

# **Keeping Good Job Opportunities in the Community: How and When to Use Public Training Resources to Revitalize Good Manufacturing Jobs in the United States**

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## **Section I: Introduction**

One of the key premises behind public support for regional economic development strategies is that people want to continue to live in the communities that they call home. A connection to place is a fundamental human value, intimately linked to a settled agricultural rather than nomadic lifestyle. Writer Ann Raver expressed it this way: “Gardens, scholars say, are the first sign of commitment to a community. When people plant corn they are saying, let's stay here. And by their connection to the land, they are connected to one another.” The connection to place and thereby to community referred to by Raver is truly at the foundation of the civil institutions of our society. For people to be able to live in the communities where they grew up, near families and friends, and for communities to be sustainable, they must have healthy local economies. Thus, the availability of jobs is essential to accomplish the goal of a vigorous community and there is a public benefit in aiding in the effort to keep or create good jobs where they are needed.

In this paper we examine the role that community colleges can play in keeping or creating good jobs in communities where people already have roots. We look closely at one success story, an industry support center housed in a North Carolina Community College. We offer information about the industrial cluster being supported, the role the community college has played in its support, and offer a set of success factors that transform our example from specifics about one community college and one industry into a compelling lesson in how to design a successful regional development strategy. The paper ends with nine explicit policy recommendations for federal, state, and local officials. The overarching policy recommendation is for community colleges, regional economic development agencies, and federal retraining program to work together for stronger local economies.

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## **Section II: Background**

In the United States, local and state governments already spend substantial amounts of public funds recruiting new companies to an area with the expressed purpose of creating good jobs. They offer tax incentives, publicly funded infrastructure, and necessary training to prepare the local labor force for the jobs in these new firms. At the same time, these economic development agents usually overlook existing industries in the region. In particular, revitalizing existing manufacturing firms that offer “good” jobs, with “good” defined as year round jobs paying above minimum wage and providing benefits, is discounted as an economic development strategy because of the commonly held belief that the life expectancy of these jobs is limited by global competition. This expectation is based on the assumption that U.S. manufacturing can’t compete against low wage countries but it ignores the fact that wages may be only a small fraction of the cost of production or that U.S. firms may have cost advantages in other aspects of the production process. Instead of expecting all manufacturing jobs to disappear, one should consider which factors predict the continued vitality of a business and then use public training resources to revitalize those firms that offer good manufacturing jobs within the community.

Research has shown that successful developed country businesses in the 21<sup>st</sup> century share a common set of identifiable characteristics. Most importantly, successful firms have already made substantial changes towards more labor saving technology; the proportion of labor costs in these firms is significantly lower than in their competitor firms in other countries. Ann Bartel, Casey Ichniowski, and Kathryn Shaw (2003) provide examples from three manufacturing industries: medical equipment manufacturing, steelmaking and industrial value manufacturing. Successful firms continually make strategic investments in information technology which allow them to reduce inventories, track products through the manufacturing process, and facilitate quick response time from customer order to delivery. Rachel Willis, Rachel Connelly, and Deborah DeGraff (2003) provide specific examples from the hosiery industry.

Successful firms may also exploit niche markets, small batch processing, or use other strategies to make their location of manufacturing an advantage rather than a disadvantage. Michael Porter (1990, 2003) has written extensively about the importance of location, particularly of co-location, that is, firms operating in close proximity of others in the same industry, known as industrial clusters. Porter (2003) defines clusters as “a geographical proximate group of interconnected companies, suppliers, service providers, and associated institutions in a particular field, linked by

externalities of various types.” (p. 562) The externalities are benefits which accrue to firms in the cluster because of being located near another firm. Porter identifies three types of clusters, “local” which joining serve local markets, “natural resources” where location is based on natural resource availability of resources used as inputs in their production process, and “traded” where firms serve national or international markets but cluster for other reasons such as location based spillovers. (p. 553, 556-558) The concentration of the hosiery industry in the middle of North Carolina discussed below is an example of a traded cluster.

Porter (2003) offers evidence that clustered firms are more likely to innovate which we have already noted is essential for a successful manufacturing firm in the late 20<sup>th</sup>, early 21<sup>st</sup> century. AnnaLee Saxenian (1994), using two high-tech clusters of Silicon Valley and the I-128 firms of metropolitan Boston as her case study subjects, argued that clustering works best when it is supported by institutions and when the firms are open to communication and sharing of ideas. We will argue below that the Hosiery Technology Center housed at a North Carolina community college serves as the location of communication for the industrial cluster of hosiery manufacturing in North Carolina. Empirical evidence of the value of manufacturing clusters in the United States is offered by Vernon Henderson, Ari Kuncoro, and Matt Turner (1995). They examine data from 224 metropolitan areas and eight manufacturing industries in 1970 and again in 1987 and find that historical concentration of an industry in an area had a significant positive effect on future employment growth within the same industry and area.

Additional strategies for success in the face of growing international competition and domestic retail pressures include embracing the increasingly diverse labor force through innovative and flexible human resource policies which enhance worker productivity. Adapting jobs to better utilize non-English speaking workers, at the same time as providing incentives for employees to improve both their English language skills and their employment related skills is another critical strategy. Stuart Rosenfeld (1992) in writing about the success of the Emilia-Romagna district in Italy argues that labor force flexibility was an important factor in the region’s successful transformation from an economically impoverished area to one of the most advanced specialty manufacturing regions in the world. Bartel, Ichniowski, and Shaw (2003) show that, in each of their three industries, increased worker flexibility and cross training are central to the firm’s successful utilization of their new technology of manufacturing.

The adoption of successful labor saving strategies does not necessarily imply that the remaining jobs are unskilled. In fact, becoming more capital intensive in production often results in the replacement of low-

skilled labor with jobs that require increasing skill levels to manage and adapt the technology for maximum efficiency. More than ever before, American workers need training that is flexible so they, along with their employers, can respond to the rapid changes in technology and manufacturing design and problem solving skills as they work with complex sets of equipment. Workers need to know how to interface with machines with computer controls. They need to know how to use hand held computers for tracking and screen interfaces with equipment. Workers who have significant practical knowledge of the product being produced may still need to be retrained as one set of jobs vanishes and another set emerges.

