



Applied Microeconomics Assignments for Health Economics¹

In this paper, I describe three assignments that are designed to reduce student misconceptions about health care and insurance. The assignments are a comparison of health care systems, the design of a health insurance plan, and an examination of a physician's choice of practice type. They require a synthesis of the theoretical and practical analysis of economic models, and they ask students to think critically and to provide quantitative estimates. Each assignment includes a group presentation and an individual writing component. The benefit of group projects is the interaction among students and the process of synthesizing their ideas. The projects may also be adapted for large undergraduate microeconomics courses.

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1. Introduction

Economics is a study of everyday life. Yet students often struggle with applying the theoretical models beyond the classroom. In order to help bridge the theory and real-life applications, I developed a series of group projects for an undergraduate health economics course with the goal of highlighting three important perspectives from the health care market. Students are often unaware of alternative health care systems globally and the first project is designed to engage them in comparing and contrasting the main characteristics of the U.S system with those from other countries. In the second project, they focus on clarifying how insurance markets function, and specifically on how insurance plans are priced. This is intended to correct misconceptions they may have about health insurance which lead to wrong conclusions regarding public policy matters. In the third project, students evaluate comprehensive market conditions from the perspective of a health care provider. These group projects are designed to enhance students' understanding by providing opportunities for them to apply theory to a variety of real-life scenarios as they progress through the course. The projects are assigned after covering the relevant theory in class and are evenly distributed throughout the semester.

While reading examples of applications in the textbook or academic articles is undoubtedly beneficial, the "hands-on" experience is what truly allows students to master economic concepts (Dalton, Coats, & Luccasen, 2015; Watts & Becker, 2008). The process of defending and explaining one's approach to solving the assigned problem deepens their understanding. Johnston, James, Lye, and McDonald (2000) find that cooperative learning allows students to identify and improve gaps in reasoning and application. Each project presented in this paper has two components: a group presentation followed by an individual written analysis. Working in a group enhances learning, because students need to discuss the analysis approach and decide how to structure the group's response that is presented in class. This gives the students an opportunity to elaborate their thinking and practice their communication skills, which are important aspects of learning (Siegfried, 1998). Furthermore, Yamarik (2007) links collaborative learning with improved academic performance and students find group work effective and enjoy it (Chapman, Meuter, Toy, & Wright, 2010).

In my course, the groups have one week to prepare and then present their analyses in class where they receive feedback from classmates and the instructor. The written portions of the assignments are completed by individual students and submitted after the presentations. They are designed to encourage them to develop their own ideas further based on the group's initial collaborative effort, and to allow students to incorporate the feedback received during the presentation and to revise their group's work. To further push the students to find connections between the class material and real-life examples, the written analysis portion of the project requires the students to include a recent news article (from the popular press) that is related to the theoretical concept or model central to the assignment and then briefly explain how it relates to the model. Each group project requires the students to use the theoretical framework as a baseline and develops their ability to "think like economists."

The next sections provide detailed descriptions of the three projects to familiarize the reader with the assignments. The subsequent sections focus on the details of administering the projects in class. I offer suggestions on forming the groups and the goals of the group presentations, and clarify the additional components of the written analyses. Furthermore, I outline the grading guidelines for the assignments and describe modifications that could be made for large classes. The appendices include printable handouts of the health economics projects and an alternative handout for use in a microeconomics course.

2. Assignment 1: Health Care Systems

This project is designed to engage students in comparing and contrasting the various existing health care systems as a general introduction to health economics. The assignment is the first of the series and therefore only focuses on the consumer side, as health care producers and insurance companies have not yet been introduced in the course. Students address the questions of why countries might adopt differing systems and what the relevant economic issues in designing a well-functioning system may be; they also evaluate the pros and cons and the incentive structure the consumers face. Most health economics textbooks will have an overview of different health care systems as a starting point. I use Santerre & Neun (2012) which reviews the healthcare systems of Canada, Germany, Switzerland, and United Kingdom. Table 1 highlights the differences between the major alternatives among developed nations, and is used as a starting point.

Table 1 – Characteristics of Health Care Systems

	Canada	Germany	Switzerland	United Kingdom	United States
Health Insurance Coverage	Universal	Near universal	Near universal	Near universal	84 percent
Financing	General taxes	Payroll & general taxes	Premiums	General taxes	Voluntary premiums & general taxes
Payer	Single-payer system	Single-payer system	Single-payer system	Single-payer system	Multi-payer system
Reimbursement to hospitals	Global budgets	Fixed payments	Negotiated payments	Global budgets	Mostly fixed payments
Reimbursement to doctors	Negotiated fee-for-service	Negotiated point-fee-for-service	Negotiated fees	Salaries and capitation payments	Mostly fee-for-service
Consumer out-of-pocket price	Very small	Very small	High	Very small	Small
Production	Private	Private	Public & private	Private but public contract	Private

Source: Santerre and Neun (2012), *Health Economics: Theory, Insights, and Industry Studies*, (6th Edition), Table 4-1, p. 119.

