

AN ECONOMICS CAPSTONE COURSE FROM CREATION TO PRESENTATION

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Abstract

This paper details a methodology used to construct a capstone course for the economics major. The capstone course should require students to utilize key concepts that they have learned. The lack of a meaningful topic, however, detracts from a showcase for student understanding. The author details the use of Michael Porter's (1998) location quotients and competitive cluster theory in a capstone course. Applying these concepts increases student understanding of state industries as well as exposing them to an alternative theory of competition not necessarily included in intermediate microeconomic theory.

Introduction

The capstone course of the economics major is a pivotal point in an undergraduate student's life. Even though the course comes at the end of the undergraduate program, it can act as a catalyst in preparing students for the next stage of their lives: graduate school, research analyst for business or government, or the business world.

This paper chronicles my experience with the capstone course during the Spring 2007 semester. It is worthwhile to share my experiences, both positive and negative, with other professors who wish to create a similar course for their students. Other notable examples of capstone course creation can be found in Donihue (1995); Elliott, Meisel, and Richards (1998); and, Carlson, Cohn, and Ramsey (2002).

In my course, I focused on location quotients and Michael Porter's (1998) theory of cluster competition. What is attractive about this theory of competition is its extensive use both in the United States and abroad. As Porter claims, "cluster-based reports and case studies" have been used in thirty-five different instances (many more by now), encompassing eight U.S. states and regions, as well as nine countries over the areas of North and Central America, South America, Europe, Africa, and New Zealand (Porter, 1998; 284-287).

Clusters are groupings of common entities. A cluster may include downstream firms, suppliers, trade associations, research universities, and think tanks. For example, an automotive cluster might include a manufacturer, glass and plastics firms, a university that has a program in automotive engineering, and so on. The members of the cluster provide an overall synergy. A more thorough discussion of clusters is included in the Appendix. Location quotients are described in the following section.

The capstone course, with its emphasis on application, distinguishes the economics major from many others. At my university, the professor may choose to run the course with or without assistance from our Center for Economic and Community Development. As our Economics faculty progresses along the learning curve, the Center will likely become more integrated into the course.

In seminal work, Siegfried, *et al* (1991; Siegfried, 1998) describe the nature of a capstone course for an economics program. "A capstone experience can help complete the process of

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intellectual maturation” (Siegfried, *et al*, 1991; 24). It is also important to organize such a course with Hansen’s (1986, 2001) proficiencies in mind: research and interpret existing knowledge; interpret economic data; apply; create new knowledge. This has also been advocated by Salemi and Siegfried (1999). Adkins and Newsome (2006), however, provide a worrisome investigation into the *lack* of implementation of Hansen’s proficiencies by department chairs.

Given that the capstone course entails analyses of existing work, an implied emphasis is on learning through writing. Numerous works have documented the benefits of learning economics through writing (Fels, 1984; Field, Wachter, and Catanese, 1985; Hansen, 1993; McElroy, 1997; Petr, 1998; Siegfried, 2001). Bartlett and King (1990) provide an example of teaching economic analysis and research using the scientific method.

Crowe and Youga (1986; 219) identify writing in economics as a tool for active learning. Writing is a “record of thought,” or reflection, and a “monitoring device,” through thought processing. Davidson and Gunnior (1993) believe that economics writing should promote basic learning of concepts as well as an increased desire to read more about economics. In a survey of economics alumni, Simpson and Carroll (1999) found that skills in writing correspondence and internal reports were necessary for professional development. Greenlaw (2003) found that students in a course with a writing curriculum performed better than a control group in an empirical investigation of student performance in two courses of macroeconomic principles.

Palmini (1996, p. 207) emphasizes an “audience awareness” approach to writing wherein students develop writing and preparation skills for different audiences (i.e., highly educated professionals versus general audiences). Following Palmini’s approach, our students presented material orally to a general lay-audience and wrote a paper for a professional audience (such as journal referees).

Section 2 provides a brief discussion of location quotients. Section 3 addresses the methodology used in creating the course. Section 4 discusses students’ anonymous evaluation of the project in which they rated their experiences vis-à-vis Hansen’s proficiencies. Section 5 concludes.

