Development Economics Section

Professor: Natalie Bau

This part is out of 100. There are 10 subparts, and each subpart is worth 10 points.

- 1. To study the effects of a large-scale primary school construction program in Indonesia in the 1970s (beginning in 1974), Duflo merges data on the number of schools constructed in a district per 1000 (pre-treatment) enrollees with information on individual's birth districts, year of birth, and years of schooling from the 1995 Indonesian census.
 - a. Write the estimating equation for a difference-in-differences strategy that would allow Duflo to measure the effect of an additional school per 1000 enrollees in a district on years of schooling. To receive credit, make sure to fully and precisely define all subscripts and variables.
 - b. Explain the identifying assumption for the equation you wrote in (a).
 - c. Is it possible to prove the assumption from (b) is satisfied? Propose a test to shed light on whether this assumption is likely to be satisfied in this context. Make sure to include the full estimating equation with all subscripts and variables clearly labelled. Explain what you would expect in this test if the identifying assumption is valid and what you would expect if it is not.
 - d. Duflo uses the school construction program as an instrument to identify the causal effect of an additional year of schooling. Write out first and second stages for this IV strategy and state the (two) key identifying assumptions. [You do not need to provide the exact equations Duflo uses but the regression strategy you propose should make sense given (a)-(b).]
 - e. Even if one can identify the causal effect of the school construction program on years of schooling from the regression in (a), the program may still not be a valid instrument for identifying the effect of increasing a specific individual's years of schooling by 1 year. Why may this be the case? *[Hint: Keep in mind that the Indonesian school construction program was among the largest school construction programs in history.]*
 - f. According to Duflo (2001), the returns to an addition year of education are quite high (8-10%). If this high return is externally valid, education appears to be a very good investment. Yet, Banerjee and Duflo (2007) tell us that the global poor do not spend a lot on education. Explain why the global poor may underinvest in education, referencing results from readings in this course.
- 2. School voucher systems and research design.

- a. Angrist et al. (2002) use a private school voucher lottery in Colombia to measure the effects of receiving a private school voucher on students' educational outcomes. They find that students who received vouchers were 10 percentage points more likely to finish 8th grade 3 years later. Does it follow from this result that enacting a voucher system will increase average educational outcomes? Why or why not?
- b. [Each sub-subpart is 5 points] Muralidharan and Sundaraman (2015) use a randomized control trial to measure the effects of a school voucher program in India. For all students in sample villages, they first asked public school students if they would like to participate in the voucher program. Then, they use a two-stage randomization where they first randomize whether the village was included in the program and then randomize whether students who would like to participate in the program receive vouchers. Explain which comparisons of means you could use to causally identify:
 - i. The effect of voucher systems on public school students who would never participate in the system.
 - ii. The effect of the voucher system on students who always attend private schools.
- c. What comparison of means from the Muralidharan and Sundaraman (2015) paper is the analog of the parameter identified by Angrist et al. (2002)?
- d. One reasonable reading of the Muralidharan and Sundaraman's (2015) paper is that private schooling does not increase test scores on average. Should we conclude that private schools and public schools are equally productive? Why or why not?

Population Field Exam

June 2022

Professor: Juliana Londoño-Vélez

Student Name:

Student ID:

- Closed book/notes exam. No laptops, phones, or tablets, similar electronic device allowed. Only scientific calculators allowed.
- Write your answers clearly and in dark ink so that your responses are legible.
- You must submit your solutions using the exam packet provided.
- This exam contains a total of 100 points.

Do NOT open this test until instructed to do so.

Determine whether each statement is true, false, or uncertain and explain why. Explain your answer fully based on what was discussed in class. All the credit is based on the explanation. Answers with no explanation will receive no points. [10 points per question]

(a) Taxing the rich with a progressive income tax to give benefits to the poor increases social welfare.

(b) The evidence shows large income effects on labor supply.

(c) Labor force participation of single mothers has increased substantially in the US over the past six decades. Labor supply theory and the changes in the incentives introduced by the reform of the US transfer system do a good job at explaining this increased labor supply.

(d) The efficiency costs of the US Earned Income Tax Credit (EITC) has increased in the past decades, as tax filers learn how to maximize the EITC refund.

(e) There is compelling evidence of high elasticity of taxable income for the top 1% since the 1980s in the US. Therefore, lowering the top tax rate, as done by Trump's Tax Cuts and Jobs Act, is likely to improve efficiency.

(f) The optimal capital income tax rate is zero when the government can use a non-linear Mirlees income tax on earnings.