Each group focuses its analysis on a different system or country. The task is to formulate a summary of the assigned system and compare it to the U.S. system for the presentation. I ask students to consider the following: (1) who is insured, (2) whether insurance is compulsory, (3) who pays, (4) how payments are made, (5) who has access to care (rationing), and (6) whether there are differences in access to basic versus specialized care. I further ask them to reflect on the system within the framework of the three indicators of health care performance: cost, access, and quality, and to characterize the system's efficiency (welfare or consumer and producer surplus) and equity (access and fairness). Classmates and the instructor provide feedback on

their group analysis in class.

Following the presentations, students prepare their written analyses of the health care system and utilize the feedback received. Additionally, as part of the individual portion of this project, each student is assigned a different role of a consumer in the healthcare market. The handout, set up for four groups and four students per group, includes a list of roles which vary by age, health status, and income level. These are merely suggestions for the instructor and the number of "patients" and their characteristics can be modified. I ask students to reflect on how the system will impact his or her choices regarding health care consumption, and to identify the economic principles behind these decisions. This reflection provides an opportunity for students to contrast the individual perspective and the power of incentives with the larger picture of the overall system. In the handout provided, I assign different roles for each country. However, it may be an interesting exercise to assign the same "patients" in all of the countries and compare how they would fare in each system. Alternatively, this would provide an interesting follow-up discussion topic for the class.

The main goal of the projects is to apply the theory to the real world. I, therefore, also ask each student to search the popular press and find a recent news story related to health care systems or markets. I ask them to briefly explain it in their written analysis using the framework of economics and identify the concept(s) behind the story, such as incentives, competition, costs, access to care, or quality of care.

A. Learning Goals

There are several learning goals with this assignment. After successfully completing the assignment students will be able to:

- compare health care systems in the United States and other countries
- recognize the different types of rationing in health care markets (by price, wait times, limited choices) and their impact on competition and different incentives for consumers/patients (consumption of health care) and producers/providers (cost reduction, innovation, quality)
- understand allocative and productive efficiency and the trade-off between efficiency and equity

B. Health Care Systems Handout¹

Each group is to describe one type of health care system (Canada, Germany, Switzerland, and United Kingdom) and is to present the pros and cons and compare and contrast these with the U.S. system. You should highlight the main characteristics of the system:

- Who is insured?
- Is insurance compulsory?
- Who pays?
- How are payments made?
- Who has access to care (rationing)?

¹ A printable copy of this handout can be found in Appendix A.

- Are there differences in access to basic versus specialized care?

Consideration must be given to the demographic characteristics (rich versus poor versus average, sick versus healthy, young versus old). How does this particular system work for these groups, considering the three indicators of health care performance (Cost, Access, and Quality)? How would you characterize the system's efficiency (think welfare/consumer and producer surplus) and equity (access, fairness)?

Your group presentation is limited to five minutes and is worth half the project's weight. Everyone should participate.

During your group presentation, you will receive feedback to incorporate into your individual written analyses. Additionally for the written analysis, each student is assigned a different role from the list below and is to reflect (using economic theory) on how the system will impact his or her choices regarding health care consumption. Lastly, find a recent news event (in the popular press) that is related to the theoretical concept or model that is central to this assignment and briefly explain how the story is related to the theoretical model. The final written analysis is worth the remaining half of the grade and should be approximately two pages with a limit of three. Please also reflect on the contribution of all group members (0 = no contribution to group discussion; 1 = limited contribution; 2 = good contribution).

Individual Roles by Group:					
Group	Country	Student	Income	Age	Health
1	Canada	1	Poor	45	cancer
1	Canada	2	Average	70	needs a kidney transplant
1	Canada	3	Rich	35	brain tumor
1	Canada	4	Average	25	perfect health
2	Germany	5	Rich	27	perfect health
2	Germany	6	Average	45	cancer
2	Germany	7	Rich	70	needs a hip replacement
2	Germany	8	Poor	35	diabetes
3	Switzerland	9	Poor	45	diabetes
3	Switzerland	10	Rich	70	needs heart surgery
3	Switzerland	11	Average	35	brain tumor
3	Switzerland	12	Poor	23	broken arm
4	UK	13	Rich	27	major injuries from car accident
4	UK	14	Poor	45	cancer
4	UK	15	Average	35	brain tumor
4	UK	16	Rich	70	cancer

