

Explaining New England's Export Performance: 1987 to 1993

The recession of the early 1990s hit New England much harder than the nation. Over the period covered by this study (1987 to 1993), New England's manufacturing employment fell 22 percent, as compared with a 5 percent decline for the nation; over the same period, total nonfarm jobs *grew* 8 percent nationally but *fell* 5 percent in the region. Although New England's manufacturing employment has stabilized recently, and the total number of nonfarm jobs has been rising for two years, both series remain well below their previous peaks. Presumably, thus, New England firms are highly motivated to seek rapidly growing markets wherever they may be—including overseas.

Exports have provided considerable support to the national economy in recent years. During the 1990–91 downturn, real net exports cut the depth of the U.S. recession by half. Looking ahead, moreover, recent forecasts by the International Monetary Fund suggest that world growth will outpace U.S. growth in 1995. U.S. GDP is projected to rise an inflation-adjusted 2.5 percent next year while, with the help of the dynamic developing countries, world growth is estimated to be 3.6 percent. Global trade is expected to grow even faster, at a 7 percent pace.

Despite New Englanders' obvious incentive to explore burgeoning foreign markets, however, the best available data indicate that the region underperformed the nation in terms of export growth from 1987 to 1993. How so? Indeed, the result seems surprising given the region's trading history and its traditional comparative advantage vis-à-vis the nation in the high-tech industries that dominate U.S. exports. This article explores the reasons for the region's below-average merchandise export growth and concludes that it largely reflects the relative importance of the regional computer industry and its recent structural problems. Also contributing are New England exporters' traditional ties to markets in mature industrial countries. As the authors point out, however, merchandise exports represent only one route to foreign consumers. New Englanders are also reaching vibrant foreign markets

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through exports of services and through sales made by foreign affiliates of New England firms. Indeed, given the region's industrial structure, these alternative paths are likely to become increasingly important over time.

the dollar retraced its steps, however, real exports renewed their climb, rising steadily in each of the last seven years to approach 12 percent of GDP in 1993. Simply put, exports have been a "growth market" for most of the postwar period.

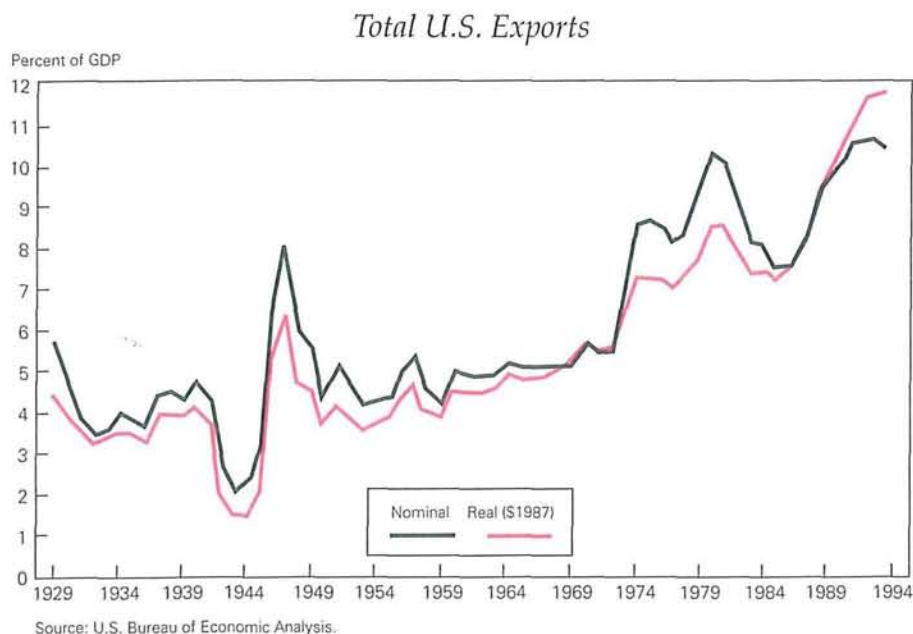
I. Exports: A Growth Market

With the start of North American free trade in January 1994, the seemingly endless trade talks between the United States and Japan, and the fractious congressional debates over the recently negotiated amendments to the General Agreement on Tariffs and Trade, the impact of world trade on the U.S. economy has been in the forefront of the news for much of the last year. Not always well appreciated by the U.S. public, however, is the growing importance of exports in national output as advances in communications and transportation and reductions in trade and investment barriers have led to increasingly global markets. With the recovery of war-torn Europe and Japan, the start of European integration in 1957, and the decline of the overvalued dollar in the 1970s, total real exports grew from 4 percent of GDP in the early 1950s to almost 9 percent in 1980 (Figure 1). During the first half of the 1980s, a 50 percent appreciation of the dollar reversed this trend. Once

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State and local economic development specialists clearly have noted these trends. According to a 1990 Government Accounting Office report, export promotion has eclipsed attracting foreign investment as a priority among state and local economic development officials. In New England, all six states have committed resources to export promotion initiatives; trade missions and educational programs are the supportive tactics most commonly used.

Figure 1



Given the growing importance of exports nationally, as well as regional efforts to promote trade, the rest of this article explores why exports appear to have played a less dynamic role in the New England economy in recent years than they have for the country as a whole. The next two sections address some basic questions about New England's exports—what they are and where they go.

II. What Are New England's Exports?

That New England's exports differ from those in the national export basket reflects fundamental differences in the regional and national resource base. In general, the region's exports consist of fewer raw materials and derivative products than is the case for the nation as a whole (Table 1). For example, New England's agricultural exports account for just 2 percent of its total, while the national share of agricultural exports is nearly three times as high. Nationally, crops account for the great bulk of agricultural exports, but, in New England, fish are most important.¹

Manufactured goods derived from raw materials also represent a relatively small share of New England's exports. Manufactured foods, tobacco, lumber, chemicals, petroleum products, and basic metals each account for an appreciably smaller proportion of New England exports than they do for the nation. Combined, these goods accounted for 23 percent of U.S. exports over the three-year period from 1991 to 1993,

¹ Maine, Massachusetts and Rhode Island, which produce nearly all of the region's fishery exports, have an export concentration in fish equal to, or greater than, the nation as a whole. As for mining products, they account for a small 1.5 percent of the nation's merchandise exports, but their share of New England exports is even lower, at just 0.4 percent. New Hampshire and Vermont each export some nonmetallic minerals (presumably quarried stone, like granite), while much of the rest comes from Connecticut.

