

Early-semester workshop sessions as a means to increase student participation in later lectures*

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1 Introduction

Fostering learning in large classrooms is a challenging task. Students learn best from being active instead of passive as we learn from Biggs and Tang (2011, pp. 62ff), but classical lecturing is inherently inactivating. Most teachers with lecturing experience will be able to relate to a situation where they pose a question to a large crowd of students, and the awkward silence that follows, only to be broken by one or two students—always the same students—who raise their hands to answer.

Students are shy to speak up in large classrooms, and this is naturally a barrier to making classical lectures an activating experience with students participating in a dialogue, asking questions when they hear something they don't understand, etc. In his eight mind frames of teaching to ensure effective teaching and successful learning, John Hattie (2012) highlights the importance of teachers developing positive relationships in the classroom.¹ That is, there should be a safe environment characterized by a high level of trust such that students are willing to say “I don't understand what you are saying” or willing to make mistakes when answering questions without a fear of losing face. Furthermore, trust should not just be trust in the teacher, but also trust in fellow students. When asking a question, a student should not be worried that fellow students will say “Oh, there he goes again. . . he doesn't understand.” In a review of the literature, Edmondson (1999) argues that actions such as asking for help, admitting errors, and seeking feedback are behaviors that pose a threat to face. Fear of engaging in such activities inhibits learning.

The question I seek to answer in this paper is whether it is possible, in the case of classical lecturing at the Department of Economics with approx 70–80 students, to manipulate the classroom environment in a way that benefits the potential for active learning and dialogue in an otherwise typically passifying teaching activity, i.e., “break the ice” in a very broad sense. The means of manipulation is to have a workshop early in the semester with myself, the lecturer, as the facilitator. This allows room for more informal interaction between lecturer and students and interactions between students.

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¹Mind frame no. 7 to be specific.

I assess the impact of the workshop with a survey among the students. The two main hypotheses I seek to falsify are: 1) interaction with lecturer and 2) interaction with other students (that they do not know well in advance) during the workshop will subsequently improve the classroom environment and entice students to speak up in class.

I find that both lecturer and other students constitute a barrier for students to speak up in class and perhaps more so other students. The course is an elective course for third year BA students and MA students, so it is likely that a student only will know a small group of the other students. To that extend, the finding that other students pose a larger threat to speaking up in class than the lecturer is not so surprising.

With the survey responses it is not possible to clearly corroborate that interactions with lecturer or other students resulted in better outcomes, i.e., better classroom environment and more willingness to speak up in class. But self-assessed personality type and self-assessed “level” or ability, which together may be thought of as “self-confidence”, was a strong predictor of students’ benefitting from participating in the workshop. This highlights that there are selection issues—what type of students engage in what kind of interactions is not random. Results should be viewed in light of this disclaimer.

With this in mind, I find that, on the one hand, introverted students gained more than extroverted students from attending the workshop in terms of willingness to speak up and classroom environment. In fact, almost none of the extroverted students admitted to any improvement. On the other hand, introverted students are not fond of lectures with a lot of interaction, whereas extroverted students find it very important for their learning outcome that lectures are interactive with lots of dialogue.

This points to the sad conclusion that those who benefit from workshops do not enjoy what I was trying to achieve with them (more interactive lectures), whereas those who enjoy more interactive lectures do not benefit from the intervention (the workshop).

From the experiment, I learned that for the workshop to be really successful, I should consider being involved in setting up workshop groups to ensure that everyone works with someone they are less familiar with. As it were, group work was encouraged, but not a necessity. This could easily be changed. On the other hand, working with someone unfamiliar comes at a cost, especially for introverted students, which suggests a weighting of costs and benefits.

Another lesson could be that perhaps the question is not how to use workshops to make lectures more interactive, but rather how to use more workshops, which are much more interactive than lectures. In the course I am teaching, this is not straightforward to implement, but that is for another paper.

The paper is structured in the following way: Section 2 describes the course context the workshop takes place in and describes the workshop. Section 3 describes the survey. In Section 4 I analyze the results, and in Section 5 I reflect on the results and discuss where to go from here.

2 The setting

I teach Public Finance, which is an elective course at the Department of Economics, aimed at MA students and third year BA students. In the survey, around $\frac{2}{3}$ are MA students, $\frac{1}{4}$ are BA students, and the rest are exchange students. This means that many of the students will not know each other beforehand.