3. Assignment 2: Designing Health Insurance

Health care spending is a large fraction of U.S. GDP, and there are constant debates over the ideal structure of the insurance market and coverage of services. Students often have misconceptions regarding the basics of insurance and confuse the concept of having insurance coverage for events that may happen with some uncertainty with simply having services paid for. Moreover, it is imperative for the students to understand the challenge of addressing moral hazard and adverse selection when designing a proper system. Therefore, for the second project, the task is to design a health insurance plan for a self-insured company. Each group is assigned a different type of firm, varying in size, the age of employees, and the risk of injury on the job. I list four options in the handout (large corporation, construction firm, software start-up, large university), but an instructor may change the existing descriptions or add additional firms to increase the number of groups. The group's goal is to determine, on behalf of the firm, what coverage they would like to offer and what the expected loss function looks like for their company. This is an active application where a mathematical equation becomes a real-life story.

In order to approximate the expected loss function $\mu = \sum \pi_i L_i$, where L_i is the value of outcome i and π_i is the probability of outcome i , three components are necessary: a list of outcomes, the probabilities associated with those outcomes, and the costs or values of the outcomes. The interaction of students within the group should help facilitate the process, as they are more likely to come up with a comprehensive set of possible outcomes.

Each group first needs to consider which health services the employees of their company may be most likely to utilize given their demographic characteristics and job risk. The list should include the most common diseases and conditions, such as flu and high blood pressure, as well as less common outcomes such as cancer; getting injured on the job; annual check-ups; and childbirth among others. While not every single possible outcome needs to be included in the expected loss function, it should demonstrate that the students thought about the issue carefully. I set the limit to 20 outcomes for simplicity. Then, the group needs to research, or at least take an educated guess at, the probabilities associated with these outcomes. Common and frequent outcomes such as the flu should be assigned a high probability, whereas rare outcomes should be assigned a low probability. The next step is to find information on how much these procedures and treatments may cost in order to estimate the expected losses. While prices may vary widely by the provider and area, for the purpose of this project, the prices do not need to be exact and simple Google search results are sufficient. There is no feasible way to assess the accuracy of these estimates within the scope of the assignment, yet it provides an opportunity for an engaging follow-up discussion. What happens if the probabilities or costs were not correct? What are the implications? This could also serve as a reminder of the basics of economic models and the need for revisions.

The group also needs to determine the structure of the insurance plan and how to address adverse selection and moral hazard. Specifically, they should elaborate on how generous of coverage the group would offer (emergency only, specialists, vision, dental, orthodontics) and what cost-sharing mechanisms they would implement (copays, coinsurance, deductibles). Insurance is not common for outcomes that are certain (such as dental and vision), because the expected loss is estimated with 100-percent probability, and therefore premiums would be roughly equal (or higher with loading fee) to the expected loss. The group should discuss the selection of their coinsurance rate and deductibles, whether to control moral hazard or contain costs. Cost sharing mechanisms such as co-pays and coinsurance are designed to mitigate moral hazard (consuming higher quantity of care because the price is lower with insurance); the higher the coinsurance and deductible, the less risk of unnecessary treatments. On the other hand, if patients skip treatment, more serious conditions may arise. Therefore, preventative

care is in most cases covered at a high rate, if not fully. Creating an insurance plan for a company pools together diverse individuals and should help reduce adverse selection. Family coverage may be offered by some groups and ideally they would discuss the implications of having a larger pool of subscribers.

Following the group presentation, which includes the plan characteristics (coverage and cost-sharing mechanisms) and the expected loss function, students incorporate the feedback received and may modify the group plan in their individual written analyses. In addition, they should provide an estimate of how to price the plan for their company and compare their estimates to the other firms in terms of the premium itself and in terms of the variance of the expected loss function. Younger or healthier firms will likely have lower expected losses that may result in a lower price of insurance. The administrative cost of managing the plan, reviewing claims, and processing payments should also be considered in addition to the expected losses when estimating the premiums. For the approximation, students should sum the expected losses over the subscribers (employees) of the company, add some administrative costs, and divide by the number of subscribers.² Premiums paid by the consumers are transfers of income for risk reduction and the service. Consumers are utility-maximizers and imperfect information and uncertainty in the health care market lead to risk. Risk-averse consumers are willing to pay in order to avoid risk and the pooling of customers, a benefit of insurance, mitigates the risk. The variance, a measure of risk, increases when the probability of extreme outcomes increases; thus, large firms will pool more people and result in lower risk.