Publicly-funded community colleges are the location for much of the training and most of the retraining in the United States and, thus, must be part of a critical public response to the increased pressure on manufacturing jobs.<sup>3</sup> Community colleges can also play other important roles by supporting industrial clusters and sustaining viable communities. This paper reports on a decade's worth of research on one successful public/private partnership which created an industry focused training center. The Hosiery Technology Center (HTC) has evolved to meet the emerging demands of regional firms as they strive to compete in the ever-globalizing economy. HTC is housed within a North Carolina community college and serves five relatively rural North Carolina counties with a traditional manufacturing base. The center has contributed to the preservation and enhancement of a healthy mix of jobs in a regional industrial cluster, leveraging existing industry-specific human capital. This local source of worker training and technology diffusion has enabled thousands of people to remain or return to the place they call home.

### **Section III: Why We Need a Strong Community College System that is Linked to Regional Economic Development**

Community colleges in the United States today serve three populations with very different needs: native young people right out of high school looking for initial training, certification, and in some cases, a doorway into a four year degree; native born older workers aiming to or forced to change jobs or simply retool for the changing nature of their current job; and immigrant workers looking to translate education and skills learned in their country of origin to their new country of residence and to enhance their English language skills. Current community college responsibilities include: college transfer programs, associate degree technical programs, certificate and diploma programs, short-term training and continuing education. These programs are a critical public policy response to the increased pressure to maintain the competitiveness of the U.S. workforce.

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<sup>3</sup> See Harold Salzman (2003) on why firms in the new economy may not provide training to employees.

But community colleges can also play other important roles of supporting cluster building and helping small businesses to provide employment specific training for their employees. In this section of the paper, we discuss the implications of the changes in U.S. manufacturing introduced in the previous section for changes in the training needs of American workers.

As discussed above, over the last twenty years, there have been substantial changes in the American business climate caused both by increased world competition and changes in the realm of U.S. retailing, which require changes in the many of the *modus operatus* of U.S. based manufacturing firms. In response to the increased pressures faced by U.S. manufacturing firms, they have reduced their inventories and their response time in a movement called lean manufacturing, they have outsourced some of the steps in the manufacturing process, and they have adopted newly developed computer driven machinery which allows more rapid changes in products and patterns. These changes have lead to a demand for more skilled employees who can interact with computer interfaces and who can make the on-site decisions needed for the successful implementation of lean manufacturing. Many successful businesses are also using more flexible job assignments where employees are cross trained in several different tasks that in the past would have been assigned to several different categories of workers. Looser job assignments and more complex interfaces with machinery lead to the need for more flexible training and more training in “soft skills” and analytic problem solving.

For a firm to be successful in the increasing competitive business environment of the last decade of the twentieth century and the first decade of the twenty-first century it must keep up with rapidly changing circumstances. Jerry Jasinowski and Robert Hamrin (1995) argue in *Making It in America: Proven Paths to Success for 50 Top Companies*, that manufacturing can be profitable in the U.S. but domestic manufacturers need to develop new and innovative business practices. In particular they need to adopt new technology and processes, instead of resting on past practices and successes (p. 72-73). For large firms, creating new technology means increased expenditures for research and development. Small firms also need a source for learning about changes and new technology, but they are not able to support substantial research and development efforts on their own. In some industries, this leads to increased firm size and a reduced number of competing firms. However, when the economies of scale on the manufacturing side of the equation are small, compared to the economies of scale of both the R & D and the retailing end of the operations, it may make more sense for firms to join together in loose consortiums rather than full horizontal integration. This is where trade associations, regional development agencies, and community-based educational institutions can be crucial to the small

firms' efforts to stay competitive and take advantage of the potential benefits of clustering.

The latter situation exactly describes the circumstances of the hosiery industry in North Carolina. Hosiery firms are traditionally small because the economies of scale in the knitting of the sock are small. Traditionally many a hosiery worker, working by day for a hosiery firm also operates a knitting machine or two at home in his basement. The rest of the operations-- seaming, dyeing and finishing-- require slightly larger operations size but there is an active market for "greige goods" (knitted but not yet seamed and dyed socks) in the region where the majority of the hosiery firms operate. The computerization of the knitting machine has recently brought some changes in the knitting of greige goods, since it is now much easier to change patterns quickly.

The computerized machines are much more expensive than the older models and this has led hosiery firms to run second and third shifts in an effort to keep their higher priced capital in full use. The increase in shift work, along with changes throughout the labor market in the region led to a severe shortage of knitters and "fixers" (knitting machine technicians) in the early to mid-1990s in the region. In the past, those jobs were trained on-site, often passed from father to son or nephew with extensive on-the-job training as the primary source of technical education. But many in the more recent generation of sons and nephews were now attending college and not interested in those jobs at the very same time that companies were looking to expand employment. In addition, the introduction of computerized knitting machines during this same period meant that even experienced knitters and fixers needed retraining to work with the new technology. The result was that the individual small firms could not supply all of the training and retraining they needed in-house. In addition, firms are often reluctant to do too much training since most of the necessary training is so industry-specific that a worker trained at one firm can be equally productive at a competing firm.

It was the Catawba Valley Hosiery Association that stepped in with a solution: a training program housed at Catawba Valley Community College. This initial training program became first service of the Hosiery Technology Center which today does far more than industry training. The HTC is a wonderful example of the success of using a community college in a central role in a regional development strategy. In the next section, we focus on the Hosiery Technology Center as a case study of the ways community colleges can have a positive impact of regional economies.

In addition to training needs, an industry cluster such as the hosiery industry of central North Carolina needed a location for industry coordination. This is the lesson emphasized by Saxenian (1994) in

contrasting the success of the Silicon Valley cluster with the I 128 corridor in Massachusetts. In California, Stanford University served as a central organizing body and financier for much industrial R & D while the Massachusetts corridor lacked that location of industry coordination. Some coordination can happen in industry associations but there are problems with using industry associations for this purpose, as the industry association is not always neutral ground especially in industries with a few dominant firms and a large number of small firms. Instead, an industry focused education center such as the Hosiery Technology Center or the BioTech Center in Eastern NC (Nicola Lowe, 2006) well serve the coordination function for a small regional cluster.<sup>4</sup> This too will be illustrated below in our extended example of the HTC.

