

# Internationalising Intermediate Microeconomics: Collaborative Case Studies and Web-Based Learning



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## Abstract

This paper describes an internationally-oriented course module for intermediate microeconomics. We describe the collaboration project as well as the results of implementing it at an US and Peruvian university. In the project, US university students were partnered with comparable students at a Peruvian university to complete a project using web-based learning tools and internet conferencing. Project learning objectives are identified and an outline of the project and assignments is presented. Based on our experiences, we evaluate the project and consider problems and issues that arose. Our results suggest that the current state of web-based technology affords university students many opportunities to productively collaborate with their international counterparts.

## Introduction

Economics programmes are under pressure to improve student learning, and the corresponding debate has been spirited. Some researchers have suggested that ‘chalk-and-talk’ style lecturing be supplanted with hands-on learning and classroom technology, while others have advocated internationalising the economics curriculum. Since Yee (1992) documented that most introductory economics textbooks relegate international issues to the back of the book, and Stiglitz (1993) called for their integration into the standard economics curriculum,

there has been a significant shift in the treatment of international topics. Recently published introductory microeconomics textbooks contain extensive international coverage (Hubbard and O'Brien, 2006; Krugman and Wells, 2005) and are well supplemented by popular-press books such as *The World is Flat* (Friedman, 2005). However, international content remains largely peripheral in the standard intermediate microeconomics curriculum.

The objective of this paper is to describe a web-based collaboration between US and Peruvian intermediate microeconomics students that both meets the demands for greater internationalisation of the curriculum as well as incorporates a wider variety of learning and evaluation techniques.<sup>1</sup> Web-based learning offers enormous potential to supplement (or substitute for) traditional classroom approaches; for example, Navarro (2000) suggests that web-based learning tools can help create a nurturing environment through interactions in chat-rooms, on discussion boards, through email and through the use of video/internet conferencing.

Our project considers the usefulness of these relatively new technologies in the context of case-study analysis, discussion and role-playing in courses at the two universities.<sup>2</sup> The economics education literature contains a number of papers that support such an approach. Siegfried (1991) encourages projects with an evaluative learning process that incorporates rounds of writing and feedback. Simpson and Carroll (1999) find that long research-type writing assignments are associated with the better understanding of course material, though may not be useful for students in their jobs later. Johnston, James, Lye and McDonald (2000) have suggested that collaborative learning can help students learn more effectively, by emphasising verbal expression and problem-solving skills, and Becker (2004) suggests applying innovative technologies in the classroom and doing the 'really cool stuff'. Web-based collaboration offers a way to take advantage of these new technologies while significantly expanding the nature and scope of team-based learning projects.

In the next section, we discuss the project structure and organisation, beginning with an identification of the desired learning objectives. Next, we look at issues specific to international collaboration. In the following sections, we assess the project from both the US and Peruvian students' perspectives and reflect on some of the specific challenges associated with international collaboration. We also compare grades and exam scores in intermediate microeconomics sections with and without the collaborative project in an effort to assess the project's impact on learning. Finally, we present our conclusions regarding web-based learning as a tool for internationalising the intermediate microeconomics curriculum.

## The web-based project and collaboration

### *Background and overview*

Case studies and collaborative projects have long been used in business courses, and to a lesser extent in economics courses, as ways to link theoretical concepts to real-world practices. While case studies can take on many forms, they are often characterised by (1) a desire for broad understanding, rather than specific tool acquisition, (2) the application of theory to examine and understand real-world phenomena and (3) individual task specialisation within a larger group. However, as the ways we communicate change with new web-based technologies, the possibilities for group collaboration are no longer limited to students in the same class or even at the same university.

