

Q&A Chat Webinar 3 (Difference-in-differences I (Theory))

March 21st 2024

	Question	Answer
1	I am following the event, but I need a certificate at the end of the day	Hi, unfortunately we are not able to provide certificates for this series. If you email me after the event, I can provide proof of attendance - srabinovsky@air.org .
2	Discrete Choice Experiment would be good. Official email would be sent	Noted
3	Can we please have the recording in YouTube video as well. Some of us are unable to download the Vimeo versions on the page. Thank you	Hi, we will take this into consideration for the next event. Thanks for the feedback!
4	How to factor that the two groups may have different characteristics. or instance, firms constrained financially vs unconstrained firms	Assuming that you can collect data for those characteristics for both groups, I would control for that in your regression. I would then test for mean balance between Treatment and Control group at baseline. Ideally, the two groups are equivalent/comparable before the start of the program AND you assume they have the same trend over time.
5	Dans un exemple similaire, et Si le but de l'intervention est de réduire (réduction de la prévalence du paludisme), dans ce cas, comment ont fait?	if you want to know why or how a program is affecting an outcome, you need to understand the theory of change of that program. What different program inputs are affective intermediate and final outcomes?
6	why the outcome of comparison group increases after treatment?	This indicates that the general trend over time was of improvement. So, conditions in the country were doing better. This illustrates the importance of having a comparison group, otherwise you would think all the improvement in the treated group was due to the program, but actually some of it was simply because everyone was improving.
7	I wanted to use DID to measure the impact of extreme weather events on welfare (per capita income). I got a question from the panel about endogeneity problem when dealing with weather events. Kindly assist. Thank you	try to follow today's lecture and see if you still have additional questions
8	Hi, how can I download the recording of this meeting	This meeting will be uploaded for viewing to the series page here https://www.airp3-africa.org/applied-quantitative-analysis-webinar-series
9	Can we download this section	You can download a copy of today's slides here: https://www.airp3-africa.org/applied-quantitative-analysis-webinar-series
10	Sir, can we get access to previous classes for personal retraining or rehearser?	Yes, you can access recordings for previous classes. These are on the P3 Africa website that can be accessed through this link: https://sites.google.com/view/airp3-africa/applied-quantitative-analysis-webinar-series
11	Please would you consider training us on Structural equation modelling	Noted
12	I thought the comparison should be similar to the treatment? How come the levels differ?	Yes, the comparison should be similar. But that does not mean that both groups need to start at the same point. The DiD assumption is about parallel TRENDS (changes over time, NOT levels!)

13	How does the Difference-in-Differences (DiD) method address the challenge of selection bias in policy evaluation?	"This is a great question! The advantage of DID over a simple OLS regression is that DID--when the assumptions hold--gives you a clean counterfactual group to compare the outcome of the treatment group against. Selection bias means that your treated group may be different from your comparison group. DiD doesn't automatically solve selection bias--it all depends on how good your comparison group is.
14	is DID can be applied to dynamic macroeconomic analysis?	Yes, the units of analysis do not matter (whether countries or firms or individuals). Now macroeconomic variables have a very strong time trend element, so you probably have to 'detrend' the data.
15	Is there any formal test to check parallel trend assumption?	Unfortunately, we do not really have a good test for parallel trend assumption. But if you have multiple rounds of pre-treatment data (before the program started), you could compare the pre-trends between treatment and control group. Remember though, past behavior doesn't necessarily predict future behavior!
16	Is it possible to use DID when you have two waves of data but you do not have the baseline data before intervention	You need baseline data. If you do not have baseline data, then you can only compare the two groups AFTER the intervention--this is a single difference.
17	But if the baseline outcome is not the same that does not mean there is a selection bias?	With DID we really care about "trends". What we are really saying is that the treatment and control group have comparable trends. Not comparable mean values. We care more about the change over time in our outcomes--this is the 'parallel trends' assumption. That in the absence of treatment, both groups would exhibit the same trend over time.
18	Kindly also share on how you created the quality of life scale	Quality of life scale is an index from combining multiple items--it is a scale developed by WHO.
19	Can you use DiD for cross country analysis please?	yes, you can.
20	How DiD can be referred to while the assumption of parallel trend is obviously broken?	if you know the assumption is broken, then DiD is not an appropriate research design
21	What if the parallel trend assumption does not hold?	If the assumption is broken, you need to find a better tool, DiD is not appropriate.
22	How do we assess the spillover effect in this example? considering that a cash transfer program is randomized within subjects	In the example, the cash was randomized at the village cluster level, not individual level.
23	how can we have all the pass section we have done?	All recordings and slides are available at the website--see links above
24	How will you separate the impact of the intervention with other underlying factors, say for example other socio-econ characteristics that would lead to changes??	"This is one of the major threats to the internal validity. If there are other changes that are happening at the same time as your treatment, and if those changes affect the treatment and the control group differently, then you are in a pickle. But remember: those changes MUST affect the two groups DIFFERENTLY. Also, for observed characteristics (age, wealth, family size), those can be added as covariates in the regression equation."