The course is a classic lecture style course with 2–4 hours of lectures per week for the duration of

the semester, and there are no exercise classes.

During the semester there are typically two workshops that *i*) trains the students' skills in handling some of the economic theory covered in the course, and *ii*) provides them with an opportunity to apply the estimation techniques also covered in the course. The setup is such that students prepare the first part before attending the workshop. This provides the foundation for the second part, where they are given a dataset, which they use to estimate parameters identified in the first part. At the workshop, they sit in groups with laptops and use statistical software to answer the questions of part two, conducting estimation exercises and interpreting the results. For interested readers, the workshop problem set can be seen in Appendix A.

Typically, the workshop has been run by a PhD student/TA, but this time I decided to conduct it myself. This allows for more low-key interaction between students and lecturer.

3 Survey

The timeline was the following: The course is a Spring course starting in February (Spring 2015). The workshop in question was conducted in March, and the survey answers were collected in May. 34 students took the survey. With approximately 70 students participating in lectures on a regular basis, this amounts to a response rate of almost 50 percent.²

The survey consists of 16 questions in four parts. They were asked about:

1. Their personality—how they rate themselves on an introvert/extrovert scale, how difficult they find speaking up in large classrooms, what makes it difficult (lecturer or other students), etc.
2. The workshop—the nature of their participation, did they interact with the lecturer, with other students, etc.
3. The outcome—did it change their view of the classroom “vibe”, did it become less daunting to speak up in class, etc.
4. Background—gender, age, study background (MA/BA/exchange student), and their own assessment of their level as students.

The full list of survey question is available in Appendix B.

4 Results

In the following, I review whether, how, and why students find it difficult to speak up in class. Then I will describe how students participated in the workshop, whether the workshop was beneficial for students' willingness to speak up in class and their perception of the classroom environment, and finally look at whether students even want more interactive lectures.

²One student took the survey just after the exam. To avoid that the exam experience might influence his or her response, this respondent is excluded from the analysis below.