Table 1
Exports by Industry: 1991 to 1993
Millions of dollars

Industry	United States		New England	
	Annual Average	Share of Total (%)	Annual Average	Share of Total (%)
Agriculture	26,299	5.9	504	2.1
Crops	22,205	5.0	128	.5
Livestock	909	.2	80	.3
Forestry	329	.1	19	.1
Fishing & Hunting	2,856	.6	277	1.2
Mining	6,882	1.5	106	.4
Metal Mining	1,079	.2	36	.2
Coal Mining	3,987	.9	36	.2
Oil & Gas	676	.2	2	0
Nonmetallic Minerals	1,140	.3	31	.1
Manufacturing	401,240	90.2	22,326	94.0
Food Products	20,419	4.6	303	1.3
Tobacco Products	4,468	1.0	1	0
Textile Products	4,791	1.1	336	1.4
Apparel	4,912	1.1	107	.5
Lumber & Wood	7,155	1.6	254	1.1
Furniture & Fixtures	2,661	.6	53	.2
Paper Products	10,044	2.3	630	2.7
Printing & Publishing	4,114	.9	277	1.2
Chemicals	43,958	9.9	1,304	5.5
Petroleum & Coal	6,708	1.5	93	.4
Rubber & Plastics	8,317	1.9	447	1.9
Leather Products	1,697	.4	320	1.3
Stone, Clay & Glass	3,999	.9	149	.6
Basic Metals	17,147	3.9	475	2.0
Fabricated Metals	13,823	3.1	1,080	4.5
Industrial Machinery	75,837	17.1	5,605	23.6
Electronic Equipment	55,083	12.4	5,182	21.8
Transportation Equip.	83,601	18.8	2,493	10.5
Instruments	24,997	5.6	2,782	11.7
Misc. Manufactures	7,512	1.7	436	1.8
Other	10,306	2.4	814	3.4

Source: U.S. Bureau of the Census and Massachusetts Institute for Social and Economic Research.

while the corresponding regional figure is much lower, at 10 percent.²

As a corollary to New England's resource base—with its relative scarcity of raw materials and abundance of skilled labor—an unusually large share of its exports are products requiring significant processing or "value added." Fabricated metal products, industrial machinery, electronic equipment, transportation

² By exception, large paper exports from mills in Maine and Massachusetts push the regional dependence on paper exports over the national average. Similarly, Maine and, to a lesser extent, Massachusetts have an above-average dependence on exports of leather products (including footwear).

equipment, and instruments account for 57 percent of national exports, while the corresponding figure for New England is 72 percent. Among these sectors, transportation equipment is the only one that looms more important in national than regional exports.

Exports have been a growth market for most of the postwar period.

Still, because Connecticut is a major producer of jet engines and other aviation equipment, transportation accounts for nearly one-third of Connecticut's exports—a figure well above the national average of 19 percent.

III. Where Do New England's Exports Go?

New England's exports also differ from the nation's in terms of destination or market mix. While Europe is a principal foreign market for both the region and the nation, New England's European trade ties are far stronger. Thirty-six percent of the

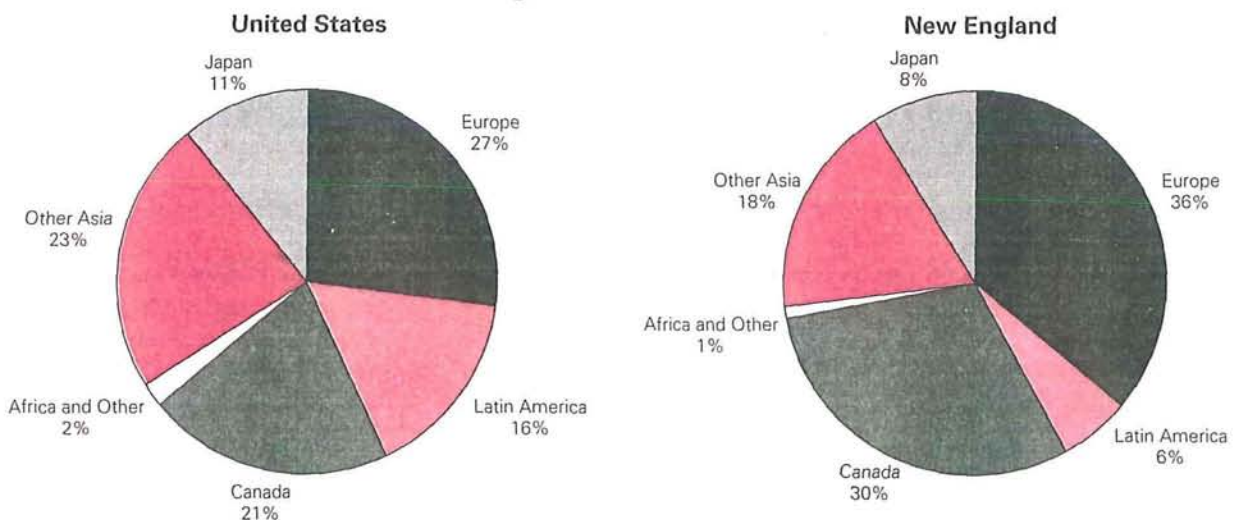
region's exports went to Europe between 1991 and 1993, as compared with 27 percent for the nation (Figure 2). For both cyclical and secular reasons, however, Europe's relative importance as a foreign market has diminished recently. Its share of U.S. exports fell from 30 percent in the boom years of 1989 and 1990 to 26 percent in 1993, the trough of its recent recession. (Maps 1 and 2 show relative average annual U.S. export growth rates to this country's trading partners from 1987 to 1990 and 1990 to 1993.) For New England the decline in Europe's share has been even more dramatic—from 43 percent in 1987 and 1988 to 35 percent in 1993.

Canada is another very significant market for the country and the region but, again, New England has the greater dependence on trade with this neighbor. Canada accounts for 30 percent of New England's total exports, compared with just 21 percent for the nation. Nationally, Canada's market share has been quite stable, holding near 20 percent of total U.S. exports throughout the 1987–93 period. By contrast, Canada's share of New England exports rose sharply from 20 percent of total exports in 1988 to 31 percent in 1993.