25	Could that also mean that the treated group improved by 0.42 than what they would have been had they not received treatment?	If the treatment group had not received the treatment, they would have achieved the same trend as the control group. That is the BIG assumption we are making with DID
26	please, is the treat*post interaction same as the ATT?	treat * post is simply an interaction between treatment group (0/1) and post variable (time=0 baseline/ time =1 endline). ATT and ITT are the type of parameters we are estimating. For today's lecture, let's not think about them in relation to the interaction term. Whether we are estimating ATT or ITT depends on how we have defined 'treated' in the study; it has nothing to do with DiD.
27	wont this variable bring some estimation issues in the model?	I am not following
28	Sir, please I wish to know if the difference in difference method can be used in a normal panel data analysis, for instance studying the effect of income inequalities on self-employment?	Yes, you can use DID with panel data. DID can be used with panel data or repeated cross-sectional data.
29	It does not look like DiD be implemented using a cross-sectional Data, can it?	if you have repeated cross-sectional data, yes you can use DID
30	Please, how do we have access to the slides?	You can download a copy of today's slides here: https://www.airp3-africa.org/applied-quantitative-analysis-webinar-series
31	Is it possible to use DiD when you don't have true baseline data? say the baseline data was collected two years after the intervention started, but you want to measure the impact of that intervention on the treated and comparison groups?	Having only post-intervention data will change the interpretation of your DID coefficient. It will not represent the difference in the two trends in the post-intervention period. Without baseline data, it is hard to make sense of that though. Say the trends are different--is it due to the intervention? Hard to say.
32	What is Y (dependent variable). is it the outcome variable?	yes, Y = outcome variable
33	I was unable to follow the past webinar sections and would like to download them to better understand the course.	You can access past webinar sessions on our website through this link: https://sites.google.com/view/airp3-africa/applied-quantitative-analysis-webinar-series .
34	where we have a few number of respondents, how can we present our data in a tubular for?	WE don't understand what 'tubular' means, sorry.
35	I can't wait to see what STATA can do in practice.	Fasten your seat belts
36	Can we also do this analysis in situations of negative influences rather than interventions? e.g. to check the effect of a natural disaster on the farm output of a particular group, using another unaffected group as control.	yes, the outcome can be anything you want. In fact, we are currently using DID to study the impacts of shock (negative outcomes).

37	what makes the interaction effect/variable to be DID impact at the end?	This was shown in the slides via the 2x2 matrix and the differences.
38	Given the following information, I have the following issue: Which method should be used to measure air quality and the program's impact? I'm currently trying to assess the impact of an air quality management program launched by a city municipality in 2022. Unfortunately, there is no counterfactual data available. However, I have access to monthly average PM2.5 air quality indicator data for the entire town before and after the program. I'm wondering if it's possible to use the Dif-in-dif method or if there's another approach I should consider. The program's goal is to meet the World Health Organization's minimum air quality requirements: an annual concentration of 5 $\mu\text{g}/\text{m}^3$ and a three to four consecutive days 24-hour concentration of 15 $\mu\text{g}/\text{m}^3$ of PM2.5. I plan to use the before-program data as a comparison and the after-program data as the treated group data. Does this sound good to go?	This is a before-after comparison, so a single difference not a double-difference. To introduce a DID, you need to have a comparison group, maybe from a city municipality that did NOT launch any air quality campaign.
39	For example, if I am interesting to analyse the impact of inflation on macroeconomics outcomes. can we applied DID?	Not sure, depends on the data, but DID can be applied to any type of data provide the assumptions hold and the data exist.
40	Why the B1 is important to know if only the change matters and not the level?	B1 is telling you whether the two groups had the same mean at the baseline. This is often a good indication of whether the parallel assumption holds. If the two means are very different, then you may want to reconsider your assumption of parallel trends.
41	Before the intervention will the coefficients B_0 be the same for the two groups in the regression? Or it is assumed.	B_0 is the mean of the comparison group before the intervention; B_1 is the difference between the comparison and treated group at baseline. So B_1 tests whether the two means are different at baseline.
42	Why is beta referred to as mean and not coefficient?	A coefficient is a mean. It represents the 'mean' effect of X and Y. In the case of the constant term (B_0), it gives the mean of the outcome when all the X variables are equal to zero.
43	Just a logistic question. will there be certificate of participation?	We currently are not offering a certificate for this series. However, you can email srabinovsky@air.org or jngao@air.org if you need proof of participation

