

An Economic Analysis of Evening Exam Policies at MIT

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At MIT, an exam is typically given during the period when the class is scheduled to meet. This prevents students from having a scheduling conflict with an exam. Sometimes, however, a professor schedules his exams to be given in the evening. This may be done for any number of reasons. For instance, if a professor plans to give a difficult exam, he may choose to give the exam in the evening to allow students some extra time to take it. Thus, offering evening exams can often improve testing situations for students.

MIT has instituted several rules regarding evening exams, to which professors are expected to adhere. These rules are published in the MIT Bulletin every year and are transcribed below (with numbers added):

1. An evening exam is defined as a written exercise (quiz) that is not given in a regular class period and begins at or after 7:00 pm. It must be the equivalent of a quiz that could be given in a normal class period.
2. It is the intent of the faculty that evening exams be used only to ease the time pressure on students of exams given during a regular class period, and not as a means of adding to the number of class periods in a term. Therefore, during the week that an evening exam is given, a regularly scheduled class hour (lecture or recitation) shall be canceled; or, alternatively, no homework shall be assigned for that week.
3. There is a need for times when evening classes and undergraduate seminars can be scheduled free from potential conflict with evening exams. Therefore, no evening exams or review sessions are to be scheduled on Monday evening, and faculty are urged to avoid scheduling exams and review sessions on Wednesday evening.
4. Students who have a conflict between a scheduled evening exam and other scheduled academic or extracurricular activities will be provided with an exam at an alternative time.

While the rules governing evening exams leave little room for interpretation, they say nothing about the penalties a professor must face should he violate one or more of them. When a professor is caught violating an evening exam policy, he must spend time speaking to the Chair of the Faculty. This action creates an opportunity cost for the professor directly proportional to the amount of time spent talking to the Chair of the Faculty. This penalty is not socially efficient, as the following model will show.

Assume that professors have two characteristics. The first characteristic can be one of two types: nice (N) and stubborn (S). A nice professor never intentionally breaks faculty rules and will instantly correct a violation once it is brought to his attention. A stubborn professor is averse to change. Thus, regardless of whether or not he intentionally violated faculty rules, he will expend energy, up to a value of R , where R is uniformly distributed between 0 and 1, to prevent himself from having to remedy the violation. If the professor uses more energy than the person speaking to him, then the professor will not have to remedy the violation. Otherwise, the professor will have to cooperate with the student. Each stubborn professor has a different value of R , and only he knows what that value is. In addition, assume that students cannot observe whether a professor is nice or stubborn. However, students know that the probability of getting a nice professor is 0.75.

The second characteristic can be one of two types: tenured (T) or untenured (U). An untenured professor will act like a nice professor because if the Chair of the Faculty were to find out that he violated a faculty rule, his chance of not getting tenure will increase. Not getting tenure, we will assume, has an extremely large cost to the professor, so he will take whatever steps are necessary to prevent it from happening. A student can observe whether a professor is tenured or untenured.

Also, assume that there are two types of students: busy (B) and lazy (L). A busy student packs her schedule with activities and classes. Thus, she has a high probability of having an evening conflict. Because of this fact, she has difficulty finding a time to reschedule a conflict. Therefore, we will assume that there is a high personal cost, H , associated with rescheduling an evening exam for a busy student. A lazy student does not have many activities, so we can assume that she has no transaction costs associated with rescheduling an evening exam. Professors know that both types of students exist, but cannot determine the type of a particular student.

Finally, we will assume that there are four types of violations possible, each of which corresponds to the number of the rule being violated. So, giving an evening exam that is longer than could be given in a normal class period would be a violation of evening exam policy #1. Using this model, we can examine violations of each of the four policies, in turn. To begin with, let's say that a professor decided to give an evening

exam that was twice as long as "a quiz that could be given in a normal class period." Regardless of whether or not the mistake was intentional, it would constitute a breach in evening exam policy #1. Since students do not see an exam before it is administered to them, it would be impossible for them to know that this policy has been violated until they have begun their exams. Thus, there are no measures, such as injunction, that could be taken to prevent such an offense. Once a professor has violated this policy, there is not very much that can be done to rectify the situation. Two possible alternatives include offering another, shorter exam and curving the exam that students already took. Without including payoffs, the professor and student would play the game shown in Figure 1 below:

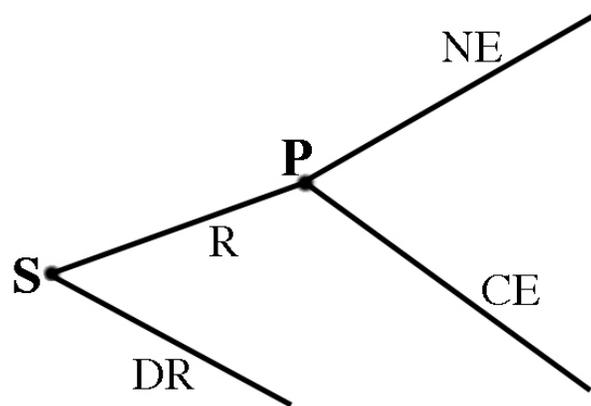


Figure 1. Extensive Form Representation of Game Between Student and Professor for Violation of Rule #1. Student (S) moves first, choosing either to report the violation (R) or to not report it (DR). If the student does not report the violation, the game ends. Otherwise, the professor chooses to either give a new exam (NE) or curve the existing exam (CE).