Intermediate microeconomics was chosen for the collaborative project because of the high degree of similarity between the US and Peruvian courses in terms of course content, prerequisites, level of rigour and pedagogical approach. Previous studies have identified intermediate microeconomics as a good candidate for horizontal communication because of the general homogeneity of course structure, topics covered and textbooks (Gartner, 2001; Von Allmen and Brower, 1998). The intermediate microeconomics courses at both universities also share a number of educational objectives. Knowledge-oriented objectives included that students should understand the basic structure of consumer and firm decision making, the role of the price mechanism in the allocation of resources and the impact of state intervention in markets. Incorporating a collaborative project into the course allowed us to identify several additional shared learning objectives, including the acquisition of technical economic skills, the ability to locate and interpret economic data, the ability to verbally discuss economic issues and the ability to work effectively in teams.

Following the recommendations of Hansen (2001), we identified nine specific proficiencies that conceivably could be enhanced through lecture, homework or the collaborative project. These included the ability to (1) access existing economic information, (2) summarise and explain economic concepts, (3) make recommendations based on economic theory, (4) discuss real-world economics events with knowledgeable parties, (5) understand, rather than mechanically memorise, economic concepts and relationships, (6) apply economic theories to the real world, (7) interpret and manipulate economic data, (8) formulate research questions that could lead to new economic knowledge and (9) make informed presentations on economics topics.

International collaboration added an additional layer of objectives, including that students would (10) learn to work across cultural and language barriers and (11) be able to demonstrate the applicability of microeconomic theory and tools – budget constraints, utility functions, elasticity, market structure – in very different countries. Several university-specific objectives were also stated. The collaboration was designed (12) to provide US students with an on-campus, international experience and (13) to provide Peruvian students with the opportunities to improve their English proficiency and become familiar with the US university system.

However, coordinating the two classes revealed several significant differences between the US and Peruvian intermediate microeconomics students. US students needed (as pre-requisites) one semester of introductory microeconomics and two semesters of business calculus or one semester of standard calculus, whereas Peruvian students needed a full year of introductory microeconomics and one year of calculus. Overall, the Peruvian curriculum for an economics major is more

**Table 1:** Comparison of US and Peruvian students

	US students	Peruvian students
Mean age of students	21.86 years (2.17)*	18.94 years (1.50)
Years in the university	3.68 (0.55)	2.36 (0.70)
Percentage of female students in the class	27.78%	45.45%
Mean hours students' part-time employment per week	18.85 hours (11.80)	0.00 hours (0.00)
Mean hours students' study per week	12.13 hours (8.47)	20.12 hours (15.48)
Mean number of economics courses taken	4.74 courses (2.28)	4.00 courses (1.00)
Percentage that have failed an economics course	13.89%	8.2%
Mean GPA	2.86 (0.51)	14.14** (1.19)
	N = 46	N = 33***

\* Standard deviation is provided in parenthesis throughout.

\*\* The Peruvian University relies on a 20-point grade scale. A 17 and up corresponds roughly to an A, 15 and 16 is an AB, 13 and 14 are roughly equivalent to a B, 10 to 12 is roughly a C, etc.

\*\*\* We have survey information on 46 US students who participated in the case studies, in two sections of Intermediate Microeconomics (Fall 2004 and Fall 2005), and survey information from 33 Peruvian students in one section (Fall 2004).

rigorous, including two years of mathematics, one year of statistics, one year of econometrics, and one year each of introductory, intermediate and advanced micro- and macroeconomics. US requirements are roughly half that.

The course work and organisation of the Peruvian university also differs from that of the US university in several ways. First, Peruvian students attend one year less of high school and one additional year of college. Second, in Peru, as in many Latin American countries, students specialise in their major immediately upon entry into the university; this contrasts with US students who often take two years of general course work before specialising. Third, the Peruvian equivalent to the US three-credit class meets for six hours a week. Three hours are spent in lectures, designed to thoroughly develop the theory, and three additional hours are spent in 'practicums', working problems and homework with teaching assistants. Fourth, Peruvian students study more and have less part-time employment than US students (at least in our sample). Additional comparison information is reported in Table 1.<sup>3</sup>

### *Description of the project*

We implemented the collaborative case-study projects during the Fall 2004 and Fall 2005 semesters of intermediate microeconomics.<sup>4</sup> In both semesters, the instructors teamed groups of four or five US students with similarly sized groups of Peruvian students. Students worked together via internet chat, email, course discussion boards and internet video conferencing to analyse the US and Peruvian milk markets. An outline of the project, assignments and classroom events appear in Table 2.

