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Looking Beyond the Shipyard: Economic Development Challenges of Southern Maine and Seacoast New Hampshire

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**Looking Beyond the Shipyard:
Economic Development Challenges of
Southern Maine
And Seacoast New Hampshire**

**Prepared for
Southern Maine Planning Commission**

Center for Business and Economic Research
University of Southern Maine

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September, 2005

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Executive Summary

The threatened closure of the Portsmouth Naval Shipyard has spurred an intense examination of the future economic prospects for York County, Maine and Rockingham County, New Hampshire. The removal of the shipyard from the list of defense facilities proposed for closure has been a major relief to the region. But saving the shipyard should not be seen as assuring the economic future of the region. Intense budgetary pressures on the Federal Government will remain and may mean yet more efforts to reduce domestic defense bases and could also reduce the amount of work at the yard even if it does stay open.

This report provides the first integrated analysis of the shipyard's effects on both the Maine and New Hampshire economies. The shipyard accounts for more than 10,000 direct and indirect jobs across the two-state region. Over 80% of these jobs are in York County, with an additional 10% in Rockingham County and the balance spread through the rest of Maine and New Hampshire. The total jobs associated with the shipyard account for 3.5% of employment in York and Rockingham counties, but 8.5% of York County employment. The shipyard, together with its indirect effects, accounts for over \$750 billion in regional output (gross regional product), which is 5% of output in the region and 12% of York County output.

The shipyard is home to unique technical skills in the region, but it also indirectly supports a large number of jobs in retail trade, construction, leisure & hospitality services, and education & health services. The most affected occupations include management and finance occupations, as well as office and sales jobs. The econometric analysis of the future of the regional economy without the shipyard indicates that closure of the shipyard would not result in recovery of the total number of jobs lost within twenty years even though large numbers of people would become available and wage costs would be thereby reduced.

Analysis of the current strengths of the region began with a study of leading industries in Rockingham County by the University of New Hampshire. Application of a similar methodology to York County, together with additional detailed analysis, suggests that the York County still faces economic development challenges even with the shipyard remaining open. Among the findings of this analysis are:

- Rockingham County's leading industries include a number of export service industries that are likely to provide a strong foundation for economic growth.
- York County's strengths include some of the industries that are strong in Rockingham County, but a much larger number of its high ranking industries lie in more locally-traded services, construction, and manufacturing, along with leisure and hospitality on a seasonal basis. York County's industrial and sector strengths all face competitive or other economic challenges which may limit their ability to continue strong growth in the County.

Economic development responses to the challenges of both the shipyard and the current economy must focus on growing export-oriented services, assuring a continued strong role for tourism, addressing the productivity needs of manufacturers, and finding approaches to urbanization in the region that both enhance the County's attractiveness to service and related industries, while maintaining the County's special qualities as a place to live and recreate.

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1. Introduction

The Portsmouth Naval Shipyard has survived yet another round of proposed closure of Defense Department facilities. While the relief within the York County and Seacoast New Hampshire region is substantial, the removal of the shipyard from the closure list by the Base Realignment and Closure (BRAC) Commission should not be taken as a sign that all will be well in the economy of the region. Rather the BRAC process and the questioning of the future of the shipyard should be seen as an opportunity to examine what is happening in the regional economy and to identify economic development issues that will affect the region with or without the Portsmouth Naval Shipyard.

This paper was commissioned at a time when the future of the Shipyard was very much in doubt, and was intended to be an overview of the strategic economic issues that the region would have faced had the shipyard been retained on the list of proposed facilities to be closed. The fact that the shipyard will remain open for some time to come alters, but does not eliminate many of the economic issues facing the region. This is so for several reasons:

- The Portsmouth Naval Shipyard will remain open and active, but the level of activity is unlikely to remain the same as now indefinitely. The number of submarines in the Navy's fleet is likely to decline over time for both strategic and budgetary reasons. The Shipyard has already seen a reduction in employment from peak levels during the Cold War and may see further reductions over the next decade even as the yard continues to play a critical role in maintaining the submarine fleet. There is also the possibility of another BRAC process in the future as budgetary pressures continue to squeeze the Federal Government.
- The principal region affected by the Shipyard, southern Maine and Seacoast New Hampshire, has been among the most economically vibrant in northern New England and in each state. But parts of the economy, notably manufacturing, have also shown signs of significant decline as part of overall regional and national trends.
- Lying between the growing metropolitan areas of Boston to the south and Portland to the north, the region has shown significant economic growth, and the economic character of the region will continue to be driven by its role in an increasingly urban economy. The coastal region from Hampton to Old Orchard has also been a summer refuge from the city for more than 150 years, but the city is rapidly expanding around this area from both north and south.

In short, the region remains one in which dynamic changes are occurring and in which, even under the best circumstances, the economic anchor of the Shipyard will remain vulnerable to shifts that may yet be unfavorable to the regional economy.

In order to get a sense of the future economic issues, this paper examines the future of the region from two perspectives. First, the role of the Shipyard itself is examined in some detail. Much has already been written about the importance of the Portsmouth

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Shipyard to both Maine and New Hampshire, but previous analyses have considered the effects on the two states separately. In this analysis, the York County-Rockingham County region will be examined together for the first time, and additional detail will be provided on the industrial and occupational effects of the Shipyard in the regional economy. Second, an analysis of the major industries in the region will suggest where economic growth and development trends are taking the region and upon which future development efforts can build.