Finally, to continue to be successful in the highly competitive environment of global competition of the late 1990's and early 2000's, the firms must have access to technology development and technology diffusion. One might think of industry associations linking with the engineering faculty at state and private universities. This strategy works well for some aspects of technology development, but not so well for moving from technology development to diffusion and commercial implementation. University faculty promotion and tenure incentives lead to long range research projects which are more theoretical and less applied than firms are usually seeking. The time frame of most businesses is more short-term than the reward time frame of the university. Because of this, the community college is a better location for an educational linkage as it can be far more responsive to business needs in terms of hiring appropriate short-term faculty and course scheduling. Faculty reward structures at the community college are different from those at the university, their credentials are often different with community college faculty more likely to have come out of industry, and most importantly, the mission of the institution is different. This is not meant to say that there is no role for the university in industry cluster promotion. Instead, we argue for a triangle of support with a strong industry association on one vertex, the community college on the second vertex, and the research university occupying the third vertex. In the following section, we examine how and why the HTC can be seen as an example of best practices for this sort of triangular approach to industry cluster support.

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<sup>4</sup> Two other examples in North Carolina are a collaboration in composite materials among Wilkes Community College, Appalachian State University, North Carolina State University, and industry, county and municipal leaders and a machining consortium of the metal trades industry, Tri-County Community College, and other local leaders. See Rosenfeld (2000), for additional examples of successful community college support for industrial clusters and Lucy Gorham, *et. al.* (2000) for a plan to establish community college-based resource centers in North Carolina.

#### **Section IV: Best Practices: The Hosiery Technology Center**

The Hosiery Technology Center was conceived in 1988 by “the boys in the back of the bus.” The bus was a chartered bus from Catawba Valley Hosiery Association headed to Nashville Tennessee where a hosiery trade show was taking place. A group of industry association members and small business owners talked about the problems they faced in terms of skilled and semi-skilled workers shortages as the bus traveled the six hours to Nashville. In addition, they worried about the increasing pressure they faced from foreign imports and also pressure from other domestic hosiery clusters. The idea for HTC was to create a training center that could be used by all firms in the industry to address their joint training needs. The HTC would be housed at the local community college and would receive support in terms of equipment from local firms. Machinery was also solicited from machine manufacturers who were displaying their wares at the Nashville trade show.

The decision they made that day to place the HTC at Catawba Valley Community College has been critical to its success in addressing the labor shortages for technicians and other production jobs. The community college has also been able to provide technical training on new technology for experienced hosiery workers, on-site training, where appropriate, for firms adopting the new technology, multi-lingual training materials, and ESL courses for immigrants. Because it was on neutral territory, firms were willing to send employees for training. Additionally, the HTC was able to convince machine manufacturers to provide expensive equipment on loan to be used for training purposes. The HTC training rooms became an effective showcase for new equipment for the machine manufacturers and also made it possible for firms to try the new equipment before making the investment in it. In part, because of the HTC facilities, the firms in the geographic vicinity rapidly adopted the new technology, which has been a substantial part of how the central North Carolina cluster of the hosiery industry has been able to stay ahead of the pressure to go off shore. More isolated firms did not adopt the new technology and were less likely to survive.

The Hosiery Technology Center has been playing a key role in the hosiery industry of central North Carolina since 1990. It is important to understand that HTC services are very different from the contract training that many community college technology programs (including CVCC) offer. Contract training refers to the situation when a firm comes to a community college or some private training company and contracts with them to provide specific training exclusively for the firm. When using contract training, the firm is mainly responsible for identifying the need and setting the curriculum. The training courses offered by the HTC are

much more of a joint effort and are available to employees from any of the firms in the industry. In many cases, it has been the HTC staff who identified the need for training from their contact with the many players in the hosiery industry and in related industries. The HTC has also mainly been responsible for the curriculum which evolves from one course to the next based on the participants and current thinking in management and organizational theories. For example, by 2000 the HTC began offering a series of course on reengineering the factory floor to increase a firm's speed in moving an order to the shipping dock, while, more recently, the HTC has offered courses on export readiness.

In addition to the training for knitting and machine technicians in the early years of the HTC, they offered classes for boarding and seaming, which were the areas in the manufacturing process that had the highest turnover. Boarding is the process that irons the socks in the shape of a foot and seaming is sewing the one seam in a sock which is at the toe. Given the tight labor market in the region in the 1990's, these jobs were increasingly filled with immigrants, mostly Hmong or Hispanic. The jobs are well-suited for workers with limited English language skills, but there was still a need for communication between worker and supervisors and training in safety and firm protocol. The HTC recognized this emerging industry-wide need and initiated a new program coordinating ESL training for newly-hired boarders and seamers with other departments in the community college and developing innovative industry-specific ESL training materials. The training material development was funded by a grant from National Institute of Standards and Technology (NIST), a federal agency responsible for fostering innovation by working with industries. They produced "Sock Talk" training videos in several languages using students from the community college theater courses and trainers from the HTC training courses. The videos were aimed at workers and supervisors to help improve communication, reduce ethnic tensions in the workplace, increase worker safety, and enhance understanding of payroll and benefits procedures.

In 1994, Governor James Hunt established The North Carolina Alliance for Competitive Technologies (NC ACTs) by executive order to serve as "North Carolina's technology-based economic development strategic planning and coordinating body." Under the leadership of Dr. Walter Plosila, six NC industries were to receive technical support while they developed strategic road maps to improve long-run competitiveness. North Carolina was producing roughly 60% of U.S. hosiery and had strong regional trade association partnerships as well as the community college training expertise through the HTC and were selected along with The Catawba Valley Hosiery Association (CVHA) entered into an agreement with NC ACTs in 1995 under the leadership of Paul Fogelman of the CVHA and Dan St. Louis, the Director of the HTC. By August of

1995, the first strategic roadmap was published. Entitled “Preserving Hosiery Manufacturing in North Carolina: Strategies for Modernization through Technologies,” the plan relied heavily on the leadership and technical training capacity of the Hosiery Technology Center at Catawba Valley Community College. More broadly focused than CVHA strategic plans, the report recommended learning about successful cluster developments in the industry through field experience.