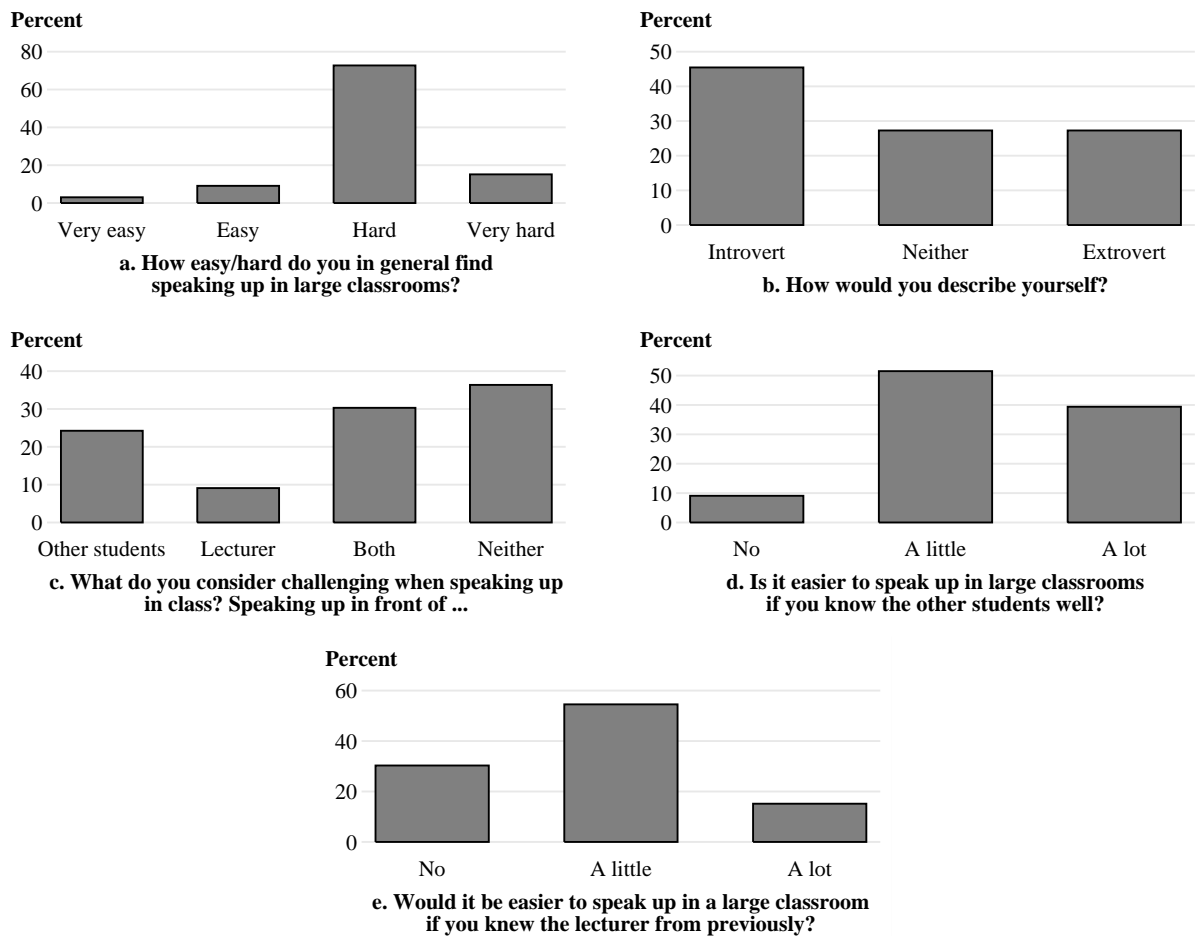


Figure 1. Survey questions and answers on the challenges for students to speak up in large classrooms.

4.1 Is it difficult to speak up in class?

Figure 1a shows survey responses on questions relating to student challenges in speaking up in large classrooms. Most students find it hard or very hard to speak up in large classrooms, which should be very much in line with most lecturers' experiences from such settings. It is difficult to start a dialogue with students at a large lecture; students are usually reluctant to participate. Students' perceived challenge of speaking up is highly linked to their self-assessed introvertedness, which is shown in Figure 1b. Of those stating to be introverts, everyone finds it hard or very hard to speak up in class, whereas those stating to be extroverts never find it very hard to speak up in class, and some find it very easy or easy.³

One may ask why students find it difficult to speak up in class. According to the survey, around 30 percent say that speaking up in front of other students as well as in front of the lecturer poses a challenge (cf. Figure 1c). Only 10 percent are mostly intimidated by the lecturer, whereas 25 percent answer that the presence of other students is the problem. This highlights that student-student interaction during an ice-breaker workshop may be equally important as or even more important than simply student-lecturer interaction. Also, asking to the importance of knowing the other students (d) or the lecturer (e) well, both point in the same direction, perhaps with a slightly larger weight on relations with other students.

³The split sample is not shown here. Available from the author upon request.

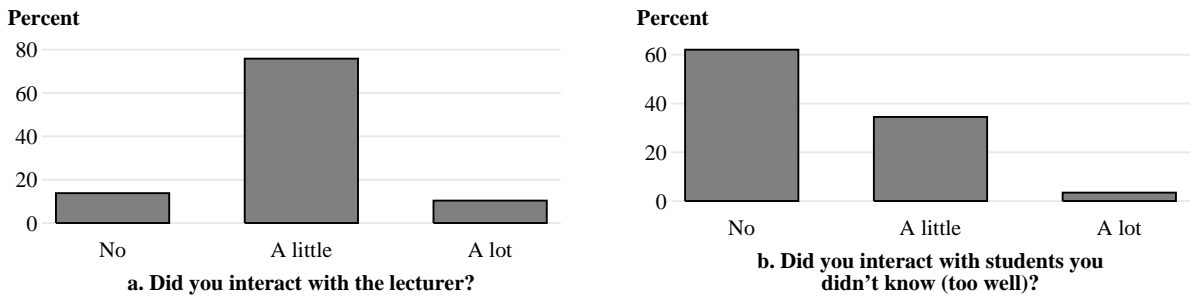


Figure 2. Survey questions and answers on student interactions during the workshop.