Location Quotients

Many location quotient analyses are done with employment data. We opted for gross state product instead, because these data reflect the value of production. Students were given the following model:

$$(1) \quad LQ_i = \frac{(\text{Industry } i \text{ GSP for South Carolina})/(\text{Total GSP for South Carolina})}{(\text{Industry } i \text{ GDP for the U.S.})/(\text{Total U.S. GDP})}$$

The location quotient (LQ) for industry *i* reflects the state industry’s performance relative to the industry’s national performance. Strictly speaking, if an industry’s LQ is equal to one, it is a non-basic industry for the state. In other words, the industry supply simply meets output demand. An LQ of less than one also suggests that the industry is non-basic and is insufficient to meet state demand. An LQ of greater than one, however, suggests that this is an export (basic) industry, in that not only is basic demand met, but also some goods and services are exported to other areas outside the state. This is common terminology is similar to that found elsewhere (i.e., the Florida State University Department of Urban and Regional Planning).

Upon calculation of LQ for each industry in South Carolina, we ranked them from largest to smallest. This indicated the industries in the state that were solid exporters with the *potential*

for strong clusters. A high LQ does not automatically guarantee a cluster, as described below. Doing this for each year from 1997 to 2004 identified the state industries that were growing or decaying relative to their national counterparts over time.

Course Methodology

Choosing an appropriate topic for a senior research seminar can be quite daunting. A professor should choose a topic that is not only worthwhile and current, but that also allows students to utilize concepts and methods learned in prior courses. For example, a capstone course could be taught as an extension of a field course (Salemi and Siegfried, 1999; Carlson, Cohn, and Ramsey, 2002) or from the elective choice standpoint of students (McGoldrick, 1998). Keep in mind that the project is not a dissertation.

I followed the principle that people should write what they know. In choosing location quotient and cluster analysis, I was not pursuing an unknown frontier of research.

While McGoldrick promotes the virtues of service learning through volunteerism, I encouraged original research by the students for public consumption by the community. Our work culminated in an article submitted for review at a regional economics journal. Authorship of an article in a scholarly journal is rare for undergraduates. Upon publication of the paper, my aim is to issue a press release from the university showcasing the students' efforts, while I direct the local and professional communities to our findings.

A disconnect between the expected course content and actual course coverage in certain prerequisites is a potential problem for the capstone course (Evensky and Wells, 1998). For example, our students take a semester of statistics, but background of the instructors of these classes, and hence the course coverage, is not uniform. Given the absence of a thorough econometrics background among the students, I wished to avoid a project requiring a lot of mathematical rigor. Specifically, I sought to avoid spending half of a semester on the finer points of regression, heteroskedasticity, autocorrelation, and so on. While students encounter regression in a decision analysis course, it is typically taken two years before the capstone course. The review required to use regression analysis would take valuable time away from the project itself (Bartlett and King, 1990). Location quotient and cluster analysis allowed me to avoid this trap.

The local flavor of the topic can also help spark interest for an audience. For example, Kurre (1992, 1993) used regional economics (metropolitan statistical areas and spatial cost of living indices) to reinforce student learning and provide students an opportunity to exercise the economic tools. Location quotient research again fit the bill.

One of the biggest concerns with group projects is the free-rider problem. I was able to avoid this by having all each student do the same assignment for more than three-fourths of the course. Everyone had to download the data; everyone had to run the location quotient numbers; everyone had to write an analysis of two bodies of work; and, everyone was involved in the presentation of our work to students and faculty at the end of the term. The students had the responsibility to share the qualitative data gathering, the data analysis, and the creation of the Power Point slides for the presentation.

I did not simply make the assignments and let the students do all the heavy lifting, but followed McElroy's (1997) mentoring approach. I ran the location quotient numbers and completed written analyses on the assigned bodies of work just as the students did. This helped me check whether the students were on the right track. It also demonstrated that I was working *with* the students as I adhered to the same due dates. Setting up due dates for each stage kept

students on a short tether at the beginning, letting them get a feel for the overall project before they were turned loose, and also helped prevent procrastination.

The Readings

We hit the ground running on the first day. I gave the students three handouts dealing with location quotients and cluster theory. The class did not write an analysis of these readings. I simply wanted them to get a feel for what others had done, which is, in and of itself, of importance to a researcher. These readings were readily available on the Internet and each student received a printed copy.

The first readings were: “Porter’s Cluster Strategy Versus Industrial Targeting,” by Douglas Woodward of the University of South Carolina from July 2005 (from a presentation that Porter had done for business and government leaders in South Carolina in 2003); “The Tide that Lifted Most Boats: Using Location Quotients to Identify Minnesota Industry Trends During Expansion of 1992-2000,” by Kyle Uphoff of the Department of Employment and Economic Development from October 2003; and, “Target Business Analysis for North Carolina’s Eastern Region,” by Market Street Services, Inc., from February 2004.

The Woodward (2005) paper was especially vital to our beginning. It defined clusters and how they work. It also provided direction on a reading from the South Carolina Competitiveness Initiative that I assigned later in the course.