While the report will focus primarily on York County, York County cannot be entirely separated from what is happening in the neighboring counties to the north (Cumberland) and south (Rockingham). A major lesson of the attention on the Shipyard is how this one facility shapes the economy of this bi-state region, and there are forces beyond the shipyard that play similar roles. The collaboration between the two states and local and regional agencies around the BRAC process provides a foundation upon which future efforts to consider both the joint as well as individual regional economies in economic development planning may be built.

2. The Role of the Portsmouth Naval Shipyard in the Regional Economy

The geographically anomalous position of the Portsmouth Naval Shipyard has long been a subject of interest- and controversy. Named for the city in New Hampshire that lies just across the Piscataqua River, but situated on an island located north of the thalweg (the major navigation channel) and thus within the Maine town of Kittery, the shipyard has been a key part of the economy for more than two centuries. In responding to the three proposals to close the shipyard, each state has undertaken separate analyses of the role of the shipyard in their respective state economies. While these separate pictures have clearly demonstrated the economic significance of the shipyard, they have been incomplete in that it has not been possible to fully account for the effects on the regional economy of southern Maine and Seacoast New Hampshire together.

Previous analyses of the shipyard have used separate economic models of Maine and New Hampshire. In this paper, a single model of Maine and New Hampshire combined is used, with separate models of York and Cumberland counties in Maine and Rockingham County in New Hampshire included. The model used is the REMI (Regional Economic Models Inc.) model, which has been the basic model used by both the State of New Hampshire (Economic and Labor Market Bureau) and State of Maine (State Planning Office). The University of Southern Maine's Center for Business and Economic Research (CBER) has maintained its own version of the REMI model covering nine county regions for more than ten years. For this analysis, that model was modified to include Rockingham County and the Rest of New Hampshire as additional regions. Thus the two principal counties affected by the shipyard and the two states are modeled together as one region.

The standard method for analyzing the economic role of a major facility such as the shipyard within a region is to remove that facility from the economy within the model and to

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examine its effects. The analysis of the closure of the shipyard thus becomes an analysis of how the shipyard affects the region even if they shipyard remains open.

	Direct Employment	Total Employment ¹		
		2005	2010	2020
Yorik County	4,800	8,132	7,764	7,446
Rockingham County	800	1,086	1,015	946
Total	5,600	9,218	8,779	8,392
Rest of NH		516	490	512
Rest of ME		846	822	891
Total		1,362	1,312	1,403
NH Impacts		1,602	1,505	1,458
ME Impacts		8,978	8,586	8,337
Total Maine and NH		10,580	10,091	9,795

Table 1 Total Employment Impact of Portsmouth Naval Shipyard

Table 1 provides an overview of the employment in the region and in the two states directly and indirectly affected by the shipyard. The shipyard and associated facilities currently employ about 4,800 workers directly in the repair and maintenance of Los Angeles class submarines. These employees are counted entirely in the State of Maine. In addition, there are up to 800 federal military employees that include the personnel assigned to the Coast Guard station on Seavey Island and the crews of the submarines while their boats are undergoing repair. This employment is counted in New Hampshire.

The economic impacts of the Shipyard are shown by removing (“closing”) the facility in 2010; for purposes of the analysis the closure occurs in one year. The employment figures shown for 2010 and subsequent years in Table 1 measure the total employment associated with the yard, that is direct (5,600 jobs in Maine and New Hampshire) plus indirect. The indirect effects measured in York and Rockingham counties are 3,332 and 286 respectively. These indirect effects imply multipliers within the region of 1.7 for York County and 1.4 in Rockingham County. For the two county region as a whole, there are a total of 3,618 jobs dependent on the shipyard beyond the direct employment, a multiplier of 1.65.

The total employment affected by the shipyard in the York-Rockingham region amounts to about 3% of total employment at estimated 2005 levels. The York County proportion is 8.5% of county employment, while the effect on Rockingham County is about 0.6% of employment.

The shipyard’s indirect effects extend beyond the two-county region. An additional 1,362 jobs in Maine and New Hampshire indirectly depend on the shipyard, for a total of 10,580 employees related directly and indirectly to the shipyard. This includes 4,980 indirect jobs, compared with the 5,600 direct jobs, a multiplier of 1.9 for the two states together.

¹ In this analysis, the total employment concept as defined by the Bureau of Economic Analysis is used. This includes wage & salary employment, agricultural employment, and self-employment.

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The REMI model permits the economic effects of the shipyard to be traced out over an extended period of time. This provides an important measure of the fundamental reliance of the region on the shipyard. When the yard is “closed” in the model simulation, the employees become available for employment in other industries. Assuming a basic level of growth in demand for the goods and services of the region, the model assumes that the large available labor pool made possible by the closing will drive labor costs in the region down, making it more competitive and, over time, replacing the employment lost in the shipyard with employment in other industries in the region. In a “low impact” situation, the total employment affected by the yard should decline over time because of this competitiveness effect.

