are applicable today. It is no longer realistic to visualize a return to a relatively fixed-rate system in the Bretton Woods tradition, he declared, because the conditions for such a return are no longer in place. This became clear in the more recent difficulties of the European Monetary System, which was a microcosm of Bretton Woods. The question then becomes, how can we improve a system with floating rates and free (and instantaneous) capital movements? A glaring weakness in current monetary arrangements, according to Daane, has been the marked volatility of exchange rates. Yet the world has survived and prospered, and we may instead need a new concept or criterion of stability. Our earlier concept assumed that unstable exchange rates would be excessively detrimental to the growth of world trade, but this does not appear to have necessarily been the case.

A final lesson Daane drew was that the worldwide monetary system is now more vulnerable to the threat of systemic risk than it was at the time of Bretton Woods. He cautioned that the same instruments that have been developed to cover risk and add liquidity and stability can also be used to speculate, leading instead to increased instability.

The Views of Current Reformers

Charles Taylor considered the future of the international monetary system from the perspective of a modern-day reformer. He recalled that the founding fathers of Bretton Woods developed a cooperative, multilateral system, with the International Monetary Fund at its center to provide the advice and financing to help overcome international payments imbalances and to encourage the liberalization of

international trade and payments. Although their par value system of fixed but adjustable exchange rates eventually broke down, in many respects their vision has proven both sound and durable.

Taylor traced recent monetary history and critiqued the present international monetary system from the viewpoint of the original Bretton Woods delegates. He imagined the delegates expressing surprise at the variety of financial services and financial instruments now available, the many types of financial institutions and the extent to which their activities overlap, and the sophisticated methods of management within these institutions. Other changes since Bretton Woods include the emergence of global markets, the growth in cross-border capital flows, and the displacement of credit markets by capital markets, along with the routine speed of transactions, the volatility of prices, and the emergence of sophisticated information systems. The delegates might also be surprised by the way in which the regulation of financial markets has fallen behind; by how ubiquitous uncertainty is; how ineffective fiscal policy has become; and how new and influential organizations like the G-7 and the European Community have sprung up alongside the IMF.

Taylor speculated that the Bretton Woods delegates would be troubled by recent economic performance in the OECD countries. Comparing the period from the 1950s to the 1970s, the days of the par value system, to the years that followed, Taylor noted that growth of real GNP declined and structural unemployment rose; the rate of growth in the trade of goods and services slowed while cross-border investment flows surged; and savings and investments as a share of GNP fell while public sector deficits grew, facilitated by the growth of international capital markets. One bright spot was inflation; "let out of the bag" in the early 1970s, it has been "squeezed back in again" since the early 1980s. Taylor attributed the poor recent performance overall to a general deterioration in fiscal policy, and to the occasional extreme currency volatility and misalignments of exchange rates that have recurred since the early 1970s.

Taylor noted the striking divergence between the increase in microeconomic efficiency in the international financial system and the decrease in the quality of overall macroeconomic performance. In the light of this disappointing record, he posed two questions: "How much of the problem is international in character and amenable to concerted multilateral action?" and "What are the public goods that can and should be provided through multilateral cooperation?" Taylor identified three such public goods: first, an environment that fosters efficient global capital markets. In the past, this entailed liberalizing payments and capital movements and establishing stable exchange rates. Now, however, limits on excessive volatility and persistent disequilibria must also be considered. Second, sustainable and coordinated macroeconomic policies. Fifty years ago, this meant macroeconomic policies compatible with the agreed exchange rate regime and with stable domestic prices. Today, longer-term structural adjustments must be undertaken to achieve this. Third, confidence in money and in the stability of financial institutions. In the past this was first and foremost a national responsibility: today this requires global cooperation in financial regulation, stretching beyond banks into other types of financial intermediaries.

Taylor noted the striking divergence between the increase in microeconomic efficiency in the international financial system and the decrease in the quality of overall macroeconomic performance.