I instructed students to purchase a copy of Porter’s (1998) book, *On Competition*. This book is a treasure trove of Porter’s work on competition and competitive theory. Each chapter presents one of his past essays on competition and/or cluster theory. I assigned the introduction as well as Chapter 7, “Clusters and Competition: New Agendas for Companies, Governments, and Institutions,” which is his essay on clusters.

The first written assignment was on Chapter 7. Students were to read the chapter and a write an analysis of no more than five double-spaced pages. From my experience, students do not necessarily like a maximum length, although they seem to love a minimum. I provided a maximum page limit, because I wanted the students to write succinctly. The business world will require their analyses to be direct and concise.

The second written assignment dealt with a 2005 paper, “A Strategic Plan for South Carolina,” by the South Carolina Competitiveness Initiative (hereinafter “Plan”). This document contained more than 100 pages of text and graphs. I split the reading of the Plan into two parts over two weeks. Students then had to write an analysis of the entire paper, limited to a maximum of six pages.

I graded each written assignment for understanding and grammar, but the students also peer-reviewed each other’s papers. Peer review can expose students to different approaches in understanding concepts [Hansen (1993)] and promote standards that assist them in becoming better writers (Smith, Broughton, and Copley, 2005). I did not follow up on the students’ peer reviews with a comment sheet or any other feedback. I explained that we were all working toward a common goal: the improvement of everyone’s work.

Empirical Data Gathering

As students were going through the readings and writing their analyses, they also gathered the data for the location quotient analysis. Our data were downloaded from the Bureau of Economic Analysis website. This website provided industry and sub-industry real gross state product (GSP) from 1997 to 2004 for South Carolina. Each student downloaded this data into an Excel spreadsheet to be used for constructing the location quotient numbers. When we noticed

movements in the LQ numbers over time, we focused our attention on the possible reasons for the changes in the numbers. This brought the course to the qualitative analysis stage.

Qualitative Data Gathering and Analysis

Within a few days of analysis, the students made copious notes. They also wrote individual reports on their hypotheses as to why the LQ numbers were changing.

Given the vast amount of information available on the Internet, students relied on official government or industry websites for much information. They avoided questionable and partisan sources. Professors must communicate this limitation if they wish to conduct a research seminar. I also stressed the importance of finding duplicate sources for information, especially if the original source material might not be entirely reliable.

Written and Oral Presentations

All of our material culminated in a final written report, part of which was taken from the students' written analyses of the assignments above. I put the final outline and paper together in an attempt to incorporate a smooth flow of presentation. From my perspective, I ran the course with the idea of a possible journal submission in mind. While our complete analysis is currently undergoing blind review at an academic journal, some broad interpretations are provided in the conclusion below.

In the final performance evaluation, students were graded on attendance; their location quotient effort; the written reports; the qualitative data gathering and analysis; and, the oral presentation in business dress before faculty, students, and invited guests. During the students' dry run, I stressed that anyone can read a presentation, but that preparation is required to actually present it *to* an audience.

I asked several attendees about their thoughts (both positive and negative) regarding the presentation. An Assistant Professor of Economics provided these comments:

The students did an excellent job. They seemed to be fairly confident in front of an audience in a fairly large room. They created an excellent Power Point presentation with good visuals, particularly the map of South Carolina that showed the concentrations of industries. The only difficulty they had was in answering some of the questions; particularly, what can be done to attract more industries to the Grand Strand Area? It would have been useful to have a discussion with the students about policy implications and about how firms respond to economic incentives prior to the presentation.

On the same day as the presentation, our university was interviewing a job market candidate in economics. The search committee chairman inserted our presentation into the candidate's itinerary. The candidate, now an Assistant Professor of Economics, commented:

I remember very well your students' presentation of the paper concerning industrial clusters in South Carolina. I was on the job market at the time and was at OUR INSTITUTION for an on-site interview. One of the events on my agenda was watching their presentation. It was the only time in all of my campus visits that I actually got to see students present their work. I was very impressed. The four students handled themselves quite professionally and did an excellent job fielding questions. Several faculty including myself [sic] asked the students

questions about the implications of their research. Their answers demonstrated a firm grasp of the topic, and again I left very impressed.