If the competitiveness effect is strong enough, that is there are good opportunities to re-employ the workers made available by the shut down, then the economic impacts would decline significantly over a period as long as twenty years (the period modeled here). But that is not the case. Over twenty years, the “competitiveness effect” is able to only reduce the employment losses by a total of about 800, or about 7%. This indicates that a very high level of the regional economy is dependent on the shipyard and could not be easily replaced if the yard closed.

	2010	2020	2030
Yorik County	\$616.1	\$704.4	\$814.0
Rockingham County	\$45.1	\$45.4	\$48.2
Total	\$661.2	\$749.8	\$862.2
Rest of NH	\$37.0	\$41.1	\$49.3
Rest of ME	\$56.3	\$65.7	\$81.4
Total	\$93.3	\$106.8	\$130.7
NH Impacts	\$82.1	\$86.5	\$97.5
ME Impacts	\$672.4	\$770.1	\$895.4
Total Maine and NH	\$754.5	\$856.6	\$992.9

Table 2 Gross Regional Product Effects of Portsmouth Naval Shipyard (Millions of 2000 Dollars)

Table 2 presents the effects on gross regional product in the region related to the shipyard. Gross regional product is the value of the goods and services within a region. It is conceptually related to the Gross Domestic Product, the regularly used measure of the value of the national economy. The figures in Table 2 represent the total effects (that is the sum of direct and indirect activity) related to the shipyard. In 2010, the shipyard would account for over \$660 million in economic activity in the York-Rockingham region, and over \$750 million in activity in the two states. To put these figures in perspective, the total GRP for the York-Rockingham region in 2005 is forecast to be just over \$15 billion, two thirds of which is in Rockingham County and the remainder in York County. The shipyard accounts, directly and indirectly, for over 12% of the GRP of York County, and about 0.5% of Rockingham County’s GRP.

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The largest industries indirectly affected by the Shipyard are retail trade, construction, and accommodation and food services. (Table 3) Together, there are just over 1900 jobs affected by the shipyard, or about 57% of the total indirect jobs affected in these industries. From the overall employment outlook perspective, the concentration of affected employment in these industries offers a ray of hope. Faster national and regional (Maine and New Hampshire) growth over the next 20 years would mean that even if the shipyard did close, growth in these relatively large employment sectors might offset the shipyard-related losses. The offsets would not, of course, include equivalent wage or output gains.

	York	Rockingham	Combined*
Forestry, Fishing, Other	8	0	9
Mining	0	0	0
Utilities	14	1	16
Construction	589	38	627
Manufacturing	52	8	60
Wholesale Trade	40	8	48
Retail Trade	832	34	867
Transp, Warehousing	11	4	15
Information	23	6	28
Finance, Insurance	70	8	78
Real Estate, Rental, Leasing	90	11	101
Profess, Tech Services	99	16	115
Mngmt of Co, Enter	4	2	6
Admin, Waste Services	117	13	130
Educational Services	52	8	60
Health Care, Social Asst	268	6	262
Arts, Enter, Rec	181	11	192
Accom, Food Services	488	19	507
Other Services (excl Gov)	374	16	390
* Totals may not sum due to rounding			

Table 3 Industries of Indirect Employment Affected by Portsmouth Shipyard

It is also important to look at the shift in occupations as well as industries. The occupational profile of the shipyard is defined by the Department of Defense employment classification but the New Hampshire Department of Employment Security provided a cross walk between the DOD classification and the Standard Occupational Codes (SOC) for the shipyard. The occupation types and estimates of the number of employees in each group are shown in Table 4. This table documents the high skill-high wage occupations that would essentially be permanently lost to the region without the shipyard.

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Mechanical Engineering Technicians	266
Industrial Machinery Mechanics	250
Helpers- Production Workers	243
Supervisors of Construction Trades	201
Mechanical Engineers	184
Nuclear Engineers	180
Electricians	153
Painters, Transportation Equipment	152
Plumbers, Pipe fitters, Steamfitters	129
Machinists	117

Table 4 Major Occupations at Portsmouth Naval Shipyard

Table 5 breaks the employment dependent on the shipyard down by major occupational groupings in the SOC using the industry-occupational matrix embedded in the REMI model. This table includes both the direct and indirect shipyard effects, that is, it includes both the shipyard occupations and the jobs in similar occupations elsewhere in the region. The largest occupations affected, accounting for 43% of York County and total York-Rockingham jobs are in management and business finance and in sales and office administrative occupations. This is consistent with the concentration in the retail and service industries noted above.

	York	Rockingham	Combined*
Management, business, finance	1,283	28	1,311
Computer, math, architecture, engineering	427	11	438
Life, physical, social sciences	253	2	255
Community & social services	75	3	78
Legal	199	5	204
Education, training, library	105	12	117
Arts, design, entertainment, sports, media	292	6	298
Healthcare	269	5	274
Protective service	446	12	458
Food prep, serving & related	481	23	504
Building, grounds, personal care, services	716	40	756
Sales, office, administration	2,229	54	2,283
Farm, fish, forestry	466	39	504
Construction, extraction	402	17	419
Installation, maintenance & repair	79	6	85
Production	270	14	284
Transportation, materials moving	139	9	149
*Totals may not sum due to rounding			

Table 5 Occupational Classifications of Indirect Employment Affected by Shipyard

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This analysis of the role of the Portsmouth Naval Shipyard in the regional economy points clearly to the critical role that it plays in the economic life of southern Maine and Seacoast New Hampshire. The dependence of the region on the Shipyard, particularly in York County, reinforces the importance of keeping the shipyard open. But it also raises the question of whether the region is *too* dependent on the shipyard even with its continued operation. The reprieve in the 2005 BRAC process should be seen as good news, but by no means the final word on the shipyard's future.