The basic nature of the public goods needed today is similar to that of 50 years ago, but no consensus now exists on how to provide them. With regard to globally efficient capital markets, "financial libertarians" are at odds with those who favor some demarkation of acceptable limits to price movements, such as target zones for exchange rates. Many of today's policymakers can envision few alternatives to the present ad hoc approach to policy coordination, even though many outside observers would prefer more structure. Taylor attributed the current lack of consensus on global systemic issues to the fact that although substantial progress has already been made on the sub-issues using a pragmatic approach, our thinking about the subject as a whole remains at a relatively early stage.

Taylor expressed uncertainty on how the system will evolve. Existing problems in the international monetary system do give substantive reason for concern. The Bretton Woods Commission, the group of

senior private sector individuals for which Taylor is the Project Director, will shortly publish its proposals for reform: They should be a major contribution to what looks like a vigorous public debate shaping up in the next few months.

The Role of International Monetary Collaboration

Richard Erb described the functions of the International Monetary Fund and the evolution of IMF surveillance, a now-routine process of international monetary collaboration among IMF members. The IMF Articles of Agreement state that "the essential purpose of the international monetary system is to provide a framework that facilitates the exchange of goods, services, and capital among countries and that sustains sound economic growth," a mandate that IMF surveillance seeks to carry out.

Following the breakdown of the fixed exchange rate regime in the 1970s, an agreement on a new regime could not be reached. The general consensus was that in order to reestablish exchange rate stability, it was first necessary to achieve "orderly underlying conditions" in those economic developments and policies that have a significant impact on a country's exchange rates. The need to focus on these "underlying conditions" led to the development of the collaborative procedure known as IMF surveillance. For each member, at least once a year, IMF staff conduct an in-depth examination of its economy, paying particular attention to monetary, budget, and exchange rate developments and policies, as well as labor markets and other structural areas. The IMF Executive Board assesses the results of this examination, which are then presented to the member's government. Analyses are also prepared for meetings of the G-7 countries, and twice annually the *IMF World Economic Outlook* is issued.

These surveillance consultations enable the IMF membership, through its representatives on the Executive Board, to assess if a country's underlying economic conditions can support sustainable growth, as well as domestic and external financial stability. Member governments generally accept the analysis of the Fund but are not obligated to adopt its recommendations. Often, it proves difficult to garner the necessary domestic political support to implement the recommended fiscal actions.

No limitations are placed on national sovereignty over economic policies and IMF surveillance seeks to influence member policies through good analysis and peer pressure. Erb believes that any effort to implement a fixed exchange rate regime in order to impose external discipline on domestic policies would receive a negative response from the IMF membership. This general attitude has not precluded regional efforts, however, such as the European Community's exchange rate mechanism, and much can be learned from them.

Erb went on to describe the spread of outward-looking, market-based reforms in both developing and formerly centrally planned economies, a development that will profoundly affect the evolution of the international monetary system. Over the years, the IMF has assisted many countries' efforts to implement sound budget and monetary policies and to establish unified exchange rates and current and capital account convertibility. The positive economic performance of those developing countries in Asia that in the 1960s and 1970s chose outward-looking economic policies, combined with prudent monetary and budget policies, has encouraged other developing countries in Latin America and Africa to pursue similar policies.

Erb noted that one byproduct of macroeconomic developments in Latin America, Africa, Eastern Europe, and Asia has been an increase in IMF membership from almost 150 countries in the late 1980s to nearly 180 today.

In the late 1980s, a still more dramatic transformation began in many Eastern European and Asian countries with centrally planned economies. Their transformation has not been easy, but Erb expressed confidence that current macroeconomic and market-based reforms will shepherd these countries to high growth paths and eventually integrate them more fully within the larger world economy. One byproduct of all these developments has been an increase in IMF membership from almost 150 countries in the late 1980s to nearly 180 today, affecting both the framework of cooperation within the IMF and the evolution of the international monetary system.

The Role of Business and Government in Volatility

Scott E. Pardee observed how both business and government, in vain, desire a stable exchange rate regime. He believes that managed volatility is preferred even by those market participants who make their living betting on currency trends. Pardee recalled that when in October 1960 the price of gold broke out of the tight band set for it under the Bretton Woods system, he experienced the break as a profoundly moving event for the future of the international monetary system. Today, in contrast, similar shocks are frequent and violent, each one affecting the international monetary system and the profitability of any position he, or his company, may have in the markets.