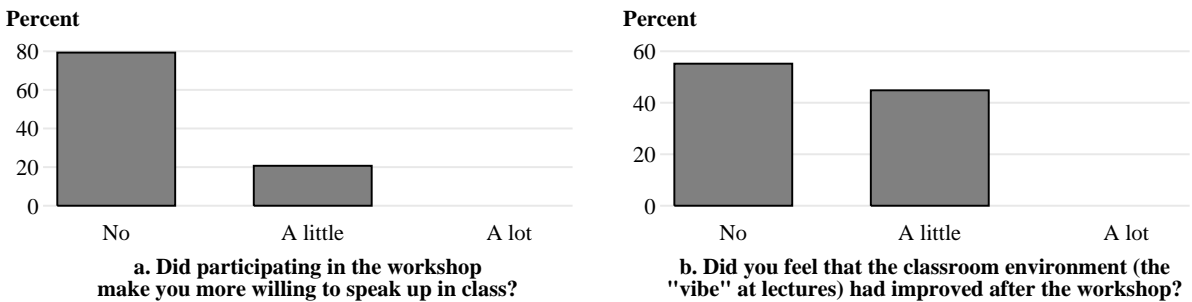


Figure 3. Survey questions and answers on students' outcome of the workshop.

4.2 How did students participate in the workshop?

Knowing now that both student-student and student-lecturer interactions are important for classroom environment, we naturally could ask “who did the students engage with during the workshop?” Of the students taking the survey, 88% participated in the workshop. In the following, only the answers of those participating are considered.

Asked whether the students interacted with me (Figure 2a) around 85 percent answered affirmatively in different degrees with the lion's share saying “a little”. Contrast this with the question regarding student-student interactions where students did not know each other too well beforehand (Figure 2b). More than 60 percent had no such interactions. Given what the students highlight as challenging for participating actively in lectures (i.e., the other students), this bodes for a poor outcome of the workshop in manipulating the classroom environment.

4.3 Did the workshop work?

Students answered two questions regarding the outcome of the workshop. One question asked them whether they felt the workshop made them more willing to speak up in class (see Figure 3a). Approximately 20 percent answers “A little”, the rest felt no difference. Slightly more uplifting, 45 percent found that the classroom environment had improved a little, yet none more than that (see Figure 3b). A positive classroom environment is important for students' feelings about speaking up; among the 45 percent who found a small improvement in classroom vibe, 38 percent felt more willing to speak up in class, whereas only 6 percent of those who found no improvement in classroom vibe felt that way.⁴

⁴This cross-tabulation is available from the author upon request.

Table 1. Cross tabulations: Did interaction with the lecturer matter?**A. Willingness to speak up in class**

Did you interact with the lecturer (Simon) at one point during the workshop?	Did participating in the workshop make you more willing to speak up in class?							
	No		A little		A lot		Total	
	No.	%	No.	%	No.	%	No.	%
No	3	75%	1	25%	0	0%	4	100%
A little	19	86%	3	14%	0	0%	22	100%
A lot	1	33%	2	67%	0	0%	3	100%
Total	23	79%	6	21%	0	0%	29	100%

B. Classroom environment

Did you interact with the lecturer (Simon) at one point during the workshop?	Did you feel that the classroom environment (the 'vibe' at lectures) had improved after the workshop?							
	No		A little		A lot		Total	
	No.	%	No.	%	No.	%	No.	%
No	2	50%	2	50%	0	0%	4	100%
A little	13	59%	9	41%	0	0%	22	100%
A lot	1	33%	2	67%	0	0%	3	100%
Total	16	55%	13	45%	0	0%	29	100%

4.3.1 Did interaction matter?

We want to test whether answers to the two outcome questions differ depending on the kind of interactions students had during the workshop, corresponding to the main hypotheses laid out in the introduction. That is, whether interactions with the lecturer or with other students (that they did not know too well in advance) matter for their willingness to speak up or their feeling of improved classroom environment.

Table 1 shows two cross-tabulations of whether lecturer interactions had an influence on workshop outcomes. Panel A cross-tabulates lecturer interactions with whether students felt more inclined to speak up in class after the workshop. Although it seems that those interacting a lot with the lecturer are much more inclined to speak up subsequently than the class as a whole—67 percent in the group with a lot of interactions say they are a little more willing to speak up compared to 21 percent of the whole class—the numbers are small and percentages have large standard errors.

The same can be said of Table 1, Panel B. Students with a lot of interaction with the lecturer are more inclined to feel that the classroom environment had improved following the workshop than students at large, but the subsamples we are comparing are too small to conclude that the difference is significant.