This dovetailed with a secondary, but critical, mission of NC ACTs: to identify external public and private funding opportunities to better develop and pursue the proposed strategies. Rosenfeld, a principal in Regional Technology Strategies, a non-profit economic development think tank located in North Carolina, secured funding from the U.S. German Marshall Fund for a collaborative trip to the hosiery manufacturing region in Italy he had studied. The March 1996 trip allowed Catawba Valley hosiery leaders and NC policy-makers to see first-hand how a regional collaboration in hosiery had been developed there. The delegation included hosiery manufacturers, trade and machine industry representatives, state policy-makers from NC ACTs, representatives from the North Carolina Department of Labor, the HTC director, and the lead community college technician. By observing the working cluster of hosiery machine and product manufacturing, along with extensive visits to the Hosiery Service Center in Goffredo and CITER, a regional center in Carpi, delegates were able to witness the high level of collaboration among government, industry, and training institutions. More importantly, they were able to observe first hand the successful results that come from proactively supporting clustered industries, especially in regard to employee training.

Over the next five years, the HTC greatly expanded their mission beyond training to broad-based support to a vibrant regional industry cluster. For example, in 1996, the HTC staff worked with North Carolina State University College of Textiles to develop a consortium to solve a particular technology problem in manufacturing, safety concerns in boarding. Boarding is the process of applying heat to the sock to make it foot shaped. As such, boarders frequently burned their arms on the hot moving metal forms. The HTC worked with a textile engineering class to develop a boarding machine improvement such that the operator would be removed from the hot forms. Two designs were developed, prototypes were made, and eventually a machinery manufacturer hired one of the students to work with them to develop a commercially viable safer boarding machine.

Other projects of the HTC in this period included: working with the industry association to develop sizing standards and measurement equipment to improve the quality control of U.S.-made socks; articulating

the growing demand from retail customers for quality measures, which resulted in a Consortium for Quality Standards; developing environmental measures to reduce water-based pollution caused by dye chemicals; and aiding firms in interpreting and implementing new environmental regulations. Even more recently, the HTC, while continuing to offer a variety of training courses, has been involved in incubating new firms, offering workshops on lean manufacturing, working with firms on export readiness, developing processes to use new fibers in hosiery manufacturing, and promoting new products and markets. HTC staff accompanied business owners and U.S. trade envoys to Japan in 2002 to explore the export of U.S.-made hosiery to Japan. The HTC facility, still located at CVCC, now houses a full product testing lab that can test hosiery for dye contents, durability related to abrasion or laundry, sizing, etc. The staff of the HTC has also been able to provide data to the U.S. Department of Commerce's evaluation WTO agreements with respect to the disruption of segments of the hosiery market.

In summary, all three vertices of the regional economic development triangle-- the industry association, the community college, and the research university—were critical to the development of the HTC. The government's role in facilitating this collaboration has also been essential over this period. Originally, funding came from the North Carolina State Legislature via Catawba County Community College. The HTC also benefited from technology and service gifts and loans from hosiery manufacturers as well as industry suppliers. Especially critical in the early years, were the long-term loans of knitting, seaming, and packaging machinery from companies that sold significant amounts of machinery in North Carolina. It enabled the HTC to train new employees and retrain current employees on the latest technology. Funding also came from N.C. Commerce, NIST, and special allocations for specific projects from the General Assembly. In 2005, HTC received a large grant to support collaborative export efforts from the U.S. Commerce department. In addition, the revenues from the quality testing labs at HTC have added to its income resource base. Throughout the history of the HTC, North Carolina State University College of Textiles has supported the work of the HTC through R&D efforts and academic expertise as needed.

We have provided this extended example of the HTC as a way of illustrating the role community colleges can play in promoting regional economic development for the purpose of keeping good jobs, and, in fact, bringing better jobs into the community. The hosiery industry cluster in central North Carolina with the help of the HTC has been able to sustain regional production and employment in spite of very large manufacturing losses in other sectors. We do not wish to give the impression that no jobs have been lost in the hosiery industry in North Carolina. Certainly, employment has fallen in the industry in recent years and many more of

the socks that Americans wear are made abroad. Some of the job losses are due to foreign competition but others are due to changes in consumer demand (less panty hose, more hiking socks) and the adoption of labor saving technology throughout the production process. However, the remaining jobs in the hosiery industry are safer and better compensated with higher levels of employee training. The industry is still dynamic with new firms, new products, and new growth.<sup>5</sup>

Tables 1 through 4 provide a brief statistical portrait of the hosiery industry over the last fifteen years. Table 1 shows the number of employees in hosiery for both the entire U.S. and for North Carolina. Employment in the industry has fallen in both the U.S. and NC such that North Carolina's share of hosiery employment has stayed fairly constant since 1995.

[Table 1 here]

A location quotient is a measure of the distribution of employment in a region compared with the distribution across the entire U.S. If the distribution were identical, the location quotient would be 1; the greater the clustering of an industry in a region, the more the quotient would exceed 1. The location quotient for North Carolina's hosiery industry by year is provided as the last row of Table 1. From 1980 to 1995, the quotient falls from 29.5 to 22.2 which we believe is due to a migration of hosiery firms from North Carolina to Fort Payne Alabama. Since 1995, the quotient has remained fairly constant but shows signs of strengthening most recently which may be because employment in North Carolina sock mills is declining less rapidly than across the U.S. (See Table 2 for that comparison.) Across the entire time period, the large values show the strong concentration of hosiery jobs in North Carolina.

Within North Carolina, there are ten counties with sizable levels of hosiery employment. Five of them are contiguous and account for approximately 50 percent of the state's hosiery employment. Two others counties are contiguous and account for approximately 25 percent of the state's hosiery employment and a third county itself has 20 percent of the state's hosiery employment.<sup>6</sup> Thus, even within the state, we find three strongly clustered areas. The location quotients for the ten individual counties with substantial hosiery production are in the range of 100 to 500.<sup>7</sup> Yunsoo

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<sup>5</sup> See Jim Levinsohn and Wendy Petropoulos (2005) who show that throughout the textile industry new firms continue to enter despite other firms leaving the industry.

<sup>6</sup> Data are from private data of the Hosiery Technology Center. Firm size was measured in intervals which is why employment percentages are approximate.

<sup>7</sup> Location quotients for Alamance, Burke, Catawba, Davidson, Guilford, Montgomery, Randolph, Robeson and Surry come from [www.bls.gov](http://www.bls.gov). The series are imprecise at the

Kim, David Barkley and Mark Henry (2000) studied industry characteristics that predict clustering in nonmetropolitan areas. They find one of the chief determinants is labor intensity such that firms locate near one another to draw from a common labor pool with industry-specific work experience. That is true of the hosiery clusters in North Carolina. Recently a German manufacturer of medical hosiery opened their first U.S. manufacturing facility in one of the three clusters primarily because of the availability of an already experienced workforce.