So the question becomes: what are the opportunities for economic diversification and development in the regional economy upon which a stronger economic future may be built. This is the subject of the next section.

3. Leading Industrial Clusters in Rockingham and York Counties

What are the foundations upon which economic development can be built? The starting point to answer this question is to assess what are the strengths in the economy today, what are the prospects for those areas, and what opportunities exist that may yet be seized?

One tool to accomplish the first of these tasks is what is termed leading industry cluster analysis. This assessment uses standard economic data, particularly employment, to identify those industries which show particular characteristics of strength in a regional economy. The approach involves assessing employment trends in order to measure:

- Size: Which industries are the largest employers in the region?
- Growth: Which are the fastest growing?
- Wages: Which pay the highest wages?
- Specialization: In which industries does a region specialize compared to other regions?

Other factors, such as the number of establishments (places of employment) may also be used, and there are options to analyze either the level of growth (absolute change) or the rate of growth (percent change). These different measures are difficult to combine into a single number, but it is relatively easy to construct a rank order index in which an industry's ranking among all industries is a weighted average of its rank on each of the measures of economic strength.

An analysis of this type has already been performed by the Small Business Development Center at the University of New Hampshire (CITE). The UNH study ranked each industry on the basis of employment levels and proportions, average wages, the number of establishments, absolute and percent changes in employment, rate of growth in average wages, and the location quotient. Data for 1998 and 2001 was used. Industries were defined as the 4-digit classes under the North American Industrial Classification System (NAICS).

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The location quotient is a measure of the extent to which a particular region specializes in a given industry, and may be more accurately called a “specialization ratio”. It is defined as the ratio of the proportion of employment in a given industry and region to the proportion of employment in a reference region.² A ratio greater than one implies a region is more specialized in that industry and a ratio less than one that it is not specialized in that region. In the case of the analysis of Rockingham County by UNH, the specialization ratio was calculated with reference to the U.S.

The UNH analysis weighted the various components as shown in Table 6. The results of their analysis are shown in Table 7, which lists the top 25 leading industries in Rockingham County.

Core Growth	Employment Growth	15%
	Average Wage Growth	15%
	US Employment Growth	15%
	TOTAL	45%
Variable Levels	Average Wage	15%
	Employment	15%
	Specialization Ratio Relative to US	10%
	Establishments	5%
	TOTAL	45%
Related Growth	Establishment Growth	5%
	Change in Specialization Ratio	5%
	TOTAL	10%

Table 6 Weighting Used in Leading Industry Analysis

When grouped into their major sectors, the Rockingham leading industries are defined as follows:

Services	40%
Manufacturing	8%
Leisure & Hospitality	4%
Trade	28%
Construction	8%
Education & Health	12%

Rockingham County has a very strong concentration in what may be termed “export services” such as employment services (ranked 1st), computer design (2nd), software publishing (6th), consulting, and architectural-engineering services (7th). These are

² . Define: $S = \frac{\frac{E_i^r}{E_i^R}}{E^R}$ where S is the specialization ratio, E_i^r is employment in occupation i in the

Kennebec Valley, E^r is total employment in the Kennebec Valley, E_i^R is employment in occupation i in the reference region (Maine or the U.S.) and E^R is total employment in the reference region.

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distinguished from local services such as education and health in that the customers for these services are likely to be found outside the region and thus these service industries perform the same “export base” functions as manufacturing firms. Local services such as trade, education & health, and construction comprise more than half of the leading industries.

NAICS Industry	Industry Name
5613	Employment Services
5415	Computer Systems Design and Related Services
5511	Management of Companies & Enterprises
7222	Limited Service Eating Establishments
3333	Commercial & Service industry machinery manufacturing
5112	Software Publishing
5416	Management, scientific, and technical consulting services
4227	Petroleum and petroleum products wholesale
5239	Other financial investment activities
4451	Grocery stores
2357	Concrete contractors
6231	Nursing care facilities
5617	Services to buildings & dwellings
3344	Semiconductor & other electronic component manufacturing
4521	Department stores
4213	Lumber & other construction materials wholesale
4411	Automobile Dealers
6111	Elementary & secondary schools
4441	Building and materials supplies dealers
5417	Scientific R&D services
6211	Offices of physicians
2369	Special trade contractors
5413	Architectural, Engineering & related services
5619	Other support services
4543	Direct selling establishments

Table 7 Leading Industries in Rockingham County

Table 8 shows the comparable leading industries in York County calculated in a like manner, using the same factors and weighting as was done in the UNH Rockingham County study.³ The York County data uses 2003 as the base year, and calculates all changes in the variables using 1998, as also done in the UNH study.