Lastly, the individual written analysis must briefly discuss a current news story related to health insurance. With this assignment, students often discuss employer-based or government-provided insurance and how it relates to adverse selection or moral hazard and the role of pre-existing conditions with a 100-percent probability of needing treatment. Having an economic model or framework provides the students with a new set of tools for analyzing the current news and gives them a deeper insight.

A. Learning Goals

After successfully completing this assignment students will be able to:

- describe the expected loss function and its determinants.
- navigate the issues of adverse selection and moral hazard by choosing specific insurance plan characteristics (subscription and cost-sharing mechanisms).
- explain that insurance is based on risk with asymmetric information and willingness to pay to reduce the risk among risk-averse individuals.
- determine (1) which events/outcomes are insurable, based on the presence of risk versus a certain payout, (2) how larger number of subscribers lowers the variance of expected payout and thus risk, and (3) how these factors relate to pricing of insurance.

B. Designing Health Insurance Handout³

Your group is to design an insurance plan for a company. The firm does not want to join a plan with other subscribers, but would rather self-insure. Use conventional theory (standard gamble) $\mu = \sum \pi_i L_i$ (L_i = value of outcome i and π_i = probability of outcome i). There are no right

² In a follow-up class discussion, one could also challenge the students to think about alternative pricing where employees pay different premiums based on their risk and how this relates to adverse selection.

³ A printable copy of this handout can be found in Appendix B.

or wrong numbers in terms of the expected losses, probabilities, or associated utilities. Use common sense and economic theory to best estimate the risks and support your analysis with reasoning. You should carefully reflect on the characteristics of your company when estimating the expected loss function and, as a group, decide how to appropriately weight the different possible outcomes you decide to include in the function (max 20). Feel free use Google search to find probabilities of diseases, injuries, etc., and to find the prices associated with these procedures. They do not have to be exact. You may also take an “educated guess” and provide some reasoning behind your estimates. Also, as a group, you need to discuss how you would address possible moral hazard and adverse selection problems. Indicate what cost-sharing mechanisms you want to implement, if any, and what types of services you would cover.

In your group presentation, please include the following:

- What is your estimated expected loss function?
- Will you incorporate deductibles, copays, and coinsurance?
- Would your plan cover dental, vision, check-ups, or hospital visits?

Your group presentation is limited to five minutes and is worth half the project’s weight.

After your group presentation, you will receive feedback to incorporate into your individual written analyses. The analysis should include the expected loss function and plan characteristics you developed with the group, but you are encouraged to expand or change the plan characteristics. Furthermore, given the size and risks of your firm, calculate (approximate) what each member would have to pay in premium if you were to self-insure (remember, you need to cover the expected expenses). How do you think that would compare to the firms assigned to the other groups? What about the variance or risk in your group compared to that of the other firms? Support your opinions with economics reasoning. In addition, find a recent news event (in the popular press) that is related to the theoretical concept or model that is central to this assignment and explain how the story is related to the theoretical model. The final written analysis is worth the remaining half of the grade and should be approximately two pages, with a limit of three. Please also reflect on the contribution of all group members (0 = no contribution to group discussion; 1 = limited contribution; and 2 = good contribution).

Group 1: Large corporation with 20,000 workers with ages uniformly distributed between 20 and 65

Group 2: Successful young company of 1,500 computer programmers ages 23 to 30

Group 3: Construction firm with 1,000 employees ages 18 to 50

Group 4: Large university with enrollment of 12,000 students and 5,800 staff and faculty

4. Assignment 3: Physician’s Choice

The physician market has changed toward a group-practice model and the majority of providers accept insurance. This development is a result of market forces that providers in any industry may face and respond to, such as the characteristics of the demand for their product or services and the costs associated with running a business. The third project switches the focus from consumers to producers and it relates to the physician’s choice of (1) determining the supply of their services; (2) evaluating the cost of providing services; (3) deciding whether

or not to advertise; (4) how to price services; and (5) whether to participate in insurance plans. Each group is assigned to be a practitioner with a different specialty, geographic market, and average income in the area. I include an inner-city family doctor, suburban orthodontist, rural optometrist, and a suburban orthopedic surgeon. One may provide additional options for more groups. The group portion of this assignment is focused on figuring out the mode or type of practice, the pricing of services (relative to marginal cost), and the decision of whether to advertise.