Table 2 shows the percentage change in employment in the entire apparel industry in both the U.S. as a whole since 1993 and for North Carolina from 2001 to 2005.<sup>8</sup> Table 2 shows us that while employment has declined in all categories in the United States as a whole, the decline in employment in sock mills was less than in sheer hosiery and substantially less than in cut and sew apparel. In addition, the decline in sock mills in North Carolina, from 2001 to 2005, is substantially less than in the United States as a whole. The role of the technology center located within a community college in supporting the cluster of hosiery firms certainly seems to have been important in understanding this outcome.

[Table 2 here]

The decline in employment is not just from increased productivity. In Table 3 a downward progression of value added dollars and value of shipment numbers for the hosiery industry is evident.<sup>9</sup> Sock imports have made in-roads into the domestic market, going from 24 percent of the domestic consumption market in 1999 to 57 percent in 2005 but a large percentage are imported by U.S. manufacturers as they have begun to source globally. Domestic production, as in many other commodities, increasingly concentrates on the higher end products as in newly engineered yarns for high performance socks. When measured in volume of socks instead of value, imports in 2005 were 70 percent of the pairs of socks sold.<sup>10</sup>

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county level because of substantial withholding of data because of confidentiality concerns.

<sup>8</sup> Data by detailed industry code is not available by state before 2001 and the source of the data after 2001 is different. Data before 2001 comes from the Annual Survey of Manufacturers while the data for 2001 to the present comes from the Quarterly Census of Employment and Wages for private firms of all establishment sizes.

<sup>9</sup> These numbers comes from the Annual Survey of Manufacturing and are not available by state. We have deflated the current values by the GDP deflator so that the numbers in Table 3 are in real terms.

<sup>10</sup> Data on sock production and imports comes from the Current Industrial Reports, [www.census.gov/mcd](http://www.census.gov/mcd) and U.S. International Trade Commission, <http://dataweb.usitc.gov>.

[Table 3 here]

Finally, Table 4 compares weekly wages in the hosiery industry in the U.S. and in North Carolina with wages in broader industry categories of manufacturing (which includes hosiery manufacturing) and service providing industries. We see that wages in North Carolina in the broad categories are lower than for the U.S. as a whole, but in hosiery the wages in North Carolina are higher than in U.S. hosiery as a whole. Wages in hosiery jobs are lower than the average for all manufacturing workers, but higher than for “service-providing” jobs in North Carolina. This table reminds us that when workers lose their jobs in manufacturing, they often are forced to take jobs in the growing service sector but that these jobs do not pay as well as manufacturing jobs. In addition, service jobs often do not include important benefits such as health insurance and pensions and work hours can more seasonal and sometimes part-time. By our earlier definition of good jobs, the decline in manufacturing jobs is a loss to the community of good jobs.

[Table 4 here]

## **Section V: Success factors—Lessons for Other Industries**

In this section we outline the key components of the HTC that have contributed to its successes, lessons that can be applied to a host of other industries and regional economic development plans. We believe this success can be accounted for by seven factors and that these elements are highly transferable to other industries and locations. Each element is discussed in turn. The factors include:

- 1) Community College Location
- 2) Collaboration
- 3) Public Funding
- 4) Leadership
- 5) Research University Linkages
- 6) Supplier and Retailer Linkages
- 7) Public Policy Engagement

***Community College Location***—By placing the training center within the community college, the HTC was able to link trainees with the many other programs offered by the community college including ESL, basic math and courses that offer academic credit. The community college also offers substantial institutional flexibility while still providing staff with the structure of a larger employer. The community college also provided a neutral ground which allowed the next success factor to take place.

***Collaboration***—Collaboration among the individual firms, the trade association, and educators has been crucial to the success of the HTC. The hosiery firms in North Carolina have a long history of collaborating in production. Firms often act as suppliers of greige goods to one another while still acting as competitors in the final goods market. In addition, more recently, some firms buy and sell final products to each other in order to widen their retail product line while specializing in production. For example, one firm may specialize in engineered fibers for high end hiking socks while another specializes in finely knit (more needles) high end women’s trouser socks. Yet, by buying and selling to each other, both can provide their sales force with a broader array of products.

Without collaboration, the collective gains to regional firms would not have been realized. An independent HTC could not have been accomplished without collaboration across firms. Additional factors contributing to the successful collaboration in the case of the hosiery industry were the personal ties of HTC staff, owners, and managers via college alumni and community connections, and the critical clustering of firms in the region. These are factors often discussed in the literature on industrial clusters.

***Public Funding***—The availability of funding through the existing publicly-supported community college system was another key factor in bringing the HTC from an idea to a reality. While most states have community college systems, they differ substantially in the level of funding and the broadness of their mission. North Carolina has one special feature of their community college funding that is especially well-suited to regional economic development projects. In North Carolina, if a community group or industry group agrees to pay for the physical capital to start a program and the program is approved then the state is required to assume operating costs. As most private colleges know, raising money for buildings is easier than raising money for day-to-day costs. This provision of the North Carolina Community College System makes it possible for a group of business owners to house a training center at the community college instead of engaging in a long negotiation process with the state legislature or with a community college board.

In addition, public funding of community colleges keeps tuition rates low which is a strong motivator for both employers and employees to engage in training. As we argued in the introduction and will discuss in more detail in the next section, maintaining vibrant communities provides a social benefit worthy of public support. Maintaining low tuition is the key to broad-based continuing participation in training and retraining efforts.

***Leadership***—Strong leadership has also made a difference in the success of the HTC. We have already discussed the importance of collaboration

but it was the collaboration of several strong leaders, firm owners and manager who were already active in the Catawba Valley Hosiery Association that made the difference. Because of the amount and the variety of work needed to run a training center, these leaders quickly determined that it was necessary to hire a full-time director for the HTC. They understood that the work needed to support the regional industrial cluster could not be accomplished solely by volunteer boards, nor by a part-time community college faculty member. Dan St. Louis, a textile industry professional, a native of the Catawba Valley, was hired as full-time director of the HTC in 1990 and deserves much of the credit for the vision of the HTC as a full-service support center for industry-wide needs. St. Louis has a long-run dedication to the mission of the HTC, an ability to identify, develop, and implement necessary strategies for sustaining the industry, and enhancing the quality of jobs in that industry.