During the middle of the Spring 2007 semester, one of the non-traditional students from the class attended a local Chamber of Commerce Canadian business conference in a neighboring city to our university. This student interacted with U.S. Ambassador to Canada David Wilkins and South Carolina Governor Mark Sanford. The student asked questions regarding horizontal and vertical integration issues between Canadian and U.S. firms. While the firms' profits returned to Canada, the Canadian representatives described how their firms benefit the local South Carolina economy by creating jobs and purchasing from local suppliers. My student also asked the Canadians about clusters and Porter's competition theory. After the session, individuals began asking this student where he worked, given both his age and his ability to discuss these issues intelligently. They were surprised when he replied that this was all part of his senior project in economics!

Hansen Evaluation Results

At the end of the project, I gave the four students an anonymous evaluation form. This form asked them to rank the course on a scale from 1 to 5 on each of Hansen's (2001) six proficiencies. The questions stated Hansen's proficiencies exactly, although students were not told this. The results are reported in Table 1.

Table 1
Evaluation Responses to Hansen's (2001) Proficiencies

Key: 1—absolutely not
2—not really
3—neutral
4—pretty much agree
5—absolutely agree
AR—average response for each question

| <u>Question</u> | <u>Student Response</u> | | | |
|--|-------------------------|----------|----------|----------|
| | <u>1</u> | <u>2</u> | <u>3</u> | <u>4</u> |
| 1. Did this course help you in accessing existing knowledge? (AR = 4.25) | 4 | 4 | 5 | 4 |
| 2. Did this course help you display command of existing knowledge? (AR = 4.00) | 4 | 3 | 5 | 4 |
| 3. Did this course help you interpret existing knowledge? (AR = 4.25) | 4 | 4 | 5 | 4 |
| 4. Did this course help you to interpret and manipulate economic data? (AR = 4.75) | 5 | 5 | 5 | 4 |
| 5. Did this course help you to apply existing knowledge? (AR = 4.25) | 4 | 4 | 4 | 5 |
| 6. Did this course help you to create new knowledge? (AR = 4.75) | 5 | 5 | 4 | 5 |

As can be seen from the table, the average response is four or above for each of Hansen's proficiencies. This was quite encouraging. Since the capstone course is designed for students to add to the economics literature, the high rankings given to the last proficiency (creating new knowledge) confirmed the course's success in this regard. Of course, only four students providing feedback is not a large number of observations. That is a valid criticism. If I run the course again, I will follow up on a similar evaluation with that group.

Students also offered additional comments on the evaluations. Student 3 stated, "Tight schedule. Could really use more time to go more in depth. But, very helpful and extremely intense (in a good way)." Student 4 replied, "It was satisfying to be able to use what I learned in previous economics classes and apply it to something actually happening in the world." These were the only written comments on the Hansen evaluation. The course evaluation results are available from the author upon request.

Our business college has instituted an alumni tracking system utilizing the permanent assignment of students' school email addresses. By periodically checking with our alumni, we can measure their success (and indirectly, our success) with their job placement. After more time passes, I will check with the participants from this course to see if the skills they acquired are being put to use in their current employment. Of the four students from the class, two have secured career employment upon their graduation, one went to Germany, and the other returned to her native Iceland.

The Appendix draws from the cluster analysis material that I wrote and distributed to the students as part of the readings assignment described above. I offer this as a primer for any readers wishing to try a cluster analysis.

Conclusion

Our findings identified both positive and negative trends in the South Carolina economy. Although a high LQ does not guarantee a cluster, the data can be used to identify *potential* clusters. For example, in recent years, the South Carolina textile industry has been declining relative to the United States, but it is still the most important industry in the state. We noticed, however, that South Carolina had high LQ numbers in industries that have the potential for interconnectivity: textiles; automotive; chemicals and plastics (for automobile parts); and, waste remediation and services (for industrial waste removal from increased automobile production).

This paper provides a step-by-step guide for colleagues wishing to use location quotient theory and Porter's cluster analysis to create a project for the economics capstone course. As described above, the capstone course has been advanced as a vital tool in testing student understanding of learned economics concepts. Additionally, it provides the instructor one last opportunity to shape the students' research, computer, analytical, writing, and presentation skills.

I identified several missed opportunities in my own evaluation of the capstone course. First of all, the students were constrained by my topic choice, meaning they may have spent a semester working on something they did not particularly enjoy. On the other hand, numerous other economic concepts came up in our industry analyses: multiplier effects, industry employment, wages, and favorable state business tax conditions, among others.

Secondly, I could have required the students to do more research from academic journals. I was their primary source of scholarly literature. I did this to expedite the project, but it denied students an opportunity. Their research in support of the project primarily focused on newspapers, periodicals, and the Internet.

Third, despite the misgivings stated above, a regression analysis could have been performed. Although determining LQ numbers does not require regression, an empirical analysis of statistically significant movements in the LQ numbers over time would have been beneficial.