That Canada has retained its share of U.S. exports and increased its share of New England sales is noteworthy in light of its relatively severe recent recession; real domestic demand in Canada showed

Figure 2

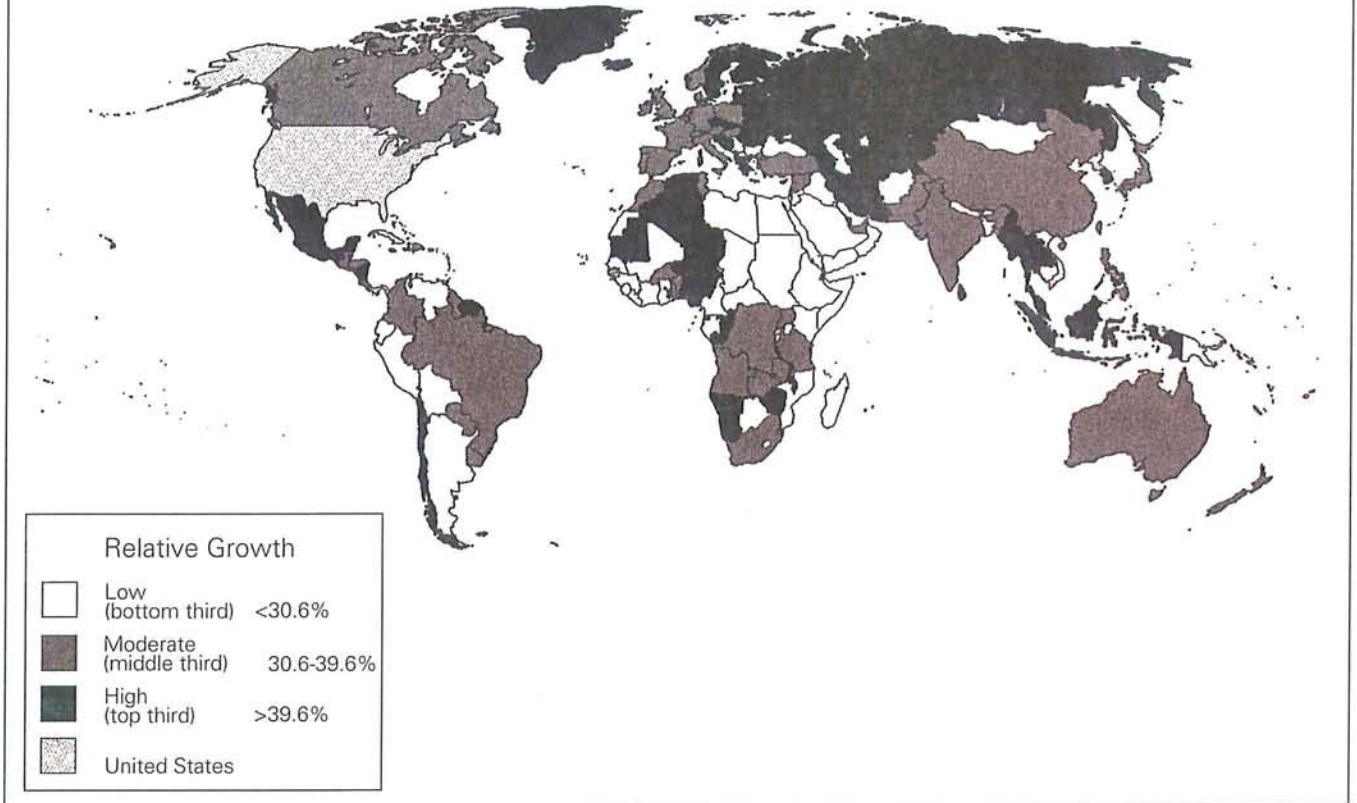
Export Destinations Average Share, 1991 to 1993



Source: U.S. Bureau of the Census and Massachusetts Institute for Social and Economic Research.

Map 1

*Growth in U.S. Exports
1987 to 1990*



no net growth at all from 1989 to 1993. The Free Trade Agreement between Canada and the United States, which went into effect at the start of 1989, provides a likely explanation. Progressively liberalizing trade between the two countries, the Free Trade Agreement expanded access to the Canadian market while the market itself remained comparatively weak.³ Recently, of course, Canada and the United States have enjoyed mutually reinforcing recoveries.

Beyond Canada and Europe, New England's

market share is lower than the national average. As it turns out, the regions where New England has less exposure include some of the world's fastest growing export markets. Latin America, for example, has enjoyed an impressive economic resurgence in recent years, perhaps in part because it has embraced increasingly open trade policies. Tariff rates, which averaged over 50 percent in the mid 1980s, have fallen to less than 20 percent in most countries.⁴ As a result, Latin America's share of U.S. exports rose from 14 percent in 1990 to 17 percent in 1993. While New England's dependence on Latin American sales has also grown, as of 1993, exports to Latin America still accounted for just 7 percent of the region's total.

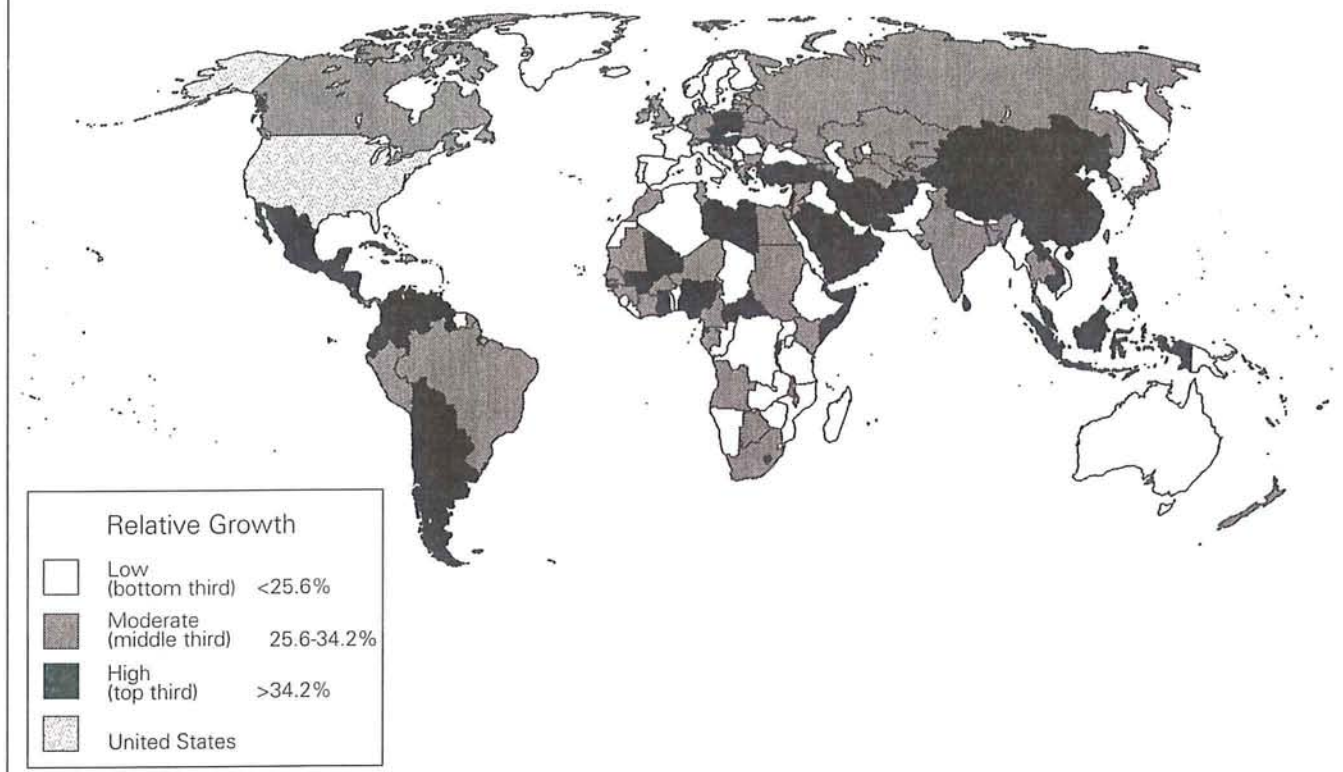
Like Latin America, the dynamic Asian econo-