³ Government employment is generally excluded from this analysis in both New Hampshire and Maine. The U.S. Postal Service is also excluded. Exceptions are local education systems and the Portsmouth Naval Shipyard, which are coded under NAICS based on their function as being in education and the manufacturing sector of ship building and repair

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NAICS	Industry Name
6211	Offices of physicians
2361	Residential building construction
5413	Architectural and engineering services
3366	Ship and boat building
4411	Automobile dealers
2389	Other specialty trade contractors
5221	Depository credit intermediation
5415	Computer systems design and related services
5416	Management and technical consulting services
2382	Building equipment contractors
3371	Household and institutional furniture mfg.
5411	Legal services
4543	Direct selling establishments
4251	Electronic markets and agents and brokers
3118	Bakeries and tortilla manufacturing
4238	Machinery and supply merchant wholesalers
6111	Elementary and secondary schools
2383	Building finishing contractors
3323	Architectural and structural metals mfg.
5312	Offices of real estate agents and brokers
6212	Offices of dentists
5242	Insurance agencies, brokerages, and related
4234	Commercial equip. merchant wholesalers
4431	Electronics and appliance stores
3327	Machine shops and threaded product mfg.

Table 8 Leading Industries in York County

. A summary analysis of the industry groups among York County’s leading industries shows that the major sectors are:

Construction	16%
Manufacturing	20%
Trade	24%
Services	28%
Education & Health	12%

The leading industries list points to important differences between the two counties. While Rochester County has a high proportion of its leading industries in export services, York County concentrates in more local services. Construction and real estate related industries comprise a larger number of leading industries in York County, with residential construction services the second ranked industry. Physician offices rank first in York County, but 21st in Rochester County. York County also lists both legal

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services and dentists offices among its leading sectors. There are some export services in York County, notably architectural and engineering services (ranked 3rd), and Computer systems design (8th). York County also has a much higher proportion of manufacturing among its leading industries. (20% v. 8%).

Seven of the top 25 leading industries are in common between the two Counties. (Table 9) The differences in rankings between the counties also reflect the patterns seen in the sector analysis. Automobile dealers and retail (direct selling) establishments rank higher in York County than Rochester County, as do Physicians Offices.

	Rank	
	York	Rochester
Automobile dealers	5	17
Direct selling establishments	13	25
Architectural and engineering services	3	23
Computer systems design and related services	8	2
Management and technical consulting services	9	7
Elementary and secondary schools	17	18
Offices of physicians	1	21

Table 9 Leading Industries in Common between York and Rockingham Counties

The absence of leisure and hospitality industries among the York County leading industries may be seen as surprising. However, this is largely an artifact of the nature of this industry in York County and the data used for this analysis. Leisure and hospitality in York County is primarily a summer-peaking industry, which means that analyses using annual average employment data will understate its overall importance. These industries and tourism in general, remain a key part of the York County economy as the additional analysis below shows.

The leading industry analysis used here provides an important perspective on local economic strengths, but it is just one perspective. To verify the trends and characteristics shown in the leading industry analysis, the data used to construct the leading industries can be used to provide additional views. One way to do this is to remove the weighting used to construct the final rank order; weighting provides a useful way to reflect greater or lesser importance among the factors, but no weighting scheme is inherently correct and all introduce some level of bias in the analysis.

Table 10 shows the top 25 industries based on an unweighted sum of the rankings of all industries on the factors used in this analysis. This analysis implicitly increases the role of the specialization ratio and establishments in defining leading industries. The summary of leading industries by sectors between the weighted and unweighted rankings shows that construction and education and health related services now comprise nearly half of the leading sectors. Tourist-related industries such as restaurants also appear in the unweighted list. This is not surprising given that these industries tend to have a large number of establishments.

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	Weighted	Unweighted
Construction	16%	20%
Manufacturing	20%	8%
Trade	24%	16%
Services	28%	20%
Education & Health	12%	28%

2361	Residential building construction
2389	Other specialty trade contractors
2382	Building equipment contractors
6211	Offices of physicians
5413	Architectural and engineering services
5312	Offices of real estate agents and brokers
4411	Automobile dealers
5221	Depository credit intermediation
6241	Individual and family services
3118	Bakeries and tortilla manufacturing
5416	Management and technical consulting services
6233	Community care facilities for the elderly
6111	Elementary and secondary schools
3366	Ship and boat building
7221	Full-service restaurants
5617	Services to buildings and dwellings
4441	Building material and supplies dealers
2383	Building finishing contractors
6213	Offices of other health practitioners
6232	Residential mental health facilities
7211	Traveler accommodation
2381	Building foundation and exterior contractors
4451	Grocery stores
6244	Child day care services
4543	Direct selling establishments

Table 10 Leading Industries in York County-Unweighted Rankings

The picture of the York County economy that emerges from the unweighted rankings is influenced in large part by the increased importance of establishments in this analysis. It highlights further the role of services, particularly local services, in the economy. At the same time the analysis emphasizes size in the economy, not necessarily key aspects of economic strength such as sales outside the region (exports). To examine the role of export industries in more detail, the specialization ratio is a useful tool. Industries with specialization ratios greater than 1 can be seen as having some competitive locational advantage within the region.