Fourth, I also could have brought in a management professor knowledgeable about cluster theory for a guest lecture on competitiveness. This would have provided students with another resource.

Nevertheless, I am convinced that the benefits of the project outweigh these miscues, particularly if our submission gets published. Lastly, for those economics programs that do not currently provide a capstone course, I highly recommend its inclusion.

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Appendix

An Overview of Cluster Theory as Advanced by Michael Porter

Conventional wisdom states that the globalization of the world economy has all but rendered firm location obsolete. In an episode of the hit series *Cheers*, Sam the bartender is thinking of opening a new bar in a high crime area of Boston. Dr. Frasier Crane, the pompous psychiatrist, explains that there is an old real estate dictum: “The three most important things in looking for a property are location, location, location.” Woody, the dim-witted bartender, refutes that that is only one thing. Dr. Crane explains that is the point; there is only one rule in real estate. Woody, even more confused, rebuts that real estate people must be stupid. Seeing that he is not getting anywhere, Dr. Crane gives up, sighs, and agrees, “Because real estate people are stupid” [“A Bar is Born” (1989)].

Michael Porter, the eminent professor at Harvard University who has done voluminous work on the theory of competition, explains that location is one of the key elements of cluster theory. According to Porter, “Clusters are geographic concentrations of interconnected companies, specialized suppliers, service providers, firms in related industries, and associated institutions...in particular fields that compete but also cooperate” [Porter (1998), p. 197-98]. Examples of clusters can be found in the financial services sector in New York City, New York; textiles in North and South Carolina; and high technology in Silicon Valley, California. Porter’s theory is that companies benefit from the presence of competition—not the absence.

The attraction of clusters comes about because the entities (downstream companies, upstream suppliers, pools of specialized labor, and research groups or universities) are all interconnected so that complementarities exist. In other words, relationships between firms have vertical associations (suppliers, distribution centers) and horizontal relationships (competitors), along with tangentially related entities (trade associations, universities, research groups, and think tanks). Specifically, Porter elaborates that, “Most cluster participants do not compete directly, but serve different industry segments” [Porter (1998), p. 205]. Hence, the cluster creates synergistic relationships among its members.

Additionally, the interrelationship of all the entities described above produces (or has the potential to produce) positive externalities (such as technological spillovers). This makes clusters function to foster competition. For example, Porter explains that complementary relationships, technological spillovers, information, buyer needs, and employee skills can all be seen in a cluster relationship, rather than among industry-specific firms [Porter (1998), p. 205].

Clusters may replace vertical integration relationships. In clusters, the interrelationships and availability of suppliers make the need for in-house production of inputs unnecessary. In fact, this availability of input suppliers and lack of need for vertical integration can free up “management attention that may be better spent elsewhere” [Porter (1998), p. 215]. Accordingly, from a managerial economics perspective, there is little need for downstream firms to lock themselves into long-term contracts with suppliers, as long as the cluster has more than one option in obtaining upstream inputs [see, for example, discussions on opportunism and input procurement by contracts in Baye (2006), p. 211-217]. Additionally, the informal relationships that may develop among cluster participants should not be overlooked.

This mutual dependence can also undermine the cluster. For example, if the number of suppliers is small and all of them perform poorly, this weak link in the chain will force the downstream firm to outsource for inputs, weakening the very advantage of the cluster [Porter (1998), p. 214, 217]. Nevertheless, since cluster theory advocates enhanced competition,

reputation, pride, and standing in the local community, the incentive for good performance by cluster participants is quite strong [Porter (1998), p. 219].

If a cluster increases profitability by causing downstream firms to become more economically efficient (lowering their total cost per unit), it also promotes increased competition due to the increased profitability. The increased number of firms will make it more difficult for downstream firms to collude and put up entry barriers [Porter (1998), p. 225].

Clearly, geography is of critical importance in identifying clusters. Porter states that, “Clusters are more likely to span political borders where there is a common language, *short physical distances*...similar legal systems and other institutions, and minimal trade or investment barriers” [Porter (1998), p. 230 (emphasis added)].

Lastly, an important distinction needs to be made between cluster theory and industrial policy. Porter emphasizes that all clusters should be encouraged so that innovation is fostered. Industrial policy is usually targeted to a specific industry, which focuses not on innovation, but on market share or the limiting of competition [Porter (1998), p. 248-49]. The steel tariff imposed by the Bush Administration in 2002 is a clear example of industrial policy. The steel industry gained at the expense of U.S. consumers and those industries which rely on steel inputs in production.