³ Although the New England states, like other border areas, stand to benefit disproportionately from free trade with Canada, a statistical change may also help to explain the sharp increase in Canada's share of New England exports over this period. In 1990 the Census Bureau began substituting Canadian import data for U.S. export data and eliminated the category "undocumented exports to Canada." Undocumented exports probably represented a larger share of exports to Canada from border areas than from more distant states; thus, the statistical change may account for part of the jump in Canada's share of New England exports.

⁴ International Monetary Fund, Western Hemisphere Department, "Adjustment and Recovery in Latin America and the Caribbean," *World Economic Outlook*, May 1994, pages 93-98.

Map 2

*Growth in U.S. Exports
1990 to 1993*



mies represent another large and rapidly growing market for U.S. exports. This region has posted the world's fastest growth rates over the past decade while pursuing increasingly open trade and investment policies. By exception, Japan, like the other industrial countries, has been mired in a deep recession from which it is just beginning to emerge; thus, its share of U.S. exports has fallen from 13 percent in 1989 to 10 percent in 1993. Nevertheless, vigorously expanding Southeast Asian and Asian Communist countries have more than taken up the slack. Overall, Asia accounts for 33 percent of U.S. exports and 26 percent of those from New England.⁵

⁵ Africa remains an export market of limited significance for the United States and New England. In both cases, South Korea represents a larger market than the entire continent of Africa.

IV. How Important Are Exports to New England's Economy?

While the question is simple enough, providing a complete answer is not. The difficulty stems from the fact that firms do not always know when their products are exported. Finished goods are frequently exported by an intermediary other than the producer. In addition, the firm's output may be used as an input into other merchandise eventually sold abroad. For the nation as a whole, the U.S. Bureau of the Census estimates that indirect exports associated with exports of manufactured goods amounted to about 60 percent of the value of those direct exports in 1989. Although Census attempts to allocate indirect exports to individual states on the basis of direct export and employment patterns, the process is complex and requires many assumptions. In addition,

these data on direct and indirect exports provide no information on destination and are available only with a three- or four-year lag.

Accordingly, this article uses another data set, the origin-of-movement data for direct merchandise exports. Although these data are relatively timely and include information on destination, they also have limitations. (See Box for further discussion of these limitations.) Nevertheless, using the origin-of-movement data as the best available indicator of recent

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state export activity suggests that direct exports account for a slightly smaller share of total New England output than they do nationally, although the shares have trended up in both cases (Table 2). Following the sharp dollar depreciation of 1985, U.S. exports increased from 5.4 percent of GDP in 1987 to 7.4 percent in recessionary 1991. In New England, similarly, exports rose from 5.2 percent of net output in 1987 to 6.9 percent in 1991. During 1993, when the United States was growing faster than most of its major trading partners, U.S. and New England exports fell back to 7.3 and 6.7 percent of output, respectively.⁶

While most New England states fit the regional pattern, Massachusetts and Vermont are exceptions. In these states, exports account for a greater share of net output than is the case nationally, as Table 2 shows. In Vermont, the export share was a well-above-average 22 percent of output in 1993. That state's unusual export-dependence is largely attributable to exports of electronic equipment to Canada. The IBM Corporation manufactures semiconductors in its Vermont facility and ships these components to Canada to be built into other products. Though IBM does not release precise figures on the magnitude of

such shipments, it acknowledges that their value well exceeds \$1 billion annually.⁷ This cross-border activity underscores the importance of North American integration and, indeed, U.S. producers' ties to their foreign affiliates generally, in determining the nature and behavior of regional exports.

Table 3 provides data to illustrate these relationships. As column 1 shows, over one-third of U.S. exports to Canada and over one-fourth of U.S. exports to Mexico are shipments from U.S. parents to their foreign affiliates. In both cases, over half of these intra-firm exports reflect the ongoing integration of North American auto production. In Mexico, another quarter of the affiliate trade involves electrical and electronics products. In combination with the figures in column 4, which show foreign affiliate sales to the United States as a share of total foreign affiliate sales, these data suggest that the activities of affiliates in Canada, Mexico, and some Southeast Asian countries, like Singapore and Malaysia, are often closely linked with U.S. production for U.S. markets; thus, U.S. exports to these countries reflect the strength of the U.S. economy as well as demand conditions overseas. By contrast, affiliates of U.S. companies in Europe, South America, and Japan are generally serving local or other foreign markets.

Given the predominance of manufacturing in national and regional exports and the relatively precipitous decline in New England's manufacturing employment (down 25 percent in the region between 1987 and 1993, compared with a 5 percent decline nationally), it is remarkable that New England has retained as large a share of U.S. export activity as it

⁶ An alternative measure of New England's export dependence—export-related employment as a share of total private employment—suggests that exports provide above-average support for regional jobs. These figures, based on Census estimates of employment related to direct and indirect exports of manufactured products for 1989, show that 6.6 percent of New England's private employment was supported by manufactured exports, compared with 5.6 percent for the nation. According to these numbers, New England was one of the most export-dependent regions in the country, following closely behind the Pacific and the East North Central regions. These Census data also indicate that New England's export-related shipments as a share of total shipments were above the national average in a majority of the 2-digit industries for which regional data are available. A significant exception, given the industry's importance in U.S. and New England exports, was one 3-digit component, computers and office machinery.

⁷ The dramatic rise in Vermont's exports over this period partly reflects the substitution of Canadian import records for U.S. export records and, thus, the elimination of "undocumented exports to Canada" in 1990. This change makes origin-of-movement export figures for 1987-89 not entirely comparable with those for the later years—particularly for states bordering Canada.