In an international monetary system that works, according to Pardee, market participants who bet with the government should be the ones who make the profits, not those who bet against it. Unfortunately, some of the biggest profits to foreign exchange traders in recent years were made in 1992 and 1993 by those market participants who bet that the European Monetary System (EMS) would break down, and again in 1993 and 1994 by those traders who bet that the United States, in a fit of pique over Japan's trade surplus, would choose to jawbone the yen higher against the dollar. In contrast, market participants who bet that governments' stated policies would ultimately prevail, that the EMS would lead to greater exchange rate stability and that the United States would not manipulate exchange rates, sustained the largest losses.

In an international monetary system that works, according to Pardee, market participants who bet with the government should be the ones who make the profits, not those who bet against it.

Pardee defined two issues as central to the failures of the international monetary system since the end of the original gold standard, in the 1930s. First, when governments seek to stabilize exchange rates by setting par values or narrow limits of fluctuation for their currencies, they often hold out too long against market forces, leading to runs on the exchange market that they cannot control. Second, when governments adopt floating exchange rates, sooner or later they revert to unilateral dirty floating, depreciating their currencies to achieve domestic economic policy objectives.

Business and government have a strong desire for stable exchange rates for reasons of expediency: the existence of separate currencies results in an additional transaction cost for anyone making international payments. Volatility also adds to the cost of doing business internationally; the greater the volatility, the greater the cost until volatility itself may choke off the international flow of goods and capital. The expansion of the markets for swaps and other derivative products reflects the basic desire by many market participants to transfer volatility risks to others. Even those market participants who take these risks, however, prefer volatility that is reasonably predictable. An efficient international monetary system must provide broad, deep, and resilient markets for both cash transactions and for the whole array of volatility-driven derivative products.

Governments can achieve foreign exchange rate stability only in the nexus of conflicting domestic policy objectives. For governments that choose to fix their exchange rates with other currencies, determining when the exchange rate is or is not out of line becomes a discrete policy choice. When the market senses that a government is reviewing that policy choice, traders are quick to bet that the change will be made. To the extent that many traders jump on the same bandwagon, the amount of money they can move into one currency and out of another often makes their bet a self-fulfilling prophecy.

A government must manage its domestic affairs well if its exchange rate is to remain in a stable relationship with other currencies. Pairs of countries have managed this, but in each successful case, exchange rate stability came as a result of frequent and occasionally profound domestic economic policy adjustments, and after years of building up credibility in the marketplace. Democratic governments have a special problem in achieving credibility because their policies are actively debated in the marketplace. Financial officials have a continuing responsibility to keep debate within the government on track. Fixity of exchange rates remains a goal, but surveying recent monetary history, Pardee noted that the collapse of the Bretton Woods system in 1971–73 and of the EMS in 1992–93 is not an encouraging track record for the near future.

A monetary system can function efficiently only when confidence exists in the stability of its money as a unit of account and as a standard of value. When governments shake that confidence by manipulating exchange rates, they damage the system. Here, too, the record over the past 50 years has been discouraging, and the U.S. government has been the biggest culprit in currency manipulation. Recent Administrations have all succumbed to the arguments of U.S. industrialists and economists that other currencies should appreciate against the dollar. Such a policy has several drawbacks: It is inflationary for the United States, it causes foreign investors to shy away from buying American securities, and it invites retaliation by foreign governments.

Recommendations for the Future International Monetary System

In the near future, the international monetary system must be protected against possible internal breakdowns to reduce risks to the system as a whole. The economic and technological challenges posed by new markets, the information superhighway, the proliferation of derivative products, and other changes will be profound. Governments must pursue effective stabilization policies, sustaining growth with a minimum of inflationary pressures and avoiding excessive trade or capital account imbalances. The international monetary system needs new leaders of vision, like those at Bretton Woods, the founding of the European Payments Union, the European Monetary System, or even Maastricht, to shape its institutions. Although the Bretton Woods delegates may have been parochial in their insistence on details that favored their national interests, what emerged was a collective, coherent view of the international monetary system as it should be. More recent agreements have lacked this insight.