Groups, group-work guidelines, group leaders and group meeting schedules were assigned on the first day of class. The project began during the second week of class with an internet video-conference wherein students met the members of their matching groups and listened to both instructors describe the case study and learning objectives.<sup>5</sup>

The project itself was divided into two phases. The first phase required students to prepare an analysis of the US and Peruvian milk markets using consumer and producer theory; they were then given a number of questions (see Table 3) to guide this process. In the second phase, students examined the market equilibrium, the role of government in the market, and aspects of exchange and international trade. The project was concluded with a simulated trade conference between the US and Peru to discuss issues in the milk market, after which groups prepared a final report. Each part of the project asked students to conduct research, prepare information to be shared, and discuss their findings and conclusions in a student-led discussion

**Table 2:** Project outline

<b>Type of activity</b>	<b>Time period</b>	<b>Description</b>
Group Formation	1st week of class (1 class period used)	<ul style="list-style-type: none"> <li>• Students were assigned groups</li> <li>• Group organisation exercises</li> </ul>
Internet Video Conference	2nd week of class (1 class period used)	<ul style="list-style-type: none"> <li>• Introduction of US and Peruvian professors</li> <li>• Exchange of names, emails, and group information among the students</li> <li>• Question and answer session between the classes</li> </ul>
Producer & Consumer Case	5 weeks after start of semester (1 class period used)	<ul style="list-style-type: none"> <li>• Research into the determinants of demand</li> <li>• Applications of consumer theory to milk</li> <li>• Research into the determinants of supply</li> <li>• Applications of producer theory to milk</li> <li>• Exchange of material between the Peruvian and US groups</li> <li>• Presentations by groups comparing the US market and Peruvian markets</li> <li>• Student-led group discussion of 4 policy-related questions</li> </ul>
Market Case	5 weeks after previous part (1 class period used)	<ul style="list-style-type: none"> <li>• Research into government intervention in the market, including regulations and the government provision of milk to the poor</li> <li>• Research into the international milk market</li> <li>• Exchange of information between the groups</li> <li>• Assignment of roles for a simulation of 'Free Trade Negotiations' between the US and Peru</li> </ul>
Simulation of a Trade Negotiation by Video Conference	12th week of class (1 class period used)	<ul style="list-style-type: none"> <li>• Presentations of the US position by one US group and the Peruvian position by one Peruvian group</li> <li>• Statement of the talking points of each country</li> <li>• Negotiation on the top 3 points</li> </ul>
Final Project	2 weeks after Trade Negotiation	<ul style="list-style-type: none"> <li>• Written final project/case incorporating material from all parts of the case</li> <li>• Written policy recommendations for the management of the market, international trade</li> </ul>

**Table 3:** Some sample case study questions

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1. Which is the historical context necessary to understand the present operation of the milk market? How has dairy farming changed over the past 100 years – who are the producers? Where is milk produced in the US? How many producers are there?
  2. How many types of cow milk exist in the market and in what forms or types? How are these types driven by preferences? Who consumes the types of milk? Who are the producers?
  3. What is the distribution system? Is sold more in supermarkets or elsewhere?
  4. Are there groups that receive milk under social or governmental aid programmes? How are budget constraints affected by such programmes?
  5. Is there foreign milk donation? How much? From where?
  6. Estimate the demand for each of the different types of milk products? What are the determinants of the demand for milk, and are the influences of demand the same for each type of product?
  7. What is the elasticity of the demand for milk? Does it vary by country? Why?
  8. What about organic milk or milk produced with cows given extra hormones? How does this relate to the above questions and influence the milk market?
  9. What are the features most important in the industry producing milk – how many companies serve the market and for how long? What is the production technology like? What inputs are necessary? What is the supply for milk?
  10. What inputs go into the production of milk? How have the costs of inputs been changing? Have producers responded by changing the input mix?
  11. Who are the major producers of milk, powdered milk and evaporated milk? What international markets do they serve?
  12. Graph/plot some cost curves for the milk industry. What has happened to the average total cost of producing milk over time?
  13. Graph/plot/estimate a supply curve for milk. Does it behave as you would expect it to?
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The US groups prepared answers to all 13 questions for the US market. The Peruvian groups prepared answers to all 13 questions for the Peruvian market. The groups then exchanged information and used the research to develop a comparison of the markets. The students completed a shorter list of questions geared at developing their analysis of the impact of government regulation and trade restrictions. These questions are available upon request from the authors.