Limitations of Origin-of-Movement State Export Data

These origin-of-movement data on state exports are collected by the U.S. Bureau of the Census from shippers' export declarations, which ask for the "point of origin"—that is, the state where the product started its export journey. The instructions indicate that shippers may choose among the state where the product was produced or the location of a distributor, regional warehouse, cargo processing facility, or Foreign Trade Zone. For a multi-product shipment, the shipper may choose the state of origin of the product having the greatest value or, for a multi-product order, the state of consolidation. According to Census-ITA research, manufacturers, who export about two-thirds of U.S. manufactured exports directly, provide the state of production about 85 percent of the time; for the rest of their exports, they tend to give the location of the port through which the export left the country. Intermediaries, who handle the remaining one-third of U.S. manufactured exports and most exports of nonmanufactured merchandise, tend to give their own location or the location of the relevant port. As a result, these data tend to overstate exports from states like Texas, where a large number of intermediaries supply Mexican "maquiladora" plants with inputs from around the country. Similarly, the data tend to overstate exports from states with major ports—Louisiana, for instance, where a large volume of farm products shipped down the Mississippi start their journey overseas. Adding to these reporting weaknesses, roughly 15 percent of the shippers do not answer the state-of-origin question.

Partly as a result of these problems, in 1993

Census began publishing a new data set based on the shipper's own zip code. Compared with the origin-of-movement data, the zip-code-based data substantially reduce exports from border or port states like Texas, Louisiana, and New York while increasing exports from states like New Jersey, Pennsylvania, and Illinois. In New England, the zip-code data suggest that for the first half of 1994 Connecticut's exports were 67 percent greater than shown by the origin-of-movement data while Vermont's exports were 13 percent less; for the other states in the region the differences were generally small. All told, according to the zip-code data, New England accounted for 5.2 percent of U.S. merchandise exports in the first half of 1994 but for only 4.2 percent according to the origin-of-movement data. Even so, these new data do not allocate exports through intermediaries to the state of production, nor do they address the issue of indirect exports.

The table accompanying this box shows New England's share of U.S. exports according to the above measures in the latest year for which the data are available. Clearly, the origin-of-movement data tend to understate the region's share of U.S. exports compared with the other series.

An additional limitation to the origin-of-movement data is that they do not cover increasingly important service exports. Further, the industrial breakdown provided—at the 2-digit Standard Industrial Classification (SIC) code level—is too broad to permit a satisfactory adjustment for cross-state differences in export product mix. This problem is discussed more fully in the body of the article.

Alternative Measures of New England's Share of U.S. Merchandise Exports

Percent

1989	Direct Exports of Manufactures (AR89-1)	Origin-of-Movement, Manufactures	Origin-of-Movement, Total
	6.7	6.0	5.5
1994, 1st Half		Origin-of-Movement, Total	Zip-Code Total
		4.2	5.2

Sources: U.S. Bureau of the Census, Industry Division. *Exports from Manufacturing Establishments, 1988 and 1989*, Analytical Report Series (AR89-1), November 1992; Foreign Trade Division. *Origin of Movement of U.S. Exports by State, 1987-93*. Massachusetts Institute for Social and Economic Research tape (also available in the FT-900 release); Foreign Trade Division. "Exports of Goods by State Where the Exporter is Located," Exhibit 2, FT-900 Supplement, August 1994.

Table 2
Exports in Relation to Output
 Millions of Dollars

	1987	1988	1989	1990	1991	1992	1993
United States							
Gross State Product	4,548,182	4,911,706	5,232,032	5,518,482	5,690,865	6,085,754	6,358,274
Merchandise Exports	246,437	312,060	348,127	392,975	421,853	447,471	464,858
Share of Total	5.4%	6.4%	6.7%	7.1%	7.4%	7.4%	7.3%
New England							
Gross State Product	277,750	303,694	319,944	327,043	331,974	349,856	363,990
Merchandise Exports	14,446	17,083	19,299	21,765	22,949	23,767	24,534
Share of Total	5.2%	5.6%	6.0%	6.7%	6.9%	6.8%	6.7%
Connecticut							
Gross State Product	79,234	86,429	91,292	94,329	96,384	100,704	103,757
Merchandise Exports	3,319	3,829	4,473	5,187	5,699	5,711	6,325
Share of Total	4.2%	4.4%	4.9%	5.5%	5.9%	5.7%	6.1%
Maine							
Gross State Product	18,993	20,895	22,415	23,007	23,241	24,341	25,179
Merchandise Exports	656	805	915	1,075	1,040	1,027	1,141
Share of Total	3.5%	3.9%	4.1%	4.7%	4.5%	4.2%	4.5%
Massachusetts							
Gross State Product	132,250	145,116	152,301	154,208	156,090	164,978	172,617
Merchandise Exports	8,349	9,692	10,472	11,587	11,891	12,158	12,195
Share of Total	6.3%	6.7%	6.9%	7.5%	7.6%	7.4%	7.1%
New Hampshire							
Gross State Product	20,760	22,444	23,170	23,616	24,404	25,990	27,122
Merchandise Exports	885	1,025	1,106	1,210	1,143	1,049	1,115
Share of Total	4.3%	4.6%	4.8%	5.1%	4.7%	4.0%	4.1%
Rhode Island							
Gross State Product	17,366	18,794	19,931	20,664	20,657	21,832	22,741
Merchandise Exports	506	560	650	756	784	1,004	1,025
Share of Total	2.9%	3.0%	3.3%	3.7%	3.8%	4.6%	4.5%
Vermont							
Gross State Product	9,147	10,016	10,835	11,219	11,198	12,011	12,575
Merchandise Exports	731	1,173	1,684	1,950	2,391	2,819	2,734
Share of Total	8.0%	11.7%	15.5%	17.4%	21.4%	23.5%	21.7%

Source: Gross state product data for 1987 through 1991 are from the U.S. Bureau of Economic Analysis. Estimated gross state product for 1992 and 1993 are authors' calculations, derived by ordinary least squares regression with industry earnings, by place of work, as the sole independent variable. (Regression results are available upon request.) Export values are from the U.S. Bureau of the Census and the Massachusetts Institute for Social and Economic Research.

has. In 1980, all of the New England states were among those most dependent on manufacturing employment.⁸ By 1991, however, none of the New England states were in the top category. Over the period covered by this study, New England's share of total U.S. manufacturing employment fell from 7.2 to 5.9 percent. The decline in the region's share of production jobs was even sharper.⁹ While part of this job loss was due to technological change and reflected productivity improvements, some jobs were shifted to other parts of the country and overseas, in part because average hourly earnings for the region's

production workers continued above the national average. As a result, the manufacturing activities remaining in New England increasingly have focused on administration, service, and research and development functions. Accordingly, much of the final processing and export of goods produced by firms headquartered in New England is likely to occur

⁸ That is, with 25 percent or more of total employment in manufacturing.