***Research University Linkages***—Linkages are needed with research universities for innovation in applied technology to support a given regional or industrial cluster. Research universities can also help by providing statistical and technical assistance for projects on quality control, environmental standards, and other needs of the industry. Equally important is the potential research university role in the development of applied technology to support local industrial clusters. Finally, research universities can provide connections to their recent graduates to fill key administrative and technical positions in the industry.

***Supplier & Retail Linkages***— Four times a year the HTC offers a course called Hosiery 101. An intense introduction to the industry, the one to two day course offering, Hosiery 101, and is attended by newly-hired employees, suppliers, and buyers. The course helps forge the necessary linkages between the industry and its suppliers and the industry and its customers. It provides regular updates on technology, demand, and changes in environmental and labor regulations. In addition, the HTC holds regular luncheons with speakers on current trends or issues in the industry.

***Public Policy Engagement***—The HTC is not a political organization and does not seek to represent the hosiery industry in political matters. This, too, has led to its continued success since no group of firms is going to always agree. Instead, the HTC has worked to facilitate strategic involvement of the industry in matters of trade protection and retraining support. The HTC, by serving as a neutral meeting ground for the industry, has helped industry leaders organize joint efforts in the political arena on both the state and national level. The HTC has also become a trusted source of industry information, accessible to industry leaders and associations making their case before state and national commerce departments.

## **Section VI: The Case for Using Public Funds to Support Economic Training at the Post-Secondary Level**

One seldom questions the need for public expenditure in the area of primary and secondary education. In the past, a secondary school education was enough to prepare our nation's children for their future and enable our communities to have a literate, trained work force. This is no longer the case. Changes in the nature of manufacturing, discussed above, require a workforce who is literate and well-versed in problem solving and computer interfaces. This means retraining for older workers and basic education beyond high school for younger workers. Lean manufacturing requires that workers be trained in several jobs, making the entire workforce more flexible to respond to just-in-time production needs. In addition, many manufacturing operations have switched to team production models rather than compensation for individual work. As such, the development of better communication skills is now even more critical to the production process. While high schools can deliver some of these new requirements, many jobs require skills beyond what a vocational high school can offer. In addition, workers need the option to change skill sets to meet the needs of the dynamic economy. Some young people drop out of high school only to realize later that they are missing the skills necessary to succeed in today's labor market. Older workers may find that their skills are no longer useful, as many manufacturing establishments have closed, and they need to retool to reenter the labor market. Finally, a growing component of the labor market in North Carolina, as in many parts of the country, are immigrant workers who need ESL courses as well as the same skill-based courses sought by native workers. All of these groups look to community colleges for the continuing education they need to compete in today's economy.

Just as the public gains from secondary school education, society also benefits from the knowledge and skills obtained in community colleges. In addition to the standard arguments of increased tax base, reduced need for general assistance funds, and reduced crime rates, the whole community profits from having a strong base of ready workers. Most people receive substantial benefits from being able to stay in the community where they grew up, near parents, extended families, and friends. In order to stay near home, the community must have a sufficient quantity and diversity of jobs available for those who seek them. This is the public value of local economic development, and, as we have been arguing, community colleges are the essential component of successful long-term strategies.

The HTC is certainly not the only example we could offer of the value of the partnership between industry and community colleges to stimulate

business growth in manufacturing and other industry clusters such as biotech, composite materials, and metal trades. The North Carolina Community College system has created three innovative funding sources aimed specifically at job retention and creation. The first is the New and Expanding Industry Training Program (NEIT). While this program is mainly designed to attract new industries to the state, it also can be used to assist existing industries with expansion. The main beneficiaries thus far have been existing North Carolina businesses. The other two programs are the Focused Industry Training Program (FIT) and Customized Industry Training Program (CIT). Both are aimed at the retraining of the existing workforce in new technologies or new procedures to enhance productivity. All three of these programs are funded by the state of North Carolina as part of its economic development strategy.

### **Section VII: The Impact of Economic Training Programs on Other Community College Programs**

A number of educators have expressed concern that, because of the growing emphasis on satisfying business needs, other parts of the mission of community colleges are compromised. These educators (Shaw and Jacobs, 2003; Brint, 2003) are particularly concerned about the health of the “transfer function” of the community college system. Community colleges can become a route of entry into four-year institutions as students can easily apply community college credits toward a bachelor’s degree. In the past, the transfer function was a much larger part of the work of community colleges and need for it persists.

However, while these educators concerns may be well founded at under current funding levels, increased attention to business needs does not need to be at the expense of the other community college functions. There is no need for us to think of this as a zero-sum game. The two goals of supporting business needs and increasing the ultimate educational attainment of young people could be mutually reinforcing. A stronger local economy would encourage some young people to both stay in the community and gain more years of education. Even retraining programs can reintroduce people to the services of the community college and can stimulate some attendees to take additional courses. If these courses provide transferable credit then they also become entry points into higher levels of education.

It is important that community colleges not be passive players in the relationship between business and employees. Part of the success of the HTC was that the community college helped set the curriculum for Hosiery 101 and could address upcoming challenges facing the industry. The community college teachers are, in fact, in an important position of being able to transfer knowledge of what needs to be taught as a result of

their exposure to workers from other firms and even from other industries. Community college educators must continue to push broad educational goals of increased reading comprehension, applied mathematics, computer applications, problem solving and “soft skills” of communication and collaboration. These general skills will always be valuable to students and workers in the very dynamic labor market.

### **Section VIII: Policy Implications**

This paper has offered a detailed look at the success of one triangle partnership among an industrial cluster, a research university and most importantly, an industry-specific community college program. The seven factors discussed above that contributed to the HTC success provide general lessons for policy related to enhancing sustainable communities through public support for post-secondary education. In particular, the role of the community college partner is critical in helping communities sustain and attract good jobs to their region. Here we elaborate on policy implications of these lessons. We believe them to be applicable to a wide range of circumstances, to other industrial clusters, and even to many service sector jobs where technology diffusion can also bring increases in productivity.