Pardee concluded by reflecting on the writings of William McChesney Martin, a former Chairman of the Federal Reserve, on the possibility of a world central bank. Although it probably could not be achieved under the nation-state political system, Martin's vision could provide an important sense of direction to the international monetary system, an alternative to confronting each monetary crisis as it comes.

The Importance of Domestic Fiscal Responsibility

Stefan Schoenberg noted that the entire globe may soon be included in the international monetary system. Throughout his presentation he emphasized that in a world of fully integrated financial markets, currency competitiveness was very much tantamount to policy competitiveness. In this context, he stressed the importance of domestic fiscal responsibility in maintaining exchange rate stability. Any international monetary system or "order" must provide answers to the following basic questions: 1) To what extent are international transactions liberalized or subject to controls? 2) How are exchange rates determined? 3) Which currencies function as "international money" (that is, as reserve, investment, intervention, and transaction currencies)? 4) Through what mechanism is international liquidity supplied?

Countries that want to benefit from free capital movements must accept impairment of their economic policy sovereignty, according to Schoenberg.

Schoenberg noted that the founders of Bretton Woods proposed that the freedom of international capital movements take a backseat to the objective of fixed exchange rates, and they limited their aims to removing restrictions on current transactions. Today, in contrast, we are confronted not only with a global market for goods and services but, increasingly, a global financial market as well. Countries that want to benefit from free capital movements must accept impairment of their economic policy sovereignty, according to Schoenberg. Large changes in capital flows can make domestic policymaking difficult, but attempts to discipline that market will fail, since it is impossible to distinguish between "good" and "bad" capital transactions. Analysis undertaken by the IMF indicates, however, that most of the policy changes forced by international capital markets seem to have been in the right direction.

Schoenberg claimed that the present "non-system" remains the only functioning solution to the determination of exchange rates at this time. A fixed-rate system would threaten the autonomy of economic policies which the major industrial countries want to preserve, despite all their cooperative efforts.

Countries that intend to maintain a fixed exchange rate system at the regional level, such as the European Monetary System, must acknowledge that to do so requires at least partial surrender of policy autonomy.

Current problems with volatility and misalignment of exchange rates can be settled, in the long run, only if major industrial countries pursue a consistent and credible economic policy that can stabilize the expectations of market participants, and thus reduce exchange rate fluctuations. To the extent that national economic policies are undisciplined or ineffective, or lack consistency in policy objectives, efforts to maintain exchange rates will lack credibility, leaving room for significant swings in nominal and real exchange rates.

The international monetary regime will doubtless remain a multicurrency system for some time, Schoenberg declared. With the decline in the international use of the U.S. dollar since World War II, other currencies, most notably the deutsche mark and the yen, serve as nominal anchors in their respective regions. A future international monetary system may be multipolar, with "loose" exchange rate commitments between the poles and "tighter" commitments by some of the countries around the poles. The availability of alternative international currencies has a strong advantage over the postwar Bretton Woods dollar-based system, in so far as it stimulates beneficial policy competition between the various anchor currencies.

A national currency used as "international money" must be convertible in terms of both current and capital transactions. There must be confidence in the stability of the currency and the policies of the country that issues it, and financial markets must meet investors' needs. The U.S. dollar remains, by far, the most significant reserve and investment currency and it plays an outstanding role as a transaction currency for international commodity trade and in foreign exchange transactions. The deutsche mark owes its status as the second most important currency primarily to its above-average stability. The deutsche mark functions both as an anchor in the EMS, providing interest rate leadership, and as the main intervention currency in both EMS countries and in non-EMS countries linked to the EMS. In contrast, despite Japan's growing importance as an exporter of goods and long-term capital, its payments practices with neighboring countries and their official reserves show that a distinct "yen zone" does not yet exist. Therefore, the formation of a symmetric tripolar world monetary system remains some time off. According to Schoenberg, market forces will continue to determine how the international monetary system develops, as they have for the past two decades.