But specialization ratios can be biased by the choice of reference regions. In the analysis presented so far, the reference region is the U.S., implying that an industry's competitiveness with the U.S. as a whole is identified. But competitiveness (specialization)

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can also be assessed relative to other regions. Table 11 through Table 13 show the top 25 industries in York County based on specialization ratios compared with the U.S., Maine, and New England. The 2003 York County employment in each industry is also shown to give a sense of the size of each industry.

NAICS	Industry Name	Specialization Ratio	York Employment 03
3366	Ship and boat building	49.759	4,025
3346	Magnetic media manufacturing and reproducing	7.140	167
3118	Bakeries and tortilla manufacturing	5.143	782
4543	Direct selling establishments	4.597	368
6232	Residential mental health facilities	2.717	804
5323	General rental centers	2.626	82
3222	Converted paper product manufacturing	2.544	458
7211	Traveler accommodation	2.379	2,113
3332	Industrial machinery manufacturing	2.352	145
6233	Community care facilities for the elderly	2.292	663
3273	Cement and concrete product manufacturing	2.118	248
2389	Other specialty trade contractors	2.053	619
3371	Household and institutional furniture mfg.	2.021	395
2361	Residential building construction	1.990	872
7221	Full-service restaurants	1.949	4,074
6242	Emergency and other relief services	1.936	130
4422	Home furnishings stores	1.913	259
3323	Architectural and structural metals mfg.	1.845	362
3327	Machine shops and threaded product mfg.	1.817	286
3328	Coating, engraving, and heat treating metals	1.793	130
4451	Grocery stores	1.792	2,286
4471	Gasoline stations	1.789	810
3231	Printing and related support activities	1.720	598
4531	Florists	1.717	98
4511	Sporting goods and musical instrument stores	1.701	385

Table 11 York Specialization Ratio Relative to U.S.

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NAICS	Industry Name	Specialization Ratio	York Employment 03
3346	Magnetic media manufacturing and reproducing	102.95	167
3366	Ship and boat building	92.80	4,025
3222	Converted paper product manufacturing	14.53	458
3371	Household and institutional furniture mfg.	12.73	395
3118	Bakeries and tortilla manufacturing	12.66	782
3273	Cement and concrete product manufacturing	8.52	248
5323	General rental centers	8.36	82
2123	Nonmetallic mineral mining and quarrying	7.72	44
7211	Traveler accommodation	7.04	2,113
1112	Vegetable and melon farming	5.53	48
3152	Cut and sew apparel manufacturing	5.30	17
3323	Architectural and structural metals mfg.	5.16	362
6233	Community care facilities for the elderly	5.09	663
3332	Industrial machinery manufacturing	4.79	145
6111	Elementary and secondary schools	4.67	5,807
2361	Residential building construction	4.65	872
1113	Fruit and tree nut farming	4.22	21
4471	Gasoline stations	3.95	810
6242	Emergency and other relief services	3.94	130
5191	Other information services	3.93	135
7221	Full-service restaurants	3.88	4,074
6232	Residential mental health facilities	3.82	804
8122	Death care services	3.80	99
3231	Printing and related support activities	3.72	598
4482	Shoe stores	3.59	125

Table 12 York Specialization Ratio Relative to Maine

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NAICS	Industry Name	Specialization Ratio	York Employment 03
3346	Magnetic media manufacturing and reproducing	102.95	167
3366	Ship and boat building	92.80	4,025
3222	Converted paper product manufacturing	14.53	458
3371	Household and institutional furniture mfg.	12.73	395
3118	Bakeries and tortilla manufacturing	12.66	782
3273	Cement and concrete product manufacturing	8.52	248
5323	General rental centers	8.36	82
2123	Nonmetallic mineral mining and quarrying	7.72	44
7211	Traveler accommodation	7.04	2,113
1112	Vegetable and melon farming	5.53	48
3152	Cut and sew apparel manufacturing	5.30	17
3323	Architectural and structural metals mfg.	5.16	362
6233	Community care facilities for the elderly	5.09	663
3332	Industrial machinery manufacturing	4.79	145
6111	Elementary and secondary schools	4.67	5,807
2361	Residential building construction	4.65	872
1113	Fruit and tree nut farming	4.22	21
4471	Gasoline stations	3.95	810
6242	Emergency and other relief services	3.94	130
5191	Other information services	3.93	135
7221	Full-service restaurants	3.88	4,074
6232	Residential mental health facilities	3.82	804
8122	Death care services	3.80	99
3231	Printing and related support activities	3.72	598
4482	Shoe stores	3.59	125

Table 13 York Specialization Ratio Relative to New England

The specialization ratios indicate a substantially increased role for manufacturing industries in York County, with between 40% and 48% of the top 25 industries in manufacturing. (Table 13) Seven manufacturing industries are to be found in the top 25 whichever reference region is chosen. These are listed in Table 15. Of course ship and boat building is on the list, which is also predominantly made up of durables goods manufacturing, which has traditionally been the area of manufacturing specialty in York County compared with Maine where nondurable goods manufacturing has been more common.

Leisure and hospitality industries are also more present among the top 25 specialized industries in York County than in the leading industries. Both restaurants and hotels (accommodations) rank high in specialization compared with New England and U.S. than Maine.