Table 2 shows similar cross-tabulations, this time looking at whether student-student interactions mattered for the outcome. Once again, subsamples become very small. With respect to willingness to speak up, there is no significant difference between those interacting a little versus not at all; among the former group 20 percent say they are a little more inclined to speak up in class, among the latter group 22 percent say they are a little more inclined to speak up in class. Concerning classroom environment there is more of a difference, although sample size is problematic. 56 percent of those with no interactions say classroom environment had improved a little, whereas only 30 percent of the group with a little student-student interactions say classroom environment had improved. That is, the opposite of the second hypothesis, but with no statistical power.

Table 2. Cross tabulations: Did interacting with other students matter?**A. Willingness to speak up in class**

Did you interact with students you didn't know (too well) during the workshop?	Did participating in the workshop make you more willing to speak up in class?							
	No		A little		A lot		Total	
	No.	%	No.	%	No.	%	No.	%
No	14	78%	4	22%	0	0%	18	100%
A little	8	80%	2	20%	0	0%	10	100%
A lot	1	100%	0	0%	0	0%	1	100%
Total	23	79%	6	21%	0	0%	29	100%

B. Classroom environment

Did you interact with students you didn't know (too well) during the workshop?	Did you feel that the classroom environment (the 'vibe' at lectures) had improved after the workshop?							
	No		A little		A lot		Total	
	No.	%	No.	%	No.	%	No.	%
No	8	44%	10	56%	0	0%	18	100%
A little	7	70%	3	30%	0	0%	10	100%
A lot	1	100%	0	0%	0	0%	1	100%
Total	16	55%	13	45%	0	0%	29	100%

To conclude, it is not possible to reliably falsify the two hypotheses laid out in the introduction. Whether or not I was able to manipulate the classroom environment by increased lecturer-student and student-student interaction is unclear with the data at hand.

4.3.2 Then what good did it do?

In the survey students provided their own assessment of their personality type as introverted, extroverted, or neither/neutral (see Figure 1b). Strikingly, this holds a lot of information in terms of predicting students' outcome from participating in the workshop, both concerning willingness to speak up in class and concerning classroom environment. Table 3, Panel A, shows that introverted students to a larger extent than the "neutral" students become a little more willing to speak up in class (36 percent compared to 14 percent), whereas none of the extroverted students become more willing to speak up.

Panel B on classroom environment improvement shows an almost similar pattern. Among introverted and "neutral" students, 57 percent find that classroom environment improved a little following the workshop, whereas only 12 percent of the extroverted come to that conclusion.

The same pattern is to a large extent mirrored in Table 4, which shows students' self-assessed "level" or ability cross-tabulated with the outcome variables. Students who rate themselves above average report a smaller gain from workshop participation in both outcomes and vice versa.

It turns out that self-assessed ability and self-assessed personality type are highly correlated in the survey. Table 6 in Appendix C shows that extroverted students generally rate themselves higher in terms of academic ability than "neutral" students who in turn rate themselves higher than introverted students. In that sense, survey responses to both questions may to a higher degree reflect self-confidence than what they are actually asked to rate.

Why the self-confident did not find much benefit from attending the workshop, we cannot determine

Table 3. Personality type and workshop outcomes

A. Willingness to speak up in class

Self-assessed personality type	Did participating in the workshop make you more willing to speak up in class?					
	No		A little		Total	
	No.	%	No.	%	No.	%
Introvert	9	64%	5	36%	14	100%
Neither	6	86%	1	14%	7	100%
Extrovert	8	100%	0	0%	8	100%
Total	23	79%	6	21%	29	100%

B. Classroom environment

Self-assessed personality type	Did you feel that the classroom environment (the 'vibe' at lectures) had improved after the workshop?					
	No		A little		Total	
	No.	%	No.	%	No.	%
Introvert	6	43%	8	57%	14	100%
Neither	3	43%	4	57%	7	100%
Extrovert	7	88%	1	13%	8	100%
Total	16	55%	13	45%	29	100%

Note: In both panels, the column response “A lot” has been removed for readability. There were no responses in this category in either of the survey questions.

Table 4. Self-assessed ability and workshop outcomes

A. Willingness to speak up in class

Self-assessed abilities	Did participating in the workshop make you more willing to speak up in class?					
	No		A little		Total	
	No.	%	No.	%	No.	%
Below average	2	67%	1	33%	3	100%
Average	10	71%	4	29%	14	100%
Above average	11	92%	1	8%	12	100%
Total	23	79%	6	21%	29	100%

B. Classroom environment

Self-assessed abilities	Did you feel that the classroom environment (the 'vibe' at lectures) had improved after the workshop?					
	No		A little		Total	
	No.	%	No.	%	No.	%
Below average	1	33%	2	67%	3	100%
Average	7	50%	7	50%	14	100%
Above average	8	67%	4	33%	12	100%
Total	16	55%	13	45%	29	100%

Note: In both panels, the column response “A lot” has been removed for readability. There were no responses in this category in either of the survey questions.