⁹ Between 1987 and 1991 (the latest date for which regional data are available), employment of production workers fell by 11 percent nationally and by 19 percent in the region.

Table 3

U.S. Parent Exports to Foreign Affiliates as a Share of Total U.S. Merchandise Exports, Selected Countries, 1991^P

Percent

Country	U.S. Parent Exports to Affiliates as a Share of Total U.S. Merchandise Exports to Country	Share of Parent-to-Affiliate Exports in:		Memo: Sales to the U.S. as a Share of Total Affiliate Sales
		Transportation	Electric and Electronic Equipment	
Canada	38.2	56.4	3.5	24.5
Europe	25.7	3.2	5.3	4.0
Latin America	20.2	38.7	20.6	20.7
Mexico	26.9	51.7	25.8	25.8
Japan	16.5	.1	7.8	4.7
Malaysia	17.9	.0	75.8	27.0
Singapore	27.6	n.a.	26.4	24.7
Total	23.0	25.7	8.9	10.1

^PThese data, which are for U.S. nonbank parents and their majority-owned foreign affiliates, are preliminary.

Note: Parent exports may include exports of services.

Source: U.S. Bureau of Economic Analysis. *U.S. Direct Investment Abroad: Operations of U.S. Parent Companies and Their Foreign Affiliates, Preliminary 1991 Estimates*, Washington, D.C.: U.S. Government Printing Office, July 1993; and "U.S. International Transactions, First Quarter 1994," Table 2, *Survey of Current Business*, June 1994, p. 102.

elsewhere. From this perspective, in other words, a region's relative export dependence or performance reflects the domestic competitiveness of the region's manufacturing sector.

As the regional economy shifts increasingly towards service activities, the failure of state export data to cover exports of services becomes more of a problem. Nationally, exports of services, which include travel, transportation, and business services like accounting, engineering, and data processing services, have been growing somewhat faster than merchandise exports. While merchandise exports rose 83 percent between 1987 and 1993, service exports grew 89 percent. "Other private services" (which is the largest component of services after travel and includes financial, telecommunications, and business, professional, and technical services) soared over 106 percent, while the royalties and license fees important to New England biotech companies, for instance, rose 93 percent. Because New England has a disproportionately large share of U.S. jobs in financial and business services (these sectors accounted for 38.0 percent of New England's non-agricultural employment in 1993, compared with 33.5 percent for the nation), it is almost certain that the region has produced a relatively large share of these service exports and is, thus, more dependent on overseas sales than the data on merchandise exports alone would suggest.

In addition, as mentioned above, exporting is not the only or even the widest avenue to foreign markets. Finding that foreign sales benefit from an on-the-spot ability to customize products and provide ongoing service support, U.S. firms increasingly are serving these markets from foreign affiliates. Indeed, as Table 4 shows, sales of goods by foreign affiliates of U.S. companies to unaffiliated customers were almost twice as large as total merchandise exports in 1991. Sales by European affiliates were roughly four times U.S. merchandise exports to Europe. Data on U.S. foreign direct investment abroad provide no information on the state where the U.S. parent is located, in large part because U.S. firms often have facilities in more than one state. Nevertheless, because New England has a disproportionately large share of U.S. employment in several industries where outbound foreign direct investment looms important (computers, electronics, and fabricated metals, for example), it seems plausible that New England firms have been particularly active foreign investors. In addition, New England has strong traditional trade and inbound investment ties with Europe, the site of over half of U.S. foreign direct investment assets (and over 40 percent of affiliate employment) in 1991. Altogether, thus, foreign sales are likely to be a great deal more important to New England firms than the state export data indicate.

With all of the above caveats in mind, the rest of

Table 4

Sales of Goods by Foreign Affiliates^a of U.S. Firms to Unaffiliated Entities, by Location of Affiliate, and U.S. Merchandise Exports to the Same Country

Billions of Dollars

	1987			1991 ^P		
	Affiliate ^a Sales (1)	U.S. Exports (2)	Ratio 1 ÷ 2	Affiliate ^a Sales (3)	U.S. Exports (4)	Ratio 3 ÷ 4
All Countries	542.1	250.2	2.2	798.7	416.9	1.9
Canada	91.0	62.0	1.5	115.0	85.9	1.3
Europe	309.0	70.9	4.4	479.4	121.6	3.9
Japan	31.0	27.6	1.1	47.7	47.2	1.0
Australia	21.2	5.3	4.0	29.9	8.3	3.6
Latin America & Other						
Western Hemisphere	47.9	34.9	1.4	63.7	63.3	1.0
Other Asia & Pacific	26.6	43.7	.6	52.1	81.2	.6

^aMajority-owned nonbank foreign affiliates of nonbank U.S. parents. P = preliminary.

Source: U.S. Bureau of Economic Analysis, *U.S. Direct Investment Abroad: Operations of U.S. Parent Companies and Their Foreign Affiliates, Revised 1987 Estimates and Preliminary 1991 Estimates*, July 1990 and July 1993; *Survey of Current Business*, June 1994.

this article will explore why New England's merchandise export performance has lagged the nation's. The analysis is based on the origin-of-movement data because they represent the best available indicators of recent export trends that include information on export destination.

V. How Rapidly Are New England's Exports Growing?

As mentioned above, merchandise exports account for a rising share of national output. But, over the period 1987 to 1993, New England's exports grew more slowly than the nation's except in 1989 (Figure 3). While national exports rose 89 percent, the region's exports grew just 70 percent.¹⁰ Although the differences were small in some years (1990 and 1993), it seems somewhat curious that New England would consistently underperform the national rate of export growth, given its traditional dependence on trade. On the other hand, judging by employment trends, the region's manufacturing industries were generally in a state of relative decline vis-à-vis the national sector at this time.

This section sets out to "explain" the region's relatively lackluster export growth by focusing on two determinants of this performance—the region's export product mix and its market orientation. It asks two hypothetical questions: How rapidly would the

region's exports have grown if exports of each product had increased at the national rate? and How rapidly would the region's exports have grown if exports of each product to each destination had grown at the national rate? The second step controls for differences in the region's and the nation's traditional geographic orientation or "market mix" as well as for differences in product mix. As it turns out, the residuals not explained by this estimating procedure point to the major reasons for the region's relatively slow export growth.