The comparison of specialization ratios with different reference regions also indicates that York County is more specialized in Education and Health Services with respect to New England and the U.S. York also has a large number of specialized industries

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in trade compared with the U.S., but not nearly as many when compared with New England or Maine.

	v. New England	v. Maine	v. U.S.
Natural Resources	8%	4%	0%
Construction	8%	4%	8%
Manufacturing	40%	48%	44%
Trade	8%	8%	24%
Services	8%	16%	4%
Education & Health	12%	16%	12%
Leisure & Hospitality	12%	4%	8%
Other Services	4%	0%	0%

Table 14 Sectoral Distribution of Top 25 Specialized Industries in York County

3118	Bakeries and tortilla manufacturing
3222	Converted paper product manufacturing
3231	Printing and related support activities
3273	Cement and concrete product manufacturing
3323	Architectural and structural metals mfg.
3332	Industrial machinery manufacturing
3346	Magnetic media manufacturing and reproducing
3366	Ship and boat building
3371	Household and institutional furniture mfg.

Table 15 Manufacturing Specializations in York County

While the analysis of the unweighted rankings reveals more about the role of establishments, and the specialization ratio analysis indicates the greater role of manufacturing, trade, and education and health services in the York County economy, the question of recent growth trends also needs to be examined. To do this, the rankings of industries by growth in employment and average wage are shown in Table 16 and Table 17 respectively.

Only one manufacturing sectors is in top 25 among employment growth industries: bakeries. This is primarily the Interstate Baking facility in Biddeford, which has recently cut employees from the 2003 levels used here. Education and health services, leisure and hospitality, and trade industries have generally been the most commonly found among the top 25 in employment growth. Wage growth, however, has been fastest in industries related to the rapidly growing construction and real estate industries in York County. Eleven of the top 25 industries in wage growth rates are in these industries.

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NAICS	Industry Name	Employment Growth	Rank
6111	Elementary and secondary schools	864	1
3118	Bakeries and tortilla manufacturing	731	2
3366	Ship and boat building	608	3
4451	Grocery stores	553	4
7221	Full-service restaurants	549	5
6241	Individual and family services	479	6
7222	Limited-service eating places	299	7
2361	Residential building construction	283	8
6233	Community care facilities for the elderly	269	9
2382	Building equipment contractors	256	10
4441	Building material and supplies dealers	244	11
7139	Other amusement and recreation industries	217	12
6211	Offices of physicians	212	13
5416	Management and technical consulting services	200	14
7211	Traveler accommodation	175	15
2389	Other specialty trade contractors	163	16
4411	Automobile dealers	154	17
5617	Services to buildings and dwellings	127	18
5221	Depository credit intermediation	116	19
5413	Architectural and engineering services	111	20
4244	Grocery and Related Product Wholesalers	90	21
6244	Child day care services	89	22
5412	Accounting and bookkeeping services	81	23
5322	Consumer goods rental	78	24
6213	Offices of other health practitioners	77	25

Table 16 Top 25 York County Industries by Employment Growth 1998-2003

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NAICS	Industry Name	Growth Rate in Average Wages	Rank
2361	Consumer goods rental	151.69%	1
5312	Nonmetallic mineral mining and quarrying	109.64%	2
6232	Bakeries and tortilla manufacturing	96.30%	3
5313	Activities related to real estate	90.76%	4
5191	Hardware and plumbing merchant wholesalers	62.71%	5
8141	Shoe stores	52.59%	6
6244	Nonresidential building construction	50.60%	7
2123	Semiconductor and electronic component mfg.	48.10%	8
7223	Investigation and security services	47.86%	9
2382	Greenhouse and nursery production	43.35%	10
5413	Residential mental health facilities	41.17%	11
2373	Special food services	40.53%	12
5616	Architectural and engineering services	40.40%	13
1114	Motor vehicle and parts merchant wholesalers	39.18%	14
6231	Child day care services	38.94%	15
4231	Offices of real estate agents and brokers	37.79%	16
4237	Other information services	36.79%	17
5322	Private households	36.66%	18
2362	Nursing care facilities	36.51%	19
3118	Residential building construction	36.28%	20
5418	Advertising and related services	35.65%	21
4543	Industrial machinery manufacturing	33.63%	22
4482	Building equipment contractors	33.42%	23
3332	Highway, street, and bridge construction	33.25%	24
3344	Direct selling establishments	33.06%	25

Table 17 Top 25 Industries in York County by Average Wage Growth 1998-2003

The analysis of key industries in York and Rockingham counties reveals the following characteristics of the two economies today:

- Rockingham County’s leading industries include a number of export service industries that are likely to provide a firm foundation for economic growth.
- York County’s strengths include some of the industries that are strong in Rockingham County, but a much larger number of its high ranking industries lie in more locally-traded services, construction, and manufacturing, along with leisure and hospitality on a seasonal basis.
- York County’s key industries are probably a less firm foundation for economic growth.
 - Construction and real estate related activity have been associated with the national housing boom, along with a steady influx of in-migrants to York County. While the latter trend will continue, the former is already reversing.