Groups need to take the market structure, cost structure and, of course, the characteristics of the market demand into consideration. The market structure dictates the competition the provider faces and influences pricing decisions; the more competition the lower the amount of market power. Cost structure, specifically fixed versus variable costs, and economies of scale and scope influence the choice of practice type and determine whether group practice may be advantageous. Demand characteristics affect pricing. The less elastic the demand is, the larger the mark-up (price above marginal cost) and high-income neighborhoods are likely to have a higher willingness to pay assuming health care is a normal good. In addition, if there are other providers in the geographic market, students may comment on the cross-price elasticity of demand for the services. By engaging in a group discussion and decision process and working as a team, students need to critically evaluate each other's proposals and formulate their theories and arguments to present to class. This offers a unique opportunity for the students to analyze the impact of competition, product differentiation, cost structure, demographics, and the determinants of price, cross-price and income elasticities of demand.

The individual portion of this assignment allows students to expand on the group analysis by incorporating their own insight along with the feedback received. In addition, I ask students to compare their decisions regarding pricing (market power) and advertising to the other providers. Furthermore, they are to decide whether to accept insurance carefully considering the trade-offs between lower reimbursement and the number of patients referred by the plan. Students are also asked to consider what factors may enter a utility function of the provider $U=f(x, y, z)$. While profit will be a large part of it, they should also reflect on the value of leisure, which may impact the choice of practice type. Group practice allows individual providers to go on vacation and not be on call at all times, while simultaneously providing plenty of availability to patients.

The written submission must also include a brief reflection on a recent news event related to health care markets, and providers in particular. Whether it is about competition, acceptance of insurance plans, insurance fraud, or the availability of services in certain areas, students should find plentiful examples and connect the economic theory with the real-life story.

A. Learning Goals

After successfully completing this assignment students will be able to:

- understand the cost structure of different types of production, mainly the difference between fixed and variable cost and economies of scale (and scope)
- distinguish market structures and their impact on market power and the ability to set prices
- describe the determinants of market demand and the role of elasticity of demand in the pricing of the product, especially from the perspective of the availability of substitutes (competition), product differentiation, and the incentives to advertise

- recognize the trade-off between the ability to charge a higher price and larger volume of patients by accepting insurance

B. Physician Industry Handout⁴

Your group is to choose what mode/type of practice you would open (solo practice, partnership, large group practice) and provide economic reasoning for your choice. Take into consideration the market you are in (perfect competition, monopolistic competition, oligopoly, monopoly), your possible competition, the determinants of market demand and its elasticities (price, cross-price, income), your profit, and your utility as a provider.

In your group presentation, please include the following:

- What type of practice would you choose?
- How would you price your services relative to your marginal cost?
- Would you use advertising? If you were to advertise, what medium do you think would be effective for advertising in your area?

Clearly present your arguments for the choices you made using economic theory where applicable. Your group presentation is limited to five minutes and is worth half the project's weight.

Upon your group presentation, you will receive feedback to incorporate into your individual written analyses. For the individual analysis, expand on your group's proposal and reflect on the economic theory to support your answers. How would your prices and advertising decisions compare to those of the other types of providers assigned to the remaining groups? Briefly contrast and compare. Would you sign up for any insurance plans? Why or why not?

I want you to create a plan that will bring the most utility to you as a provider, so you need to provide a utility function. There is no need for a specific functional form; simply fill in what you believe should be considered: $U = f(x, y, z)$. In addition, find a recent news event (in the popular press) that is related to the theoretical concept or model that is central to this assignment and explain how the story is related to the theoretical model. The final written analysis is worth the remaining half of the grade and should be approximately two pages, with a limit of three. Please reflect on the contribution of all group members (0 = no contribution to group discussion; 1 = limited contribution; 2 = good contribution).

Group 1: Family doctor in a low-income, urban neighborhood

Group 2: Orthodontist in an above-average income, suburban community

Group 3: Optometrist in a rural community

Group 4: Orthopedic surgeon in an average-income, urban neighborhood

5. Setting Up Groups and Implementing the Assignment

A large benefit of group projects comes from the interaction between students. It facilitates learning and understanding of the concepts and also allows students to experience working

⁴ A printable copy of this handout can be found in Appendix C.

as a team and experience the pros and cons that may arise from such an arrangement. For this reason, I assign different random groups of four to five students for each of the projects. Based on the existing literature, students do not appear to prefer random versus self-created groups (Chapman, Meuter, Toy, & Wright, 2010), and student outcomes also do not appear to be sensitive to the composition of the group (Moore, 2011), though there is some evidence that suggests that male-dominant groups perform worse (Hansen, Owan, & Pan, 2015).