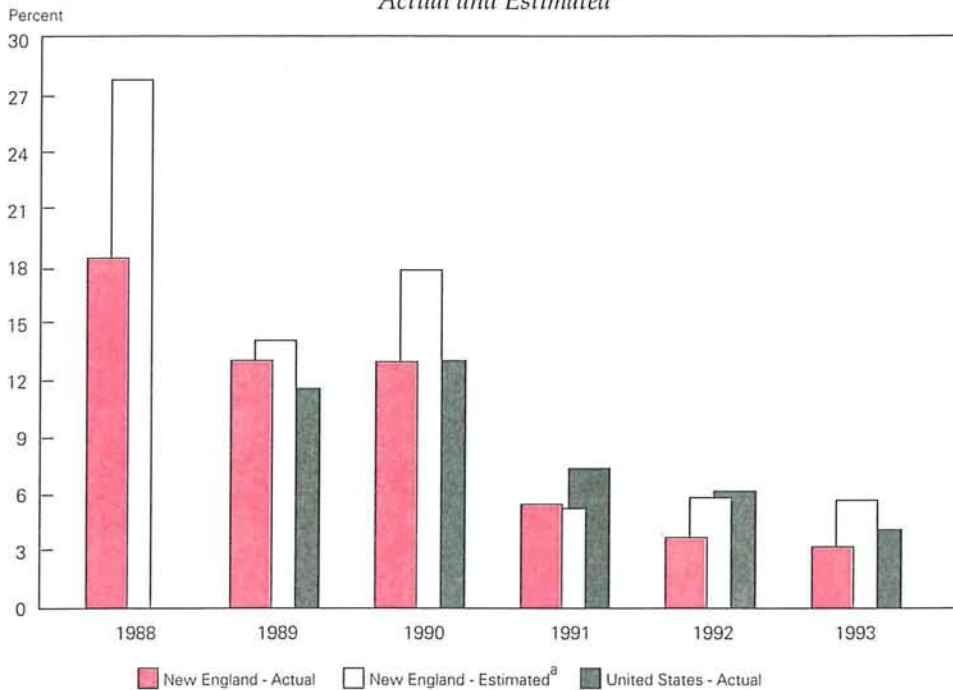
In the first step, total New England exports were estimated for each year from 1988 to 1993¹¹ assuming that regional exports perfectly tracked the national export performance of each product. For example, because national exports of paper products rose 4.4 percent between 1989 and 1990, New England's exports of paper products were also estimated to have grown by 4.4 percent, instead of by the 4.5 percent actually observed. Following the same procedure for all products, for each year, summing the estimated export values, and comparing the estimates with the export values actually observed indicates whether the

¹⁰ Information for the first half of 1994 suggests that the discrepancy is continuing; national exports grew 7.1 percent on a year-over-year basis while the region's exports climbed just 2.8 percent.

¹¹ The analysis did not include 1994 because a full year's data were not available at the time of writing.

Figure 3

*Export Growth in New England and the United States
Actual and Estimated^a*



^a Adjusted to U.S. export mix and market orientation
Source: Massachusetts Institute for Social and Economic Research; authors' calculations.

region's export product mix explains its relatively disappointing export performance over time.¹²

To control for New England's above-average dependence on exports to relatively slow-growing regions like Europe and Canada, total New England exports were then estimated assuming that regional exports tracked national exports of each product to each destination in each year (step 2). For example, New England paper exports to France in 1992 were assumed to have grown at the same pace as U.S. paper exports to France in that year.

The results of this two-step process are shown in Table 5. Estimated exports (line 6) are obtained by adding the results of step 2, which controls for both product and market mix, to actual exports for the preceding year. The estimated growth in exports has

¹² Because the origin-of-movement data for state exports are only available at the 2-digit SIC code level, this study's adjustments for product mix are only partial. For example, employment data indicate that computer-related products account for a much larger share of SIC 35, industrial machinery, in New England than they do nationally. Similarly, aircraft looms much larger in transportation (SIC 37) in New England than in the national industry.

two components: product gain and destination gain. The difference between the estimates made in step 1 (controlling for product mix alone) and actual exports equals the product gain, shown in line 3. The product gain measures the extra exports New England would have sold if exports of each New England product had grown at the national pace. Destination gain (line 4) is calculated as the difference between the estimates made in step 2 (controlling for product and destination mix) and in step 1 (controlling for product mix alone). The destination gain indicates whether New England has benefited or suffered from its traditional trade ties. Finally, the unexplained residual (line 7) is the difference between total estimated and actual exports. This residual reflects factors other than product mix and market mix that account for the difference between the regional and national export performance.

These calculations yield a striking conclusion. New England's export product mix and market orientation do not account for the region's subpar trade performance from 1987 to 1993. In fact, New England's export product- and market-mix should have

Table 5
Actual versus Estimated Exports from New England, 1987 to 1993
 Millions of Dollars

	1987	1988	1989	1990	1991	1992	1993	Cumulative Change, 1987 to 1993
1) Actual Exports	14,446.4	17,083.5	19,299.0	21,765.3	22,949.0	23,767.2	24,534.4	+10,088.0
2) Actual Change		2,637.1	2,215.5	2,466.3	1,183.7	818.2	767.2	+10,088.0
3) Estimated Product Gain		4,186.5	1,950.4	2,610.2	1,637.1	1,516.9	1,495.5	+13,396.6
4) Estimated Destination Gain		-170.7	462.9	832.9	-494.7	-200.7	-169.3	+260.4
5) Total Estimated Gain		4,015.8	2,413.3	3,443.1	1,142.4	1,316.2	1,326.2	+13,657.0
6) Estimated Exports (actual)	14,446.4	18,462.2	20,875.5	24,318.6	25,461.0	26,777.2	28,103.4	+13,657.0
7) Unexplained (1-6 or 2-5)		-1,378.8	-197.8	-976.8	41.4	-498.0	-559.0	-3,568.7

Source: Authors' calculations based on MISER data. See the text for details.

caused its export gains to exceed the nation's in five of the six years covered by the study, as shown in Figure 3. Over the entire period covered by this study, actual New England export growth exceeded the modeled result only in 1991.

Looking at the results in more detail indicates that, by and large, New England enjoys an attractive product mix and exports the type of U.S. goods increasingly in demand in foreign markets. The New England export growth implied by U.S. export growth for comparable 2-digit products exceeded actual export growth in every year from 1988 to 1993. For the entire period, the region's exports should have been \$3.3 billion higher than they actually were if they had tracked national trends without regard for differences in market orientation.

However, performing the second step and controlling for the region's market orientation indicates that New England's geographic focus is sometimes disadvantageous. In 1989 and 1990, the region's export ties to Europe and Canada were beneficial, since those countries were approaching cyclical peaks and were investing heavily in American goods, like transportation and electronic equipment. But from 1991 to 1993, when restructuring Latin American economies and South East Asian countries were the nation's fastest growing foreign markets, New England was at a disadvantage. In those years, the region's market focus damped its export performance by an estimated \$169 to \$495 million per year.