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forum. Discussion of the case took one of three forms: exposition in front of the classroom, discussion between the different groups or role-play in a simulated trade negotiation.<sup>6</sup>

While students had some freedom to choose topics and approaches, their analysis of consumer issues was generally expected to include a discussion of budget

constraints, utility functions (e.g. substitutes versus complements), and general demographic and social trends that might drive milk demand, as well as an analysis of the demand curve for milk (including demand elasticity). In addition, producer analysis required a discussion of milk inputs, labour and capital usage, cost curves and supply functions. These activities implicitly required the students to be knowledgeable about milk pricing and production, and be familiar with the data, policy and analysis of the milk industry by the United States Department of Agriculture (USDA) and the Peruvian Ministry of Agriculture.

## Evaluation

Given the multiple learning objectives, evaluating the learning that took place proved challenging. When compared to sections of intermediate microeconomics taught without the international collaboration project, but by the same instructors, we found no significant difference in overall course grades or exam scores. For example, the mean grade earned in the two participating US sections was 3.03 (with a standard deviation 1.08) and the mean grade earned in the two non-participating sections was 2.79 (with a standard deviation of 0.88); this difference was not statistically significant. The differences in grades across participating and nonparticipating sections were even less noticeable for the Peruvian students.<sup>7</sup>

One concern was that student skills associated with the collaborative project might come at the expense of students mastering the technical skills usually emphasised in intermediate microeconomics. To ensure students were gaining appropriate intermediate microeconomics skills, neither of the instructors altered the technical problem-solving orientation of the exams or the amount of material covered. Case-study material was not tested. We found that including the collaborative project had little impact on test scores. US students in the collaborative project sections scored an average of 82.9% (with a standard deviation of 12.2%) on all exams, whereas US students in the non-project sections scored an average of 80.5% (with a standard deviation of 10.6%) on all exams; the difference was not statistically significant. Similar results were found for the Peruvian students. Thus, despite reducing the number of problem-solving homework assignments (for both the US and Peruvian students) and the elimination of one exam (for the US students), the Peruvian and US students in sections with the collaborative project performed as well on exams. Further, neither instructor noticed any significant change in overall course evaluations between the sections completing the collaborative project and previous intermediate microeconomics sections.

We rely on two additional methods to evaluate the collaborative project: student self-evaluation of proficiencies and open-ended, written student evaluations. In an



attempt to assess whether the first nine objectives were met, students were asked to self-rate their confidence at the beginning and end of the semester in the identified areas of proficiency on a scale of zero (not at all confident about performing the task) to ten (very confident about performing the task correctly). Results, reported as the difference between initial student skill evaluation and end of the semester student skill evaluation, are available in Table 4, along with standard deviations. For interpretation, we would hope that all scores are positive (i.e. that students are more confident, on average, at the end of the semester than the beginning).