The rapid globalization of the economy requires strategic economic development within existing firms. This, in turn, requires substantial new investments in training and flexibility from both managers and employees within firms. If there is a shared desire of community members to remain “home,” local areas can make good strategic use of their community colleges to provide for not only the workforce preparation needs of the community’s economic base but also thoughtful and necessary support for existing regional industrial clusters. Because a healthy local economy provides significant benefits to individuals who value living in that particular community, it justifies the use of public funds to meet the broader needs of cluster firms in a dynamic international commerce environment. Research has shown substantial levels of geographic clustering of manufacturing industries across the entire United States. (Glenn Ellison and Edward Glaeser, 1997, Barkley, Kim and Henry, 1999) Channeling the response to technology diffusion through community college technology centers can, if done right, promote local economic development, support existing economic clusters, and, thus, strengthen our commitments to the communities we call home.

In order to “do it right” we make the following specific policy suggestions related to our national, state, and local support for community colleges to successfully take on this expanded role of cluster support of industries.. The suggestions relate to the broad topics of identifying which programs and people should receive funding, the appropriate level and source of

funding, and finally, a few general recommendations on how the funds should be spent.

***Who should receive funds?***—In identifying the firms and industries eligible for community college attention to training needs, economic development goals need to be readjusted to include not just new firm recruitment, but also sufficient support for viable existing firms and industries. Good examples of program structures that support existing industries can be found in North Carolina’s NEIT, FIT and CIT programs. All are designed to provide money to existing firms for training related to new job creation or retraining of the current workforce. They need to be well funded, and, thus, more broadly available to community college programs that meet the standards enumerated below. State and local policy makers can identify viable industrial clusters for support based on evaluation of the following criteria:

- (1) current regional unemployment rates;
- (2) the percentage of employees in the area in manufacturing jobs ten years ago, as these are the areas most impacted by federal trade policies;
- (3) empirical evidence of clustering, obtained by examining location quotients and percentages of employment in the state or county;
- (4) evidence of industry involvement;
- (5) evidence of local firm participation;
- (6) matching grants with state and federal partners.

Note that the contributions of industries and local businesses need not be financial; in-kind donations of machinery, space, work time, and other resources can also demonstrate a commitment to the process.

In determining which community colleges should receive funding, a word of caution related to the geography of industrial clusters should be noted. Since much of the funding of community colleges currently comes from states, we must be careful that communities located on state borders are not excluded in this process. In circumstances where clusters cross state boundaries, two or more state community college systems need to work together to both satisfy state accountability needs and the reality of industrial activity transcending state boundaries. Too often, there is a tendency to avoid border counties because of the complexities of working across state lines.

In terms of which individuals should be eligible for subsidized training, receipt of public training funds should not depend on whether workers are currently unemployed, are employed by existing companies, or will be potentially employed by a company state or local economic development

staff is trying to recruit. All of the workers in the same industry or even in the same local labor market are subject to the same market forces. As it stands right now, each group of workers falls under different programs and eligibility requirements to receive subsidized training. Both community colleges and their students would also benefit from a reduction in paperwork caused by having too many different funding sources and reporting requirements based on arbitrary worker eligibility categories.

***What are the appropriate levels and sources of funding?***—There is no question that more public funding is needed for community colleges for all the reasons given above: the economy is changing leading to increased skill demands on American workers and individuals accrue substantial benefits from living in an economically healthy community. The basis for supporting free trade is that the consumer benefits and can compensate the losers and everyone be better off. For this to be true, the nation should bear the costs of changes, especially with regard to high unemployment in manufacturing regions. This is the responsibility of a nation to its citizens

As imports increase and exports decline, we need to increase the federal level of support for workforce preparation proportionally. This is the cost of being competitive in a global economy. Only responding to the financial needs of unemployment is neither adequate nor a wise industrial strategy. As a nation, we want a long-term thoughtful response that focuses on education and training to impacted regions that enables them to strengthen employment prospects at home. Competitor nations in the global economy have already adopted this strategy; the United States needs to meet this challenge as well.

While some new monies are needed, we also suggest that public money already allocated to regional economic development and worker retraining could be allocated more effectively. In particular, two categories of funds, already allocated for the purpose of revitalizing jobs and retraining workers, could be reallocated to better support competitive industrial clusters. Money allocated to local economic development incentives are now biased towards attracting new companies to an area. Some of that money could and should be reallocated to support strengthened existing firms and industries. This means it needs to go directly to community colleges to support the work discussed throughout this paper.

Additionally, the federal government already spends some money on retraining for new jobs as part of a societal response to redistributing the unequal costs and benefits of our trade policies. Trade adjustment money now goes directly to workers deemed to have been displaced by imported goods. The process of determining eligibility is both too little and too late for revitalizing industries in communities. It is meaningless to try to differentiate between workers displaced by imports versus workers

displaced by labor saving technology since the adoption of the new technology is a rational response to competitive pressures. Instead, we argued above that all workers in a region impacted by trade policies should be eligible for training and retraining programs and here we suggest that some portion of the federal funding for worker retraining should go directly to institutions and technology centers. This would enable community colleges to be proactive in offering support for a forward-looking regional economic development strategy. Community colleges need funds to develop new programs that later will be sustained with enrollment-based monies.

One place not to look for increased funding for community colleges is from the students themselves. We believe that it is important for community colleges to keep tuition low to encourage workers who are still employed to upgrade their skills. Recall that the entire community benefits from a healthy job environment, and, thus, should pay a significant part of the cost for maintaining the skill base of the community members.

***How should the funds be spent?--*** Funding for community colleges programs should incorporate more flexibility. In particular they should include provisions for competitive long-run funding to programs that can demonstrate excellence, seed money for new and innovative programs, and emergency allocations of funds to respond quickly to the changing needs of existing industries. More generally, adequate funding for community colleges must be part of a long-term continuous public training investment so that community colleges can engage in multi-year planning.

One area where funds need to be spent is in professional development for community college faculty. Access to and financial support for professional development opportunities is needed to keep community college faculty current in their fields. State universities could aid this endeavor although there is also a role to be played by private consultants and companies who make equipment.