All told, thus, the model estimates (by succes-

sively adding estimated export gains to estimated exports in each preceding year) that for the 1987-1993 period as a whole New England exports should have been \$3.6 billion larger than they actually were, given the region's product mix and market orientation. In other words, unexplained factors reduced New England's export growth by \$3.6 billion. What were these additional factors?

Examining the shift-share residuals for total exports, as well as for each industry, helps to answer this question.¹³ For example, because the residuals were positive in a single year, 1991, the proposition that the region's below-average export growth reflects unusually limited access to trade finance seems unconvincing. Other research has shown that the region's "credit crunch" was most severe in 1991, the only year in which New England's export growth exceeded the modeled results.

In addition, negative residuals did not predominate across a wide range of product categories and showed no consistent trend over time. This result undermines the suggestion that New England is especially disadvantaged by a lack of public sector support for exports or that its cost environment is generally or increasingly debilitating. Although either explanation may apply to particular industries or

¹³ A statistical supplement with actual and estimated exports, and residuals, for individual New England states and industries is available on request to Research Library-D, Federal Reserve Bank of Boston, P.O. Box 2076, Boston, MA 02106-2076.

states, the evidence does not support a broad-based deficiency.

Finally, it is noteworthy that, over time, one sector—industrial machinery—accounts for the bulk of the negative residuals. In fact, New England exports of this set of products fell well below the modeled results in each year and, for the entire 1987–93 period, this one industry's cumulative residual amounted to \$3.5 billion, virtually all of the region's unexplained export shortfall for the years studied. While other industries, such as transportation equipment and instruments, also had substantial negative residuals (–\$0.9 billion and –\$0.5 billion, respectively), these residuals represent relatively small fractions of the total shortfall and were largely offset by positive residuals in industries like chemicals (\$0.4 billion), fabricated metals (\$0.4 billion) and electronic equipment (\$0.2 billion). In other words, if

By and large, New England enjoys an attractive product mix and exports the type of U.S. goods increasingly in demand in foreign markets.

it were not for the industrial machinery industry, New England export growth would have done a reasonably good job of tracking the nation's export performance.

One explanation for the industrial machinery sector's relatively poor performance may be the familiar misfortunes besetting the region's computer industry during this period; more powerful microprocessor-based personal computers and the trend towards open-architecture systems have both cut into the market share of the region's mini-computer makers. More generally, the level of industry detail available with the origin-of-movement export data (2-digit SIC codes) may simply be too broad to allow full adjustment for differences in product mix. For example, computers account for a major part of the industrial machinery industry in New England, but for a much smaller share of the national industry. Thus, using trends in U.S. exports of industrial machinery to estimate New England's industrial machinery exports (largely computers with falling prices) could

greatly exaggerate the region's apparent export shortfall. Similar distortions could also contribute to the relatively large residuals found in the transportation and, to a lesser extent, the instruments industries. In the case of transportation equipment, for example, aircraft engines and parts dominate the regional industry whereas autos or complete aircraft loom larger elsewhere.

VI. Summary and Policy Implications

This article uses the best available state export data, the U.S. Census Bureau's origin-of-movement data provided through the Massachusetts Institute for Social and Economic Research, to explore the reasons for New England's below-average export performance from 1987 to 1993. En route, the article points out that the region's exports differ from the nation's because they comprise more highly processed merchandise and are disproportionately destined for European and Canadian markets.

Although New England's recent export growth has lagged the nation's, the shift-share analysis of product and market mix underlying this article indicates that the region has no pervasive "exporting problem." On the contrary, the region's apparent underperformance seems to be substantially attributable to a single industry, industrial machinery. Although the origin-of-movement data cannot support further conclusions, other data suggest that the region's relatively slow export growth largely relates to its above-average dependence on computers as well as to the specific challenges confronting the regional computer industry.¹⁴ Otherwise, the region appears to enjoy a generally favorable export product mix, dominated by the high-tech capital equipment foreigners seek from the United States. The data provide no indication that the region suffers from peculiarly limited access to trade finance or that ongoing structural shifts from manufacturing production activities to services have pulled its export growth below average.

On the other hand, New England's traditional trade ties to Atlantic Rim countries did prove detrimental from 1991 to 1993. Europe and Canada, New England's major export markets, suffered severe recessions in those years, and the region's exports

¹⁴ Another possible exception is the region's above-average dependence on aircraft engines and parts, rather than complete aircraft or autos, within the transportation industry.

suffered as a consequence. As of late 1994, however, recovery is well under way in these areas. Accordingly, New England's established market focus—rooted in geography and culture—should soon become less disadvantageous.

Nevertheless, Latin America and Asia will undoubtedly continue to gain importance as U.S. export markets, as these developing regions outpace growth in the mature industrial countries and become increasingly open to trade. Starting in early 1994, the North American Free Trade Agreement (NAFTA) gradually eliminates Mexican tariffs (presently averaging 10 percent) on U.S. products. Similarly, NAFTA provisions protecting U.S. intellectual property rights and a side agreement on enforcing Mexico's environmental laws enhance export opportunities for the U.S. software and environmental businesses, important in New England. Other Latin American and Asian countries are also committed to reducing barriers to international trade and investment and have made such policies a central aspect of their development strategies as their leaders have increasingly recognized that cutting trade barriers will improve their nation's productivity and living standards. Such policies led over 120 countries to the commitments embodied in the Uruguay Round amendments to the General Agreement on Tariffs and Trade (GATT), recently approved by the U.S. Congress.

Although the foregoing analysis suggests that New England exporters are generally aware of and responsive to global market trends, obtaining a good

understanding of foreign markets requires timely and appropriate trade data. Given the growing importance of services in international trade, information on state service exports would be most welcome. In addition, the data on state merchandise exports by industry would be much more useful if transportation could be divided into autos and other transportation, and if computers and office equipment could be segregated from other industrial machinery.

In light of New England's traditional involvement in international trade and investment, it is somewhat reassuring to find that the region's recent export performance is probably akin to the national average, once remaining differences in product mix—particularly the relative importance of computers—are taken into account. Still, since the computer industry remains key to New England's industrial future, this result provides no grounds for complacency. Indeed, the fact that New England merchandise exports have not grown faster than the national average, given New Englanders' international sophistication, probably reflects the region's ongoing shift from manufacturing production activities to services. After all, relative merchandise export performance signals a region's competitiveness as a manufacturing production site. The ongoing restructuring of the regional economy suggests that New Englanders will increasingly serve global markets through exports of services and overseas investments. For this reason, the merchandise trade data discussed in this article provide only a partial picture of New England's involvement with the world economy.

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