**Table 4:** Student self-evaluations based on Hansen's proficiencies

Questions*	Differences in mean values reported (standard deviation)	
	US students	Peruvian students
1. On the scale below, indicate how confident you feel that you could access existing economics knowledge or retrieve information on an economics topic or find relevant economic data without assistance.	0.25 (1.96)	0.26 (0.33)
2. On the scale below, circle how confident you would feel summarising a key economic concept and explaining to others how that concept could be used.	0.77 (1.78)	-0.43 (0.45)
3. On the scale below, circle how confident you would feel making a recommendation to your boss based on the economic theory you have learned in your classes so far.	0.72 (1.89)	-0.05 (0.65)
4. On the scale below, circle how confident you would feel discussing a real-world economics event you heard about on the news with an economics professor.	0.37 (2.14)	-0.36 (0.24)
5. On the scale below, circle to what degree you feel that you understand concepts in economics as opposed to memorising mechanically how to solve specific problems? In other words, do you feel that you would be able to use the course concepts and apply them to new problems that you have not seen before?	0.33 (2.37)	-0.06 (0.83)
6. On the scale below, circle to what extent you feel that the economic theories you have learned so far can be applied to the real business world.	0.26 (1.89)	-0.08 (0.53)

**Table 4 (continued):** Student self-evaluations based on Hansen's proficiencies

Questions*	Differences in mean values reported (standard deviation)	
	US students	Peruvian students
7. On the scale below, circle how confident you are that you can interpret and manipulate economic data to make an argument or convince someone of the correct course of action.	0.09 (2.16)	-0.26 (0.40)
8. On the scale below, circle how confident you are that you could formulate a relevant economics research question that will illuminate new economic knowledge.	1.02 (2.15)	0.56 (0.24)
9. On the scale below, circle how confident you are when talking about economics in front of other people and/or asking informed economics questions.	0.84 (2.07)	-0.29 (0.24)
	N = 46**	N = 33

\* The self-assessment scale ranged from zero (not at all confident about performing the task) to ten (nearly absolutely certain about performing the task correctly). Most questions averaged a score of 7 or 8. The reported values here are the difference between the end of semester self-score and the beginning of the semester self-score. None of the differences were statistically significantly different from zero, indicating that in no case can we reject the null hypothesis of "no change" in student perceptions of their skills before and after the project. None of the differences were statistically significantly different from zero, indicating that in no case can we reject the null hypothesis of 'no change' in student perceptions of their skills before and after the project.

\*\* Results are reported for two U.S. sections of intermediate microeconomics (one from Fall 2004 and one from Fall 2005), but for only one section of intermediate microeconomics from Peru (Fall 2004). While we have initial and follow-up surveys for 94% of Peruvian students, we only have similar information on 88.5% of U.S. students.

While US students realised nominal gains in confidence across all nine areas of proficiency, none of these differences were large enough to allow us to reject the null hypothesis of 'no change in perception of skills'<sup>8</sup> The Peruvian students almost uniformly reported losses of confidence in skill areas, though, again, none of the differences were statistically significantly different from zero. One possible explanation is that both the US and Peruvian students were over-confident in evaluating their skills at the beginning of the semester. Rarely being required to apply economic theory, do research or interpret data, all students forecasted that, if asked, they would be able to comply. When faced with actually applying the proficiencies, the US and Peruvian students realised they knew less than they thought.

Student evaluations of the project appear to explain these results, at least in part. In general, the students (US and Peruvian alike) found the milk industry difficult to understand, and finding data on their own proved challenging. Many students also stated that the process of applying economic theory was far more complex than they had anticipated. As one US student stated:

'With people gaining knowledge, I think they realised how little they actually knew... this project may have just been a reminder of how students still need to dig further to become more specialised to make better assessments on the subject.'

Despite the findings in Table 4, student verbal and written evaluations of the project were highly positive. Overall, 89% of US and 86% of Peruvian students recommended that collaborative case studies become a regular part of the intermediate microeconomics curriculum. When asked to rate their ability to apply economic theory to the real world (Questions 5 and 6 in Table 4), US students demonstrated little change in their perceptions. However, in open-ended comments, 66% of US students reported that they felt the case study helped them to develop a sense of how to apply economic theory to real-world situations. Three examples illustrate this evaluation.

'At first I didn't want to do to this project, but the farther we got into it, the more I liked it. I've learned so much and it really helps apply economics to the real world, which I thought was really important.' (sic)

'While Principles of Microeconomics taught me a lot about graphs, models, methods of computing, etc. ... I did not know where those numbers came from, nor how economists would use those models to explain about the market. With the lectures, examples and readings from the book, I was able to apply this to the project. Every time I go back to look at the project, it just summarises what I'd learned in Intermediate Microeconomics.'