Table 5. Should there even be more interaction at lectures?

A. Do students want more interaction at lectures?

Self-assessed personality type	Would you like for there to be more interaction/dialogue during lectures?									
	Yes		No		Don't care		Don't know		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Introvert	2	14%	8	57%	3	21%	1	7%	14	100%
Neither	1	14%	2	29%	2	29%	2	29%	7	100%
Extrovert	5	63%	1	13%	0	0%	2	25%	8	100%
Total	8	28%	11	38%	5	17%	5	17%	29	100%

B. Do students feel that more interaction is important for their learning?

Self-assessed personality type	Do you feel that it is important for your outcome of following lectures that you are able to/willing to speak up?							
	No		A little		A lot		Total	
	No.	%	No.	%	No.	%	No.	%
Introvert	7	50%	7	50%	0	0%	14	100%
Neither	4	57%	3	43%	0	0%	7	100%
Extrovert	2	25%	3	38%	3	38%	8	100%
Total	13	45%	13	45%	3	10%	29	100%

precisely. However, we can rule out that it is because none of the extroverted had difficulties speaking up in large classrooms. More than 60 percent answer that they find it hard to speak up in large classrooms, so there is room for improvement. It may be, though, that the workshop does not address their difficulties. Extroverted students are as inhibited as students as a whole by not knowing other students, but they care less about knowing the lecturer in order for them to speak up in class.⁵

4.4 Do the students even want more interaction?

The short answer is “it depends”. Table 5 shows cross-tabulations of personality type with whether students want more interaction (Panel A) and whether students feel that more interaction would benefit their learning outcome (Panel B).

Although we are back at the issue with small subsamples, there seems to be a pattern. Introverted are relatively comfortable with no more interaction at lectures, whereas extroverted students to a much larger extent would like for there to be more interaction. Also, introverted students feel that they benefit much less than extroverted students from lectures with more interaction.

These numbers illustrate nicely differences in students relative discomfort with speaking up in large assemblies and differences in how they learn best. These are naturally related; for learning to occur, students need to feel safe as argued by Hattie (2012).

5 Recommendations and reflections

One of the conclusions of this study is that students care what other students think about them. A way to address this issue could be to set up groups with students that do not know each other well beforehand. The workshop could even be structured such that it necessitated the groups to commit to some preparation task to enhance such student-student interactions. But there is a psychological and a resource (time) cost of such an exercise. Is the improved learning environment improved enough to

⁵Based on answers to the questions in Figure 1 from the subsample of extroverted students.

warrant such an intervention?

In a paper on learning and teaching styles, Felder and Silverman (1988) discuss the distinction between active and reflective learners, which they find is closely related to extrovertedness and introvertedness, respectively. Active learners learn best by active experimentation and in groups, reflective learners learn best in a reflective environment with time to think about the information being presented and working solo or with at most one other person (Felder and Silverman 1988). In light of this, does forcing students to be more active come at a cost as well? Who are we guiding our teaching and learning initiatives towards? Introvert students are probably fundamentally uncomfortable with participating in plenary discussion no matter the circumstances. One could argue that workshop-style teaching should be an offer that provides the reflective/introvert students with a more comfortable environment for engaging in learning while at the same time allowing the active learners an opportunity to experiment and engage with the material in a more active fashion than lectures allow.

So am I really addressing the problem optimally? Instead of trying to make an inherently inactive setting, the classical lecture, less inactive, one could replace this with, say, more workshops. This is something I have considered following the experiment. Although it seems the obvious solution, there is a great obstacle in doing so in this particular course in that the course lacks a good textbook at a relevant level. The implication is that much of the exam relevant curriculum only exists in the slides that are part of the final curriculum. This necessitates classical cover-the-ground lectures with little room for workshops and other alternatives. To some degree, there is room for more workshops, but not as a revolution of the course design.