Clearly, the latter option would be more attractive to a professor. It would require minimal cost, while offering another exam would require the professor to write another exam. After a second exam was written, he would have find a time for students to take it. This would add an additional cost for each busy student he had in his class. Thus, a professor would strictly favor curving the exam. Using backward induction, a student would know that a complaint would result in the exam being curved. Since it is costless for the student to report a complaint, she will always report when she would benefit from an exam being curved. In this case, the efficient outcome results.

Now let's consider a case where a professor does not cancel class the week of an evening exam. This would constitute a violation of evening exam policy #2. Since

students can observe this on the syllabus, they can remedy this violation before it occurs. Unlike a violation in evening exam policy #1, this violation must be remedied within a fixed time period. For this reason, the student must expend energy to expedite the discussions between the Chair of the Faculty and the professor. Thus, for the purpose of this example, we will assume that the student will incur as much cost as the professor does to remedy a violation. If the student has an untenured (U) professor, she knows that the violation will be remedied at no cost to her, regardless of whether the professor is stubborn (S) or nice (N). If the professor is tenured (T), however, the expected cost of repairing this violation is:

$$\text{Expected cost} = P(N) * E(\text{cost of N}) + P(S) * E(\text{cost of S})$$

$$\text{Expected cost} = 0.75 * 0 + 0.25 * 0.5 = 0.125$$

Each student can decide on her own whether or not to report the violation. If the student values canceling class more than the expected cost of obtaining a canceled class, she will report the violation. If no one student felt the benefit of canceling class exceeded the cost of attaining it, and the sum of the valuation of everyone in the class was greater than the cost of attaining it, the socially optimal solution would not be reached. Alternatively, if students acted cooperatively, they could share the cost of attaining the remedy. For this reason, students have an incentive to behave cooperatively. When the class behaves cooperatively, the socially optimal option results. A similar analysis can be done for a violation in evening exam policy #3.

Finally, an individual student might have a conflict with a specific evening exam. According to evening exam policy #4, she must be given the exam at an alternative time. Because of the nature of the conflict, collective bargaining is not a feasible alternative. Therefore, each student must determine individually if she wishes to try to reschedule her exam. If a student has an untenured (U) professor, she will have no professor-induced cost associated with rescheduling an exam. If the professor is tenured (T), the student can expect a professor-induced cost of 0.125, as shown the previous example.

In this case, the student's type is also important. If the student is lazy (L), she will attempt to reschedule her exam if she values rescheduling the exam more than the expected cost of rescheduling the exam. If the student is busy (B), however, there is an additional cost to consider. Busy students will only attempt to reschedule an evening

exam if their valuation of rescheduling exam exceeds the sum of the personal cost of rescheduling to the student and the expected cost of energy needed to get the professor to reschedule the exam. Numerically:

$$\text{Value of rescheduling} > |H| + 0.125$$

This case is very inefficient. If a busy student (B) had an untenured (U) professor who was nice (N), it is fairly possible for:

$$|H| + 0.125 > \text{Value of rescheduling} > |H|$$

Similarly, a lazy student (L) in the same circumstances could value rescheduling her exam at less than 0.125 but greater than 0. In these cases, it would be socially efficient for the student to reschedule the exam, but the student does not because of the expected cost of dealing with the professor. If the student could somehow determine her professor's type at little or no cost, the efficiency would increase.

As these cases illustrate, the penalty for violating evening exam policies at MIT does not generally result in social efficiency. While collective bargaining theoretically increases efficiency, in reality it would be difficult for students to coordinate such efforts. Much of the inefficiency is caused by imperfect information in bargaining, in that students cannot determine if a tenured professor is nice (N) or stubborn (S). If students could somehow obtain this information, the Coase Theorem could be applied to show that the solutions would be efficient in all cases, as the evening exam policies define student rights clearly. However, there is no simple way to do that. Instead, the penalty for violation of evening exam policies should be changed to yield a more socially efficient outcome.

One alternative penalty would be to reallocate a portion of a professor's research money to his colleagues each time he is caught violating a policy. If a penalty amount, P, is chosen such that a professor's valuation of P is greater than R, he will never intentionally violate a policy, and immediately fix any violations brought to his attention. The difficulty with this solution lies in determining a professor's valuation of P. This problem can be solved by basing P on the number of previous violations that professor has had. So, for instance, a professor with no violations might have \$1000 of research funds taken away from him for his first violation. For each violation thereafter, P could be increased by a factor of 10. After a few violations, every professor would reach a

point where he would no longer want to violate evening exam policies. While the method for determining the actual amount of P can have many variations, it is important that an individual professor's actions dictate his penalty. In addition, the penalty should increase with each violation. This would force the professor to internalize the costs of violating policies and remove the problems of asymmetric information.

In several of the scenarios presented above, the current penalty for violating evening exam policies was shown to be inefficient due to incomplete information. A more efficient penalty would more directly penalize a professor for violations and force him to internalize the costs of his violations. Thus, this evaluation suggests that MIT should change its penalty for violations of evening exam policies to a more efficient one.