'It [the project] made me more conscious of our class and made me use the material we learned in a more relevant manner, which made the homework and material easier.'

Open-ended responses also suggested that many students had learned a lot about accessing and evaluating economic data (Questions 1 and 7). As one US student claimed, 'Case studies are very interesting and it's more logical than doing homework because some jobs may require you to do lots of research and put it all together with other group members.'

When asked what they liked least about the project, US students commented that the project was too time consuming (33%) and that it was difficult to coordinate the group work (44%). Open-ended evaluation of the discussion and presentation portions of the project yielded mixed results, as some students enjoyed the class discussions and presentations and others did not. No conclusions regarding Questions 2, 3 or 9 are possible. However, none of the US students indicated that they felt the collaborative project undermined any of the stated learning objectives for the course.

Much like the US students, the open-ended comments given by the Peruvian students indicated that they too had made gains in some of the identified proficiency areas. In fact, 100% of the Peruvian students stated that they felt the collaborative project had applications to the real world; however, only 14% reported that this was their favorite aspect of the project. Further, 36% of Peruvian students opined that the collaborative project aided their understanding of local and international markets. An additional 7% of Peruvian students reported that the project best illustrated the practical applications of consumer theory, while another 7% of students reported that the project was most beneficial in teaching them where to find real-world data.<sup>9</sup> Over 71% of Peruvian students reported that coordinating group work with the US students was their least favorite part of the project; an additional 7% of students reported that the case was too time consuming. In terms of difficulties, 28% of Peruvian students reported that finding information or organising said information was the most difficult part of the project.

## Reflections

While neither group of students identified gains when asked to rate their confidence in particular areas of proficiency, the vast majority of US and Peruvian students felt the collaborative project was worthwhile. In addition, the open-ended survey responses discussed above indicate that US and Peruvian students did in fact associate the collaborative project with gains in some of the nine identified proficiencies; e.g. the ability to apply economic theory to the real world. Further, the evidence suggests that the collaborative project was added to the usual course requirements without adversely affecting the technical skills of students. And the instructors found that group discussions and video conferences combined to foster a more interactive and dynamic classroom.

In terms of the international objectives identified earlier in this paper (10 to 13), we find that a significant majority of the students stated that working with people from another country was the most interesting part of the project (US = 65%; Peru = 58%), despite the fact that most students also reported that international

communication was the major difficulty of the project (US = 52%; Peru = 71%). Overall, students reported much higher levels of global awareness, particularly with regards to consumer choices, and differences in income, health and living standards in different countries. For example, US students were surprised that much of the market for milk in Peru is centered on dried and condensed milk, not initially realising that a significant majority of the Peruvian population lacks access to regular refrigeration. In contrast, Peruvian students were shocked at the amount of 'fresh' milk US students consume weekly.

Since the US groups and Peruvian groups were expected to work closely together, an effort was made to organise the classes in a similar fashion, including using the same textbook and coordinating the number and dates of exams and problem-solving-type homework assignments. While tightly coordinating course, homework and exam schedules had organisational advantages, it also meant that there was little room for spontaneous discussion or decision making (e.g. delaying a due date). Both instructors found this constraining.

As instructors, we were particularly concerned about the loss of materials coverage that would come from introducing a collaborative project to the class requirements. While students were expected to do most group work out of class, five days of class were necessary to facilitate the project (see Table 2). To compensate for the additional out-of-class work associated with the collaborative project, the US and Peruvian instructors scaled back the number of homework assignments to four. For the US class, one exam was eliminated, allowing that day to be devoted to the collaborative project. This rearrangement also meant that both the US and Peruvian classes had one midterm and one final exam, which served to bring the classes into closer alignment. That the Peruvian university had three extra hours of class time per week compared to the US university meant that they did not have to make many adjustments to their course to incorporate the collaborative project. For the class at the US university, a review of introductory microeconomics and the review days before the midterm and final exams were eliminated (saving three days).<sup>10</sup> Given this rearrangement, the project was added to the course while still covering the same number of topics.