Once groups are assigned, they have one week for discussion and preparation of the presentation. I ask students to keep their presentations to five minutes in length to accommodate all groups' presentations in one class period.⁵ Furthermore, all groups are required to email me their presentations one hour prior to class so that I can have them open and ready to go before class begins, which minimizes the time it takes for groups to switch. The group presentation may be live in class using a power point or one may ask students to record a video of their presentation in advance. Using a recording eliminates the risk of groups running out of time and also allows the students to practice and revise their presentations. However, it requires more time and coordination from the group members especially if the student body is predominantly non-residential. After watching the live or recorded presentation in class, the class has the opportunity to ask questions and provide feedback. I reserve my comments until the end of class. Once the presentation is completed, the remainder of the project is individual. Group members are given an additional week for incorporating the feedback into their written analyses.

6. Written Assignment

For the individual written portion of the projects, students are asked to draw on the group presentation and synthesize the analysis in writing. During the group discussion, all students may not completely agree with the details of the analysis and results, and this part of the project allows them to not only express their own opinions but to incorporate the feedback received following the group presentation. Furthermore, the projects also include student-specific assignments which would be answered in the individual submissions. There are two additional components to the written analysis. Each student is responsible for finding a current (within a year) news story that is relevant to the group project topic. My goal for these projects is to connect the classroom with the world and I do so by turning the students' focus to current events. Their task is to identify a theoretical concept that we discussed in class and briefly explain how it relates to the story they choose. Lastly, students are asked to rate the participation and contribution of their groups' members to provide a feedback channel in case there is shirking, which serves as an incentive for everyone to contribute during the group portion of the project. In my course, I simply ask the students to reflect on the contribution of all group members with the following options: 0 = no contribution to group discussion; 1 = limited contribution; and 2 = good contribution.

7. Grading

Completion of each group project requires a fair amount of time and effort; therefore, I assign a five-percent weight of the final course grade to each assignment. Half the weight is placed on the group presentation and half on the individual written analysis. When evaluating the projects, I use the following guidelines. Table 2 reports the evaluation points for the group project, while Table 3 reports the same for the student's individual written assignment.

⁵ Depending on the amount of time available, instructors may choose to provide more time for each group.

Table 2 – Evaluation of Group Presentation

	Points Possible
Emailed one hour before class	5
All students in group participated ⁶	10
Well organized presentation	10
Presentation met time requirements	5
Presentation included careful consideration of the appropriate economic theory	20

Table 3 – Evaluation of Written Assignment

	Points Possible
Submitted on time	5
Organized well; clear writing style; absent of grammatical errors	10
Analysis included careful consideration of the appropriate economic theory	25
Current news analysis	10

8. Large Lecture Modification

Relatively small modifications can make this series of assignments applicable to large lectures, making it especially attractive as engaging students in large classes is challenging. Most universities utilize a learning management software (LMS) which allows for generating groups of students. If the LMS does not have the automatic grouping function, creating groups by alphabetical order makes it easier to manually group students within the system. In a large-class setting that would not allow for in-class presentation, the groups can post their recordings on the LMS discussion board, so that others may review it and provide feedback. Requesting students to provide insightful written feedback may be used as an additional graded out-of-class assignment. For large classes, instead of asking each student to provide feedback to all presentations, groups could be paired up and required to provide feedback to each other. When using recorded presentations in a large class setting, completion of the project in three weeks rather than two may be more realistic. One might dedicate one week for group discussion and preparation of presentation, one week for providing written feedback to other groups, and one week for incorporating feedback and revising the final written analysis. In order to reduce the volume of papers and thus grading in a large class, the written portion can also be a group write-up.

⁶ If the group indicates that a student did not participate in preparing for the presentation, I subtract points accordingly.

9. Microeconomics Modification

While these projects were developed for a health economics course, the assignments could also be modified for use in an undergraduate microeconomics class. Several of the current principles of microeconomics textbooks cover the market for health care and one may utilize the first project which compares different types of systems. For example in Hubbard and O'Brien (2017), the economics of health care chapter is introduced after the supply and demand model, price controls, elasticity, and taxes. Therefore, students are in a good position to consider the incentives that are unique to the systems and to comment on the trade-off between the systems' efficiency (welfare or consumer and producer surplus) and equity (access and fairness). One may consider providing a summary table like Table 1 to the students as a starting point for the group project.

The health insurance project could be adapted to designing other insurance plans in upper-level electives that cover risk and insurance. For example, one could ask students to price car insurance or bicycle insurance on campus, and to evaluate the probabilities of risk and events covered by the policies. Furthermore, the evaluation of market conditions is not unique to health care providers. Therefore, the last project may be modified for use in either principles or intermediate microeconomics courses. One may focus on the food or clothing industry, for example, and offer a different set of providers. The existing structure of the project applies, as it utilizes the analysis of market structure, the number of sellers, economies of scale and scope, product differentiation, advertising, and profit maximization. An alternative handout for a food industry is included in Appendix D for the instructor's convenience.