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Appendices

A The workshop problem set

Exercise in Public Finance: Empirical Measurement and the Elasticity of Taxable Income

Claus T. Kreiner, Jakob E. SØgaard, and Simon H. Boserup

Part 1: Theory

Imagine that the Minister of Finance in Denmark hires you to assess the behavioral response to taxation summarized by how individuals change their taxable income. As a first part of the assessment you want to go through the theoretical effect of taxation. To do this consider a number of individuals i at time t having preferences represented by the utility function

$$u_{it} = c_{it} - \frac{ba_{it}}{1+b} \left(\frac{z_{it}}{a_{it}} \right)^{\frac{1+b}{b}},$$

where c_{it} is consumption and z_{it} is taxable income, while a_{it} and b are positive parameters. The budget constraint equals

$$c_{it} \leq z_{it} - T_t(z_{it}) + y_{it},$$

where $T_t(z_{it})$ is the tax function in year t and y_{it} is non-labor income of the individual.

(1A) Show that the optimum of the individual is characterized by

$$z_{it}^* = a_{it} (1 - m_{it})^b, \quad (1)$$

where $m_{it} \equiv T_t'(z_{it}^*)$ is the marginal tax rate. What would be the earnings of the individual without taxation? Use the result to provide an interpretation of the parameter a_{it} (what does it represent?).

(1B) Consider the case of a linear tax system with a constant marginal tax rate m . Illustrate the budget set and indifference curves of the individual in a diagram with pre-tax income out of the 1. axis and consumption out of the 2. axis. How will an increase in the tax rate m change the optimum of the individual? Provide an economic interpretation of the results.

(1C) Derive the elasticity of taxable income (ETI) with respect to the after-tax rate $(1 - m_{it})$.

Part 2: Estimating the elasticity of taxable income

In order to derive an estimate of the ETI you have collected a data set containing taxable income for a random sample of Danes over two years (the SAS file `Period12.sas7dbat`). In year 1, the tax system had two income brackets: A bottom income bracket for all income below 2,000 DKK, which was taxed by 25 percent, and a top income bracket for all income above 2,000, which was taxed by 50 percent.

(2A) Start by considering only year 1 and use equation (1) to derive the following equation:

$$\ln(z_i) = \beta_0 + \beta_1 \ln(1 - m_i) + \varepsilon_i, \quad (2)$$

where $\ln(a_i) = \beta_0 + \varepsilon_i$ and ε_i is a standard error term (time subscripts are removed because we only consider one year). Estimate β_0 and β_1 on the cross section data in year 1. Is β_1 a consistent estimate of the ETI? Why / why not?

In year 2, Denmark implemented a tax reform that reduced the top marginal tax rate from 50 to 25 percent.

(2B) Use the variation in the tax rate for the subgroup of top taxpayers (based on their income in year 1) to estimate the ETI under the assumption that $\ln(a_{i2}) = \ln(a_{i1}) + \varepsilon_i$ in equation (1) — use the dataset `period12top.sas7bdat` that only contains the top taxpayers.

Hint 1: Starting from (1) you can write: $\ln(z_{it}) = \ln(a_{it}) + b \ln(1 - m_{it})$. By taking this equation for year 2 and subtracting the same equation for year 1 you obtain the estimation equation: $[\ln(z_{i2}) - \ln(z_{i1})] = \beta_1 [\ln(1 - m_{i2}) - \ln(1 - m_{i1})] + \varepsilon_i$ after using the assumption $\ln(a_{i2}) = \ln(a_{i1}) + \varepsilon_i$. Note that because we only consider the group of top income payers all individuals will have the same change in the marginal tax rate and we therefore cannot both estimate β_1 and an intercept (β_0). To exclude an intercept from the estimation in SAS you need to write `/noint` after your model statement in `PROC REG`.

(2C) Discuss potential problems of using the identification strategy in question (2B) to estimate the ETI.

(2D) Replace the assumption in question (2B) with $\ln(a_{i2}) = \ln(a_{i1}) + \delta + \varepsilon_i$, where δ is a constant. Discuss how the assumptions differ and use the new assumption to derive an estimation equation for $[\ln(z_{i2}) - \ln(z_{i1})]$.

Use the equation to estimate the ETI using data for the entire population in year 1 and year 2.