However, though the students were enrolled in highly similar courses in the US and Peru, there were some important differences that influenced student performance on, and satisfaction with, the project. The group dynamics and personalities that complicate collaborative projects in one location compound across locations and languages. The primary issue was communication – misunderstandings and miscommunications as to who would complete what work and at what time. Overall, half of the US students and more than two-thirds of the Peruvian students

felt that communication was the most difficult part of the project. Communication issues included the expectations about what information would be exchanged, in what format, in what language, when, and if the materials were what had been requested.

The Peruvian students found that communicating economic ideas in English was very challenging, though the vast majority believed that their English improved as a result of the collaboration. Sometimes, Peruvian groups sent materials in Spanish, sending the US students to web-based translators and Spanish-speaking friends for assistance. Some terms and concepts proved difficult to translate – Peruvian students talked about ‘dust’ milk for several weeks before it was determined that the more typical English translation would be ‘powdered’ milk. By the end of the semester, each pair of groups had developed their own working relationship for communication, based on the relative skills of the group members. Emails and contributions to discussions by both US and Peruvian students, while still nearly entirely in English, would regularly include Spanish words for types of milk, small farm, large farm and ranch.

A second issue was the differing expectations about the quality of the work being produced by the groups. Some of the differences in expectations can be attributed in part to the number of class hours per week (six hours in Peru compared to three hours in the US). Other explanations include the differences between the attitudes of Peruvian private-school and US public-school students toward course work. For example, Peruvians report studying considerably more and working considerably less than the US students (refer to Table 1). These differences contributed to education-culture clash between the classes, which sometimes had to be resolved by the intervention of the instructors.<sup>11</sup>

A third issue was that given the less rigid course scheduling system in the US, we found that the older US students had taken more economics courses (4.7 courses compared to 4.0) and, more importantly, had taken a wider variety of courses than their Peruvian counterparts. Thus, despite having better technical skills, the Peruvian students had less wide-ranging economics experience than their US counterparts, who had taken more economics electives at the time of enrolling in intermediate microeconomics. This allowed the US students to draw on knowledge gained in courses such as international trade and econometrics. When they shared materials based on this information (such as linear regression estimation of demand curves), the Peruvian students struggled to make sense of it.

## Recommendations

The demands for increased internationalisation of the undergraduate economics curricula can be met in numerous ways: through traditional internationally oriented courses (such as international trade or economic development), as well as through courses with a global emphasis or which include readings on international topics. Additional ways to promote internationalisation include attracting international students and faculty, promoting study abroad, and supporting international campus programming, such as movies, clubs, speakers and reading series.

In this paper, we describe a class project that was completed collaboratively by intermediate microeconomics students at an US and Peruvian university. In groups, students were required to collect data, analyse supply and demand determinants, and apply the theories of budget constraints, utility functions, consumer maximisation and firm cost minimisation to the market for milk in the US and Peru. We believe that the ideas of international student collaboration through case study projects could be modified to fit different courses at different levels. Our recommendations for implementation at other universities and in other classes include the following:

- Choose classes with highly similar content, difficulty level and course format.
- Choose to work with a university with which you have strong ties, and where communication and exchange between the instructors is relative easy and supported by the administration.
- Devote time to establishing groups within a location and fostering group communication across locations; this improves student perceptions of the project and increases student commitment.
- Seek out classes or universities in relatively similar time zones – this encourages real-time communication and contemporaneous discussion.
- Be aware that students have trouble with the open-ended questions, ambiguity and alternative interpretations. Students often worry about finding the 'right' answers to questions. Students able to function in an atmosphere of uncertainty seem to find the project more appealing than students who are interested in moving in a straight line from question to answer.
- Be aware that such a project requires a significant time investment from the professor, to assist with research and questions, to mediate group conflicts, and generally to get students to see the wood from the trees.