10. Conclusion

This paper presents three assignments designed to engage students and deepen their understanding of the material covered in a health economics course. The assignments focus on the different players in the health care market: consumers, insurers, and providers. Students actively apply economic theory to different scenarios and also look for relevant examples in the news, making a further connection between class material and real life.

The added benefit of group assignments, as demonstrated by the literature, is the interaction and communication with other students. Analyzing a problem as a group requires each student to be ready to defend their suggested solutions. This facilitates learning and understanding of the concepts and also allows students to experience working as a team. The presentation component challenges the team to come up with a group answer and utilize technology, while the written component of these assignments allows for individuals to present their own perspective and reasoning. These projects can be used as a set or individually and they are easily adaptable to large lectures, which makes them especially attractive as engaging students in a large class can be challenging.

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Appendix A – Health Care Systems Assignment

Each group is to describe one type of health care system (Canada, Germany, Switzerland, and United Kingdom) and is to present the pros and cons and compare and contrast these with the U.S. system. You should highlight the main characteristics of the system:

- Who is insured? Is insurance compulsory?
- Who pays? How are payments made?
- Who has access to care (rationing)?
- Are there differences in access to basic versus specialized care?

Consideration must be given to the demographic characteristics (rich versus poor versus average, sick versus healthy, young versus old). How does this particular system work for these groups, considering the three indicators of health care performance (Cost, Access, and Quality)? How would you characterize the system's efficiency (think welfare/consumer and producer surplus) and equity (access, fairness)?

Your group presentation is limited to five minutes and is worth half the project's weight. Everyone should participate.

During your group presentation, you will receive feedback to incorporate into your individual written analyses. Additionally for the written analysis, each student is assigned a different role from the list below and is to reflect (using economic theory) on how the system will impact his or her choices regarding health care consumption. Lastly, find a recent news event (in the popular press) that is related to the theoretical concept or model that is central to this assignment and briefly explain how the story is related to the theoretical model. The final written analysis is worth the remaining half of the grade and should be approximately two pages with a limit of three. Please also reflect on the contribution of all group members (0 = no contribution to group discussion; 1 = limited contribution; 2 = good contribution).

Individual Roles by Group:					
Group	Country	Student	Income	Age	Health
1	Canada	1	Poor	45	cancer
1	Canada	2	Average	70	needs a kidney transplant
1	Canada	3	Rich	35	brain tumor
1	Canada	4	Average	25	perfect health
2	Germany	5	Rich	27	perfect health
2	Germany	6	Average	45	cancer
2	Germany	7	Rich	70	needs a hip replacement
2	Germany	8	Poor	35	diabetes
3	Switzerland	9	Poor	45	diabetes
3	Switzerland	10	Rich	70	needs heart surgery
3	Switzerland	11	Average	35	brain tumor
3	Switzerland	12	Poor	23	broken arm
4	UK	13	Rich	27	major injuries from car accident
4	UK	14	Poor	45	cancer
4	UK	15	Average	35	brain tumor
4	UK	16	Rich	70	cancer

Appendix B – Designing Health Insurance Assignment

Your group is to design an insurance plan for a company. The firm does not want to join a plan with other subscribers, but would rather self-insure. Use conventional theory (standard gamble) $\mu = \sum \pi_i L_i$ (L_i = value of outcome i and π_i = probability of outcome i). There are no right or wrong numbers in terms of the expected losses, probabilities, or associated utilities. Use common sense and economic theory to best estimate the risks and support your analysis with reasoning. You should carefully reflect on the characteristics of your company when estimating the expected loss function and, as a group, decide how to appropriately weight the different possible outcomes you decide to include in the function (max 20). Feel free use Google search to find probabilities of diseases, injuries, etc., and to find the prices associated with these procedures. They do not have to be exact. You may also take an “educated guess” and provide some reasoning behind your estimates. Also, as a group, you need to discuss how you would address possible moral hazard and adverse selection problems. Indicate what cost-sharing mechanisms you want to implement, if any, and what types of services you would cover.

In your group presentation, please include the following:

- What is your estimated expected loss function?
- Will you incorporate deductibles, copays, and coinsurance?
- Would your plan cover dental, vision, check-ups, or hospital visits?

Your group presentation is limited to five minutes and is worth half the project’s weight.