Concerns about international liquidity, Schoenberg's final question, now relate more to its distribution than its adequacy. The supply elasticity of the markets has proven generally adequate to satisfy any justified global demand for reserves. Earlier concerns that led to the creation of the Special Drawing Rights system did not materialize and are unlikely to do so in the future. The fact that many countries do not have access to private sources of liquidity or must pay higher spreads when borrowing in international financial markets reflects mainly past economic policy failures. High costs in borrowing reserves thus serve as an indispensable indicator of the need for macroeconomic policy changes. In Schoenberg's opinion, governments or international institutions would not make more rational decisions about credit allocation than the market.

Schoenberg concluded with comments on the future of monetary policy in Europe. In 1999, European Union member countries deemed mature enough are to form a monetary union and introduce a common currency. Market behavior has made it rudely clear over the past 18 months, however, that a long road remains to the achievement of a single currency in Europe. Institutional arrangements must be in conformity with the market's assessment, because if the two clash, market forces inevitably prevail. For too long, financial markets fixated excessively on the final goal of European monetary union, mistakenly assuming that the success of future convergence efforts could be predicted by fixing exchange rates. To regain their credibility, European Union central banks must recognize that improving convergence is a long-term job requiring the coordinated action of all member states, not solely an exchange rate constraint.

Conclusion

In their remarks and in the discussion that followed, each speaker agreed that a return to a fixed-rate system, as envisioned by the founders of the Bretton Woods system, is not possible today given the changes in underlying economic conditions since that time, in particular, the high degree of integration of financial markets. Each examined the damaging effects of fiscal imbalance and volatility on current

regimes, both floating and relatively fixed, such as the European Monetary System, and as a result, on the world economy. Daane remarked that unstable exchange rates have not been excessively detrimental to the growth of world trade, however.

To limit volatility, Schoenberg, Pardee, and Taylor emphasized the need for better fiscal policy, stable exchange rates, and consequent domestic policy compromises. Schoenberg pointed out that a stable international monetary system requires that institutional arrangements coincide with market expectations. Along similar lines, Pardee remarked that market participants who bet with governments should profit, not those who bet against them, as has recently been the case. Erb stressed the importance of IMF surveillance to encourage responsible fiscal policy by IMF members and, thus, limit volatility. He focused, uniquely among the speakers, on the important role that developing economies in Asia, Latin America, and Africa, and the formerly centrally planned economies in Eastern Europe will play in the international monetary system in the near future. Pardee and Taylor alluded to the possibility of institutional reform in the near future, with Pardee advocating a world central bank as a possible long-term goal for present reform efforts.

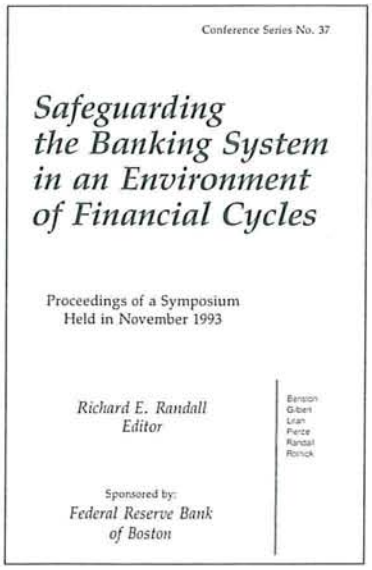
All agreed that different arrangements will emerge by which individual countries can choose, through formal or informal reciprocal agreements, to peg their currencies to one another, eventually creating clusters of linked currencies. This process may lead to a more stable, multipolar international monetary system in the twenty-first century, with several currencies acting as anchors in their respective regions, a possible future implementation of the original goals of Bretton Woods.