In sum, implementing these policy recommendations with respect to the funding levels and focusing on community colleges as part of a successful local development strategy would lead to a substantial recommitment to regional economic development. Enhancing the workforce development mission of community colleges and providing the community college system with the necessary resources to achieve the desired goals is a critical part of keeping good jobs opportunities in the community.<sup>11</sup> One of the central messages of this paper is that more resources need to be available to community colleges and they need to be made available to

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<sup>11</sup> See 2006 report and recommendations on enhancing workforce skills by The North Carolina Rural Economic Development Center and CFED.

meeting the training needs of existing industries-- especially when they are in concentrated regions or clusters. Second, all workers should be eligible to receive subsidized training to meet the challenges of a globalized economy and new technologies. If new resources are provided, the recommitment to industry-focused training does not need to supplant the other roles of the community college in providing access to transfer programs, immigrant integration, degree or diploma programs, and improving the skills of recent high school graduates and new labor market entrants. In fact, using public resources to train and retrain American workers, through expanding our national commitment to community colleges, will enable us to keep good jobs opportunities at home.

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Table 1: Employment Statistics for U.S. and North Carolinian Hosiery Industry by Year

	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
<b>Number of Employees: in Hosiery (1000s):</b>														
United States	63.8	69.5	71.2	63.3	60.6	58.1	54.4	50.7	49.9	35.2	31.1	28.3	26.3	23.2
North Carolina	44.9	47.6	46.1	39.2	37.1	35.8	33.2	31.2	29.0	20.4	17.9	16.4	16.1	14.5
<b>North Carolina Share of Hosiery Employment</b>	70.4	68.5	64.7	61.9	61.2	61.6	61.0	61.5	58.1	57.9	57.3	57.9	61.1	62.6
<b>Employment in Hosiery as Percentage of Total Employment:<sup>a</sup></b>														
United States	0.06	0.07	0.06	0.05	0.05	0.05	0.04	0.04	0.04	0.03	0.03	0.03	0.02	0.02
North Carolina	1.89	1.80	1.48	1.13	1.05	0.98	0.88	0.81	0.73	0.64	0.57	0.53	0.51	0.45
<b>Location Quotient</b>	29.5	27.7	24.7	22.2	21.9	21.8	21.6	21.3	19.7	19.8	19.7	20.0	21.1	21.6

<sup>a</sup> Total employment figures are based on civilian employment. Total employment figures for North Carolina exclude agricultural employment.

Source: [www.bls.gov](http://www.bls.gov), custom tables. Before 1997 the hosiery category is a combination of SIC codes 2251 and 2252. For data from 1997 to the present, the hosiery category is NAICS 31511.

Table 2: Five Year Percentage Changes in Employment in the Apparel Industry 1993-2005 for United States, 2001-2005 for North Carolina

NAICS Code		US			NC
		1993-1997	1997-2001	2001-2005	2001-2005
<b>315</b>	<b><i>Apparel</i></b>	<b>-17.15</b>	<b>-54.14</b>	<b>-49.27</b>	<b>-49.56</b>
<b>3151</b>	<b><i>Apparel knitting mills</i></b>	<b>-11.37</b>	<b>-46.29</b>	<b>-49.10</b>	<b>-38.79</b>
<b>31511</b>	<b>Hosiery and sock mills</b>	-11.69	-30.86	-41.15	-33.72
<b>315111</b>	<b>Sheer hosiery mills</b>	-26.79	-43.26	-48.41	-44.39
<b>315119</b>	<b>Other hosiery and sock mills</b>	0.71	-23.37	-37.06	-22.88
<b>3152</b>	<b><i>Cut and sew apparel</i></b>	<b>-18.62</b>	<b>-57.47</b>	<b>-50.61</b>	<b>-67.84</b>
<b>31521</b>	<b>Cut and sew apparel contractors</b>	-16.74	-54.38	-43.17	-83.16
<b>315211</b>	<b>Men's cut and sew apparel contractors</b>	-23.54	-62.81	-55.85	-86.27
<b>315212</b>	<b>Women's cut and sew apparel contractors</b>	-14.80	-51.09	-38.98	-74.67
<b>31522</b>	<b>Men's cut and sew apparel</b>	-20.15	-64.19	-66.55	-57.37
<b>31523</b>	<b>Women's cut and sew apparel</b>	-19.46	-57.30	-52.80	-83.65
<b>31529</b>	<b>Other cut and sew apparel</b>	-19.25	-47.56	-29.22	-6.33
<b>3159</b>	<b><i>Accessories and other apparel</i></b>	<b>-8.51</b>	<b>-27.21</b>	<b>-35.64</b>	<b>-40.98</b>

Note: SIC codes before 1997 were converted to new NAICS codes for comparability. Data for percentage change comes from Annual Survey of Manufacturing from 1993-2001 and from Quarterly Census of Employment and Wages, Private Firms, All Establishment Sizes found at [www.bls.gov](http://www.bls.gov). Detailed industry employment not available by state before 2001.

Table 3: U.S. Hosiery Production and Value Added in Real Dollars by Year

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
<b>Value of Industry Shipments in real millions of dollars</b>	5111.5	4818.0	5000.8	4775.9	5020.3	4775.3	4564.8	4179.2	4094.8	3828.7	3364.3	3200.1	2885.5
<b>Value Added by manufacturing in real millions of dollars</b>	2586.0	2319.0	2482.7	2370.3	2556.5	2299.6	2218.2	20236.6	2110.7	1876.5	1674.6	1653.4	1447.9

Source: Annual Survey of Manufacturing, [www.bls.gov](http://www.bls.gov). Before 1997 the hosiery category is a combination of SIC codes 2251 and 2252. For data from 1997 to the present, the hosiery category is NAICS 31511. Dollars made real by the GDP deflator obtained at <http://research.stlouisfed.org/fred2/data/GDPDEF.txt>

Table 4: Weekly Wages in Hosiery Industry Compared with All Manufacturing Industries and All Service Providing Industries in U.S. and North Carolina

		2001	2002	2003	2004	2005
Hosiery weekly wages in real dollars	US	467	503	515	546	551
	NC	508	553	575	610	620
Manufacturing weekly wages in real dollars	US	804	813	828	838	837
	NC	694	705	714	731	725
“Service-providing” industry weekly wages in real dollars	US	651	646	649	660	662
	NC	569	571	574	579	582

Source; [www.bls.gov](http://www.bls.gov), Custom Tables, Quarterly Census of Employment and Wages, Private Firms, All Establishment Sizes.