After your group presentation, you will receive feedback to incorporate into your individual written analyses. The analysis should include the expected loss function and plan characteristics you developed with the group, but you are encouraged to expand or change the plan characteristics. Furthermore, given the size and risks of your firm, calculate (approximate) what each member would have to pay in premium if you were to self-insure (remember, you need to cover the expected expenses). How do you think that would compare to the firms assigned to the other groups? What about the variance or risk in your group compared to that of the other firms? Support your opinions with economics reasoning. In addition, find a recent news event (in the popular press) that is related to the theoretical concept or model that is central to this assignment and explain how the story is related to the theoretical model. The final written analysis is worth the remaining half of the grade and should be approximately two pages, with a limit of three. Please also reflect on the contribution of all group members (0 = no contribution to group discussion; 1 = limited contribution; and 2 = good contribution).

Group 1: Large corporation with 20,000 workers with ages uniformly distributed between 20 and 65

Group 2: Successful young company of 1,500 computer programmers ages 23 to 30

Group 3: Construction firm with 1,000 employees ages 18 to 50

Group 4: Large university with enrollment of 12,000 students and 5,800 staff and faculty

Appendix C – Physician’s Choice Assignment

Your group is to choose what mode/type of practice you would open (solo practice, partnership, large group practice) and provide economic reasoning for your choice. Take into consideration the market you are in (perfect competition, monopolistic competition, oligopoly, monopoly), your possible competition, the determinants of market demand and its elasticities (price, cross-price, income), your profit, and your utility as a provider.

In your group presentation, please include the following:

- What type of practice would you choose?
- How would you price your services relative to your marginal cost?
- Would you use advertising? If you were to advertise, what medium do you think would be effective for advertising in your area?

Clearly present your arguments for the choices you made using economic theory where applicable. Your group presentation is limited to five minutes and is worth half the project’s weight.

Upon your group presentation, you will receive feedback to incorporate into your individual written analyses. For the individual analysis, expand on your group’s proposal and reflect on the economic theory to support your answers. How would your prices and advertising decisions compare to those of the other types of providers assigned to the remaining groups? Briefly contrast and compare. Would you sign up for any insurance plans? Why or why not?

I want you to create a plan that will bring the most utility to you as a provider, so you need to provide a utility function. There is no need for a specific functional form; simply fill in what you believe should be considered: $U = f(x, y, z)$. In addition, find a recent news event (in the popular press) that is related to the theoretical concept or model that is central to this assignment and explain how the story is related to the theoretical model. The final written analysis is worth the remaining half of the grade and should be approximately two pages, with a limit of three. Please reflect on the contribution of all group members (0 = no contribution to group discussion; 1 = limited contribution; 2 = good contribution).

Group 1: Family doctor in a low-income, urban neighborhood

Group 2: Orthodontist in an above-average income, suburban community

Group 3: Optometrist in a rural community

Group 4: Orthopedic surgeon in an average-income, urban neighborhood

Appendix D – Food Industry Assignment

Your group is to choose how big of a production facility you would open. Would you choose a small restaurant/shop for a few customers or a large restaurant/market? Would you share your space with other types of providers (frozen yogurt, bakery, florist, hairdresser)?

Your group is to determine how, as a provider, you can price your products and whether you would want to use advertising. You should provide economic reasoning. Take into consideration the market you are in (perfect competition, monopolistic competition, oligopoly, monopoly), your possible competition, the determinants of market demand, its elasticities (price, cross-price, income), your profit, and your utility as a provider.

In your group presentation, please include the following:

- How would you price your goods relative to your marginal cost?
- Would you use advertising? If you were to advertise, what medium do you think would be effective for advertising in your area?

Clearly present your arguments for the choices you made using economic theory where applicable. Your group presentation is limited to five minutes and is worth half the project's weight.

Upon your group presentation, you will receive feedback to incorporate into your individual written analyses. For the individual analysis, expand on your group's proposal and reflect on the economic theory to support your answers. How would your prices and advertising decisions compare to those of the other types of producers assigned to the remaining groups? Briefly contrast and compare. I want you to create a business plan that will bring the most utility to you as a producer. Provide a utility function. There is no need for a specific functional form, simply fill in what you believe should be considered: $U = f(x, y, z)$.

In addition, find a recent news event (in the popular press) that is related to the theoretical concept or model that is central to this assignment and explain how the story is related to the theoretical model. The final written analysis is worth the remaining half of the grade and should be approximately two pages, with a limit of three. Please reflect on the contribution of all group members (0 = no contribution to group discussion; 1 = limited contribution; 2 = good contribution).

Group 1: Coffee shop in an average-income, urban neighborhood

Group 2: Fruit and vegetable market in a low-income, urban neighborhood (a food desert)

Group 3: Organic food market in above-average income, suburban community

Group 4: Pizza diner near a college campus