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- Manufacturing industries remain highly threatened by competition.
- The absence or relatively low rank of Leisure & Hospitality industries from the leading industries measure suggests that this industry has not seen significant growth recently and its high seasonality means that it is not a firm foundation for the year-round economy.
- Relative to the U.S., York County is retail trade and local service intensive. Relative to Maine, New England, and the U.S., York County is manufacturing intensive.
- Education and health services, particularly health and social services play a significant role in the York County economy.

4. Conclusions and Implications

York and Rockingham counties, together with Maine and New Hampshire clearly dodged an economic bullet when the decision was made to keep the Portsmouth Naval Shipyard open. The size of that bullet as documented here is significant and would have had widespread repercussions in the region. While the region would have partially recovered over time, particularly if rapid redevelopment in economically sound ways could have been undertaken. But nothing within the economies of southern Maine-Seacoast New Hampshire, or of New England as a whole, indicates that the size of the economic contribution of the shipyard could have been replaced by a single facility. Only significant time, robust overall economic growth, and good planning and development policies would have worked.

Examining the economies of York and Rockingham counties, it is certain that York County would have borne the brunt of the economic effects of a shipyard closure, but, more troubling, would be in a weaker position to recover economically. York County's economy has a number of strengths, but those strengths are also threatened. The fact that the shipyard will not close in the immediate future means that York County must now concentrate on addressing the threats that it faces other than the shipyard. These include:

- The construction and real estate industries are vulnerable to a rising interest rate and energy cost environment, which is likely to be the situation for the next several years.
- The county remains very dependent on manufacturing, which will remain under continual threat from intense competitive pressure. Survival strategies for manufacturers will almost certainly concentrate on steadily increasing productivity by substitution of capital for labor, meaning that even a robust manufacturing sector in York County in the future will almost certainly employ fewer people than today.
- Tourism remains a key industry, but it does not show signs of increasing competitiveness on the indicators examined here.

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- Health services will clearly be a major industry for the future in the County as an aging population, which is growing from both natural population aging and in-migration from the South as the County increases its role as a retirement destination. But the region is already labor force constrained meaning that growth in this most labor-intensive of industries will face its own challenges.

What does this mean for economic development in York County? The response may be made under four headings: services, tourism, manufacturing, and urbanization.

Services Services already dominate the economy, but it makes a difference what kinds of services are present. Local services such as health care, education, legal, and social services play a different role than such services as management consulting, software design, and architecture & engineering, whose customers can be anywhere in the world. York County has begun to see some strength in some of these industries, but has not succeeded to the extent that neighboring Rockingham County has. This is not surprising. Rockingham County is a larger and more urban economy, and has the advantage of having the University of New Hampshire as a nearby resource.

If the shipyard had closed and the property had been made available for development, it is likely that development of office space for these kinds of services would have been seen by the development community as a potential use for the property. These are growing industries, and Kittery is ideally placed to serve the urban regions of Portland, Boston, and Manchester. The challenge is to encourage similar growth in export service industries with the existing resource base. Rockingham County has already begun to show the way.

Tourism The analysis here suggests that tourism related industries in York County faces competitive pressures and limited resources. The form of the analysis used understates the importance of these industries because of their highly seasonal nature, and these industries do appear in York County's specializations when compared with New England and the U.S., but these industries still rank relatively low even on the measures that are most favorable to them.

York County's tourism industry is clearly concentrated in its coastal communities, and there are limitations as to how fast it can grow there. The key resources are the beaches, and these are already highly developed. Traffic and other concerns about the demands on these communities in the summer may suggest further limitations on significant growth for tourism. Tapping new tourism markets, considering the role of inland communities, and managing access and transportation issues will be the foundation for tourism development in York County.

Manufacturing The challenge in manufacturing, as suggested above, focuses on increasing productivity to remain competitive. The ability of local and regional efforts to affect productivity and costs is relatively small, but one key area is in assuring an educated and trained workforce. The metals manufacturing industry, which is a key part of the York

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County economy, has already seen the availability of a technically skilled and trained workforce a priority.

Urbanization From an economic geography perspective, York County has several distinct characteristics. There are no large central cities in the County. The major urban areas of Biddeford-Saco, Sanford, and York-Kittery are relatively small, even by Maine standards. Yet the County is fast developing urban, and particularly suburban, features through most of the communities. At the same time, the County is home to important tourism resources and has a long history as a summer resort. It is also situated among a number of larger urban regions in Maine, New Hampshire, and Massachusetts.

How economic activity is distributed across the York County landscape will be one of the keys to the future. Space must be found for the growth of the service industries, particularly the export industries noted earlier. These, along with other service industries like health care, will need urban-like places with relatively high densities of trade and service establishments, efficient transportation connections, and sufficient quality and cost characteristics to provide York County locations with a competitive advantage for these industries.

At the same time, the region's tourism and recreation resources must be protected and built upon. And York County will likely continue to be a highly attractive location for housing development, and increasingly so for retirees or near retirees (those who move to York County but keep their jobs outside the County until they retire).

Saving the shipyard, once again, has been an important event in York County's economic life. But it is by no means the end of the story. The road ahead would have been much harder if the shipyard had closed. A vibrant Portsmouth Naval Shipyard will make the road easier but not easy. York County still has much to do to assure a vibrant economy.