(2E) Replicate the above results in a "standard difference-in-difference" table of the following form:

$x = E(\ln(z))$	Year 1	Year 2	Difference
Bottom tax payers	x_{11}	x_{12}	$x_{12} - x_{11}$
Top tax payers	x_{21}	x_{22}	$x_{22} - x_{21}$
Difference	$x_{21} - x_{11}$	$x_{22} - x_{12}$	$(x_{22} - x_{12}) - (x_{21} - x_{11})$
$y = E(\ln(1 - m))$	Year 1	Year 2	Difference
Bottom tax payers	y_{11}	y_{12}	$y_{12} - y_{11}$
Top tax payers	y_{21}	y_{22}	$y_{22} - y_{21}$
Difference	$y_{21} - y_{11}$	$y_{22} - y_{12}$	$(y_{22} - y_{12}) - (y_{21} - y_{11})$

where individuals are defined as top and bottom tax payers based on their income in year 1 and each cell shows the group average. Show that the estimate from (2A) is the same as $(x_{21} - x_{11}) / (y_{21} - y_{11})$, the estimate from (2B) is the same as $(x_{22} - x_{21}) / (y_{22} - y_{21})$, and the estimate from (2D) is the same as $[(x_{22} - x_{12}) - (x_{21} - x_{11})] / [(y_{22} - y_{12}) - (y_{21} - y_{11})]$.

Finally, imagine that you in year 3 were able to make a controlled experiment, where individuals are randomly selected into two groups each facing a different tax rate. Group 1 was given a uniform tax rate of 25 percent, while group 2 was given a uniform tax rate of 50 percent. The income data from year 3 is available in the SAS file period3.sas7bat.

(2F) Use the new data to estimate the ETI.

(2G) Compare your ETI estimates in questions (2D) and (2F). Which estimate do you think is most reliable? Send an e-mail to shb@econ.ku.dk with your group's choice. What could be an explanation for the difference in the estimates (apart from randomness)?

Hint 2: Think about the individuals located exactly at the income cut-off in year 1. How would they react to the tax reform compared to individuals above or below the cut-off? Try for example to illustrate it in a diagram similar to the diagram used in question (1B).

B Survey questions

Below, find the survey questions with possible answers in parentheses.

First part: Personality—establishing a general idea of how easy/difficult students find speaking up in public/class

1. How would you describe yourself? (introvert, extrovert, neither)
(explanation: introvert = shy person, extrovert = outgoing, socially confident person)
2. If you should describe yourself, how easy/hard do you in general find speaking up in large classrooms? (very easy, easy, hard, very hard, don't know)
3. Is it easier to speak up in large classrooms if you know the other students well? (no, a little, a lot)
4. Would it be easier to speak up in large classrooms if you knew the lecturer from previously (for example from another course you followed, from BA supervision, etc.) (no, a little, a lot)
5. What do you consider challenging when speaking up in class? (speaking up in front of other students (what will they think of me?), addressing the lecturer (intimidating), both, none of the above)

Second part: The workshop

6. Did you participate in the first workshop of the semester (“Empirical measurement and the elasticity of taxable income”)? (yes, no)
7. Did you interact with the lecturer (Simon) at one point during the workshop? (no, a little, a lot)
8. Did you interact with other students that you did not know (too well) during the workshop? (no a little, a lot)

Third part: The outcome of the workshop

9. Did participating in the workshop make you more willing to speak up in class? (no, a little, a lot)
10. Did you feel that the classroom environment (the “vibe” at lectures) had improved after the workshop? (no, a little, a lot)
11. Do you feel that it is important for your outcome of following lectures that you are able to/willing to speak up (asking or answering questions)?
12. Would you like for there to be more interaction/dialogue during lectures? (yes, no, don't care, don't know)

Fourth part: General background information

13. What “level” of student are you? (remember, you are completely anonymous) (below average, average, above average)
14. Please note your biological gender (male, female)
15. Please note your age (19, 20, ..., 29, 30 or higher)
16. Please note your study background (BA, MA, exchange student, other)

C Additional statistics

Table 6. Correlation of self-assessed ability and personality type

Self-assessed personality type	Self-assessed abilities							
	Below average		Average		Above average		Total	
	No.	%	No.	%	No.	%	No.	%
Introvert	2	14%	8	57%	4	29%	14	100%
Neither	0	0%	4	57%	3	43%	7	100%
Extrovert	1	13%	2	25%	5	63%	8	100%
Total	3	10%	14	48%	12	41%	29	100%