(g) Many European countries levied annual wealth taxes in the 1990s but abolished them due to enforcement issues. The US is unlikely to be able to remedy these weaknesses and, therefore, taxing wealth is undesirable.

(h) Most taxpayers behave as the Allingham-Sandmo model of tax evasion predicts.

(i) Empirical studies show that the automatic upstream enforcement features of the valueadded tax break down for sales to final consumers.

(j) Governments' tax enforcement capacity explains why developing countries often rely on sub-optimal forms of taxation (e.g., taxes on turnover instead of profits).

ECON 262F - FIELD EXAM SPRING 2022

Part 1

Consider the following hypothetical scenario:

Suppose you just obtained data on public procurement contracts from the Ministry of Transportation and Public Works in Ecuador. The data comprise the universe of highway repair contracts awarded by the Ministry through competitive bidding from 2002 to 2014. In all of these contracts, you know that the Ministry used a first-price, sealed-bid procurement auction format with no reserve price.

For every contract, the data contain information on the type of repair being procured, the number of firms placing a bid, the time of the year when the repair is to take place and the geocode of the repair location.

The data also contain information on the bids made in each procurement auction—although I am not specifying yet what exactly this information is.

You are interested in using these data to structurally estimate an auction model. The only primitive to be recovered from the data is the distribution of the costs of executing the repairs across the bidders.

After talking to some officials at the Ministry, you are comfortable with the assumption that the firms that participate in these procurement auctions have *private values* (or, more appropriately in a procurement setting, private costs).

You also feel comfortable disregarding any issues associated with the endogenous entry of bidders in the procurement auctions.

Analyses of procurement and auction data of this type tend to be much easier if, besides assuming that the values are private, the researcher is able to assume that the values are identically and independently distributed across all bidders. Unfortunately, the independence assumption is often hard to justify.

Common complications that arise in settings like this and that lead to the violation of the independence assumption are: (i) *observed heterogeneity* across the contracts; (ii) *unobserved heterogeneity*

Date: June 6, 2022.

across the contracts; and (iii) affiliation in the values of the bidders within an auction.

(1) (15 points) Explain the difference between observed heterogeneity, unobserved heterogeneity and value affiliation in a procurement auction setting.

Hint: There is absolutely no need to be very formal to answer this question. You just need to explain in words the difference between the three concepts. But feel free to use math notation, if you think that doing so will help. This hint holds for all of the questions in this 262F exam.

(2) (15 points) One popular way of dealing with *observed* heterogeneity, especially when the observed contract attributes are high-dimensional, is due to Haile, Hong and Shum (2003). Ignoring concerns about unobserved heterogeneity and affiliated values, describe as well as you can the assumptions about the model primitives that are necessary for this method to work. Also, briefly outline the steps involved in the implementation of the approach.

Hint: The approach involves running a regression.

- (3) (15 points) One popular way of dealing with *unobserved* heterogeneity is due to Krasnokutskaya (2011). Ignoring concerns about observed heterogeneity and affiliated values, describe as well as you can the assumptions about the model primitives that are necessary for this method to work. Also, describe the minimum requirements about the the bid information in your data for the implementation of the approach.
- (4) (15 points) Briefly explain how, in theory, value affiliation affects the bidding behavior of the firms in a procurement auction. That is, explain how affiliation changes the bids, relative to a scenario in which values are independent. For simplicity, ignore concerns about observed and unobserved heterogeneity in answering this question.
- (5) (15 points) Provide one reason why you would actually be interested in structurally estimating a procurement auction model, as we are considering in this exam. What would you do with the estimated model primitives?

Part 2 (25 points)

Over the course, we read some papers that employ an empirical auction framework to analyze settings that are not traditionally thought of as auctions. One example is the study of price discrimination in tuition discounts by Fillmore (2021). Another example is Slattery (2020), which studies discretionary firm subsidies by state and local governments.

FIELD EXAM

Here I want you to use your imagination to describe an empirical setting that you think could be studied using some of the auction techniques that we covered in class. The only requirement is that it cannot be an *actual* auction or procurement setting. Think of this as writing a mini project (but you need to do it within the time of the exam). The good thing is that you do not need to have the data or to have a very clear idea of how to obtain the data. That said, one of the criteria that I will use to evaluate the project is its *plausibility*. This should discourage you from proposing something that would obviously be unfeasible in terms of data. The other two criteria that I will use to evaluate you are *creativity* and the *relevance* of the setting and research question that you describe.