Despite the additional work, students responded favorably to the project, with 89% of US and 86% of Peruvian students recommending that the project become part of the regular intermediate microeconomics curriculum. Students also reported that they enjoyed the discussion and the research aspects of the project. Overall, we believe that students completing the case study evidenced a better understanding of how theoretical economics can be applied to real-world situations, without a loss of theoretical proficiency.

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## Notes

- 1 The US university recently instituted an international economics major emphasis. To complete the emphasis, students are required to have at least three courses with significant international content and a study abroad experience. In addition, there is a significant push for all courses to include some international content.
- 2 The Peruvian university added group case studies to its curriculum in 2000, in an effort to introduce problem-based inquiry into courses that were traditionally lecture and homework based; cases are now used in seven different courses, including



introductory, intermediate and advanced microeconomics. The essential format of the case approach is the same across the courses, though as students move to upper-level courses, the extent and demands of the cases increase.

- 3 In Table 1, we report that 28% of students in the US course were female, whereas 45% in the Peruvian course were female. We are unable to draw any conclusions from this difference, but can state that the gender balance in the courses is representative of the declared majors at both institutions. Why the US institution has a low percentage of female economics majors is beyond the scope of this paper.
- 4 The fall semester in the US corresponds very closely to spring semester in Peru. However, while the US is in school from January to March, this is Peru's summer vacation period. Similarly, while the Peruvians attend school from late March through August, the US is largely observing summer vacation. Thus, we found the collaborative project could only take place during the semester falling over the period of September to December.
- 5 Since students were given very limited time in class for group work, the majority of the collaboration was expected to be completed outside class. However, in addition to coordinating with their same-campus group members, students also had to communicate with their out-of-country group members. The main language of communication was English, though some of the US groups had individuals who could speak Spanish. Those groups exchanged materials in both English and Spanish.
- 6 By the end of the semester, each group had (1) produced a 25- to 30-page written case study, including graphs and data analysis, (2) made one presentation in front of the class and (3) had participated in class discussions and simulations. Students were given guidelines for each part of the project; in each part, they were asked to address specific questions that required applying topics in consumer and producer theory to the milk market. Students were graded on their written case, power point presentation slides and discussion participation; these accounted for a combined 25% of their grade.
- 7 US and Peruvian students participated in the project during the Fall 2004 and Fall 2005 semesters. Students had no choice as to whether their section was participating in the project, and project sections were not identified in advance to students. Comparisons for US students were drawn from a second section of intermediate microeconomics that took place during Fall 2004, as well as a section from the Fall 2006 semester. All four US sections were taught by the same instructor. The comparison groups for Peru were drawn from the Fall 2003 and Fall 2006 semesters, and were also taught by the same instructor as who led the project sections.
- 8 The null hypothesis is specified as the mean difference is zero, compared to an alternative hypothesis that the mean difference was not zero ( $H_0 : Diff = 0; H_a : Diff \neq 0$ ). A t-test of means was performed; however, high standard deviations meant that none of the calculated values were statistically significant.
- 9 Unfortunately, the student open-ended responses to questions about the collaborative project were compiled by the support staff at the Peruvian university (to maintain student privacy). Thus, we have no direct statements from the Peruvian students, but do have the categorised responses reported (e.g. 'most comments were about applying theory to the real world').
- 10 Given these potentially significant changes in course format to accommodate the collaborative project, any direct comparison between the project and nonproject sections of intermediate microeconomics is necessarily 'back of the envelope'. With a small sample, regression analysis controlling for outside factors is not feasible.

- <sup>11</sup> Further issues that influenced the quality of collaboration centered on timing and schedule matching. The US university started two weeks later and ended one week later than the Peruvian university during the Fall semester. Classes did not meet at the same time nor on the same days of the week, requiring that internet video-conferencing take place largely outside class for all students. There were other minor, but crucial, practical considerations, including when the video-conferencing technology was available and remembering to adjust for daylight savings (which the US observes but Peru does not).

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