Conference Series

The Federal Reserve Bank of Boston Conference Series

No. 1	Controlling Monetary Aggregates	June 1969
No. 2	The International Adjustment Mechanism	October 1969
No. 3	Financing State and Local Governments in the Seventies	June 1970
No. 4	Housing and Monetary Policy (out of print)	October 1970
No. 5	Consumer Spending and Monetary Policy: The Linkages	June 1971
No. 6	Canadian-United States Financial Relationships	September 1971
No. 7	Financing Public Schools (out of print)	January 1972
No. 8	Policies for a More Competitive Financial System	June 1972
No. 9	Controlling Monetary Aggregates II: The Implementation	September 1972
No. 10	Issues in Federal Debt Management	June 1973
No. 11	Credit Allocation Techniques and Monetary Policy	September 1973
No. 12	International Aspects of Stabilization Policies	June 1974
No. 13	The Economics of a National Electronic Funds Transfer System	October 1974
No. 14	New Mortgage Designs for Stable Housing in an Inflationary Environment	January 1975
No. 15	New England and the Energy Crisis (out of print)	October 1975
No. 16	Funding Pensions: Issues and Implications for Financial Markets	October 1976
No. 17	Minority Business Development	November 1976
No. 18	Key Issues in International Banking	October 1977
No. 19	After the Phillips Curve: Persistence of High Inflation and High Unemployment	June 1978
No. 20	Managed Exchange-Rate Flexibility: The Recent Experience	October 1978
No. 21	The Regulation of Financial Institutions	October 1979
No. 22	The Decline in Productivity Growth	June 1980
No. 23	Controlling Monetary Aggregates III	October 1980
No. 24	The Future of the Thrift Industry	October 1981
No. 25	Saving and Government Policy	October 1982
No. 26	The Political Economy of Monetary Policy: National and International Aspects	July 1983
No. 27	The Economics of Large Government Deficits	October 1983
No. 28	The International Monetary System: Forty Years After Bretton Woods	May 1984
No. 29	Economic Consequences of Tax Simplification	October 1985
No. 30	Lessons from the Income Maintenance Experiments	September 1986
No. 31	The Merger Boom	October 1987
No. 32	International Payments Imbalances in the 1980s	October 1988
No. 33	Are the Distinctions between Debt and Equity Disappearing?	October 1989
No. 34	Is There a Shortfall in Public Capital Investment?	June 1990
No. 35	The Financial Condition and Regulation of Insurance Companies	June 1991
No. 36	Real Estate and the Credit Crunch	June 1992
No. 37	Safeguarding the Banking System in an Environment of Financial Cycles	November 1993

Conference Series



Safeguarding the Banking System in an Environment of Financial Cycles, proceedings of a symposium sponsored by the Federal Reserve Bank of Boston, is now available. The November 1993 symposium brought together bankers, regulators, academics, and consultants to consider various proposals to enhance the safety and soundness of the banking system. Alternative proposals presented included one for timely supervisory intervention against excessive risk concentrations in banks; one for obtaining market discipline from acquirers of subordinated debt; another calling for coinsurance of deposits, and another for functional reorganization of banks to expose all but transaction accounts to market discipline.

The proceedings include all the papers and the prepared remarks of the discussants, along with an overview of the symposium and a summary of the general discussion. The authors and discussants are George J. Benston, R. Alton Gilbert, Robert E. Litan, James L. Pierce, Richard E. Randall, and Arthur J. Rolnick.

Copies of conference volume no. 37, *Safeguarding the Banking System in an Environment of Financial Cycles*, may be obtained without charge upon request to the Research Library—D, Federal Reserve Bank of Boston, P.O. Box 2076, Boston, Massachusetts 02106–2076. Or telephone (617) 973–3397.

Please type or print

Name _____ Title _____

Organization _____

Address _____

_____

Please check

☐ Please send Conference Series No. 37 *Safeguarding the Banking System in an Environment of Financial Cycles.*

☐ Please send back-issue Conference Series No. _____

Note: Single volumes will be mailed without charge, but a $10.00 payment (check drawn on a branch of a U.S. bank) will be required for more than 10 volumes or more than 10 copies of the same volume.

PLACE
STAMP
HERE

Research Library—D
Federal Reserve Bank of Boston
P.O. Box 2076
Boston, Massachusetts 02106-2076

Federal Reserve Bank of Boston
P.O. Box 2076
Boston, Massachusetts 02106-2076

Address Correction Requested

Bulk Rate
U.S. Postage
PAID
Richmond, VA
Permit No. 930