44	Would it be possible to have a detailed explanation of the staggered DiD next week and not just the intuition as was stated in class today? I plan to use the technique for my research and have been looking forward to this topic in particular. Thank you.	WE cannot provide a detailed session on staggered DID, sorry. It is an advanced topic, we will give some guidance, maybe we can consider a separate session on that.
45	Why do you always use 60% to close the poll?	IDK! I am trading off the extra time to wait for responses versus giving everyone a chance to respond. Time is tight, we have to make difficult choices. :)
46	Can we assume B_0 is the average for both groups before intervention?	No, just the comparison group. B_1 gives the difference between the two groups at baseline.
47	Does it matter which model you use to estimate your D-i-D regression?	Not sure what you mean by 'model'.
48	I am wondering if and why the error term is the same for all the scenarios?	Please don't focus on the error term, the focus of these two sessions is the DID model! The error term is placed on the slides to remind us that these are statistical models
49	My request is that the next webinar can be discrete choice models	Thank you for your request. We have it noted down
50	In the case of analysis in DiD what is the source of Comparison and Treated data. Basically the based how do you determine it	Using our knowledge of the study and the program. We know which areas received the treatment and which did not.
51	Why is it minus 0.08	On slide 24 first column we have $[(2.99 + -0.08) - (2.99)] = -0.08$. The mean of the treated group is 0.08 LOWER at baseline. You can see this in the graph below.
52	Comment s'interprete le résultat de la différence de la différence (0,42) au regard de l'impact attendu du cash transfert?	Those receiving the cash transfer had an improvement in Quality of Life that is 0.42 units greater than those who did not receive the cash transfer.
53	Is it possible to use DiD if I don't have pre-intervention information like if i want to study the effectiveness of the drug.	See the same question above, and the response. You can, the DID coefficient gives the difference in trends during the intervention period.
54	A cash transfer program targets individuals randomly in a community and not getting every individual in a selected community. how do you assess the spillover effect considering that if individual A benefits from the program and shares with individual B who did not benefit, both will be better off after time. how do we capture this effect to ensure that we get the real impact of the program?	National cash transfer programs are targeted, not random. And yes, some in a village will qualify (based on program rules) and some will not. And yes, the not-receiving neighbors or family in the village may benefit, causing a spillover. To estimate the spillover, you could collect data on non-beneficiaries in treated and untreated villages and compare them.
55	Why the R^2 is too low?	Please focus on DID!!! In causal inference, we don't really care about 'goodness of fit'. If you are doing a prediction model, not a causal

		model, then you would try and maximize fit (R^2). That however is not our goal here.
56	Can we see the nature of data entry before this Stata output?	Will try and show that in session 2.
57	If I want to do a DiD between countries, what dynamics should I consider, for example when doing research on a policy effect in say EAC countries	People use country level data with DiD all the time! The usual assumptions must hold--parallel trends.
58	How do we explain the "negative" coefficient of the treatment??	See slide 24--B1 gives the baseline mean difference between the two groups.
59	How do you interpret DD?	Those receiving the cash transfer had an improvement in Quality of Life that is 0.42 units greater than those who did not receive the cash transfer.
60	May be it is good consider the lecture time to at least 90 minutes... seems so many things and so little time. a little bit or more time could be better.	Thank you for the feedback.
61	Do you ignore the statistical significance of treat coeff when interpreting the impact? I noticed that treat coeff is not significant at 5%.	Answering your question with a question: How do you interpret B1 (the coefficient of TREAT)? What is it testing? See slide 24. So, it is not statistically significant--what does that mean?
62	How can we get the slides?	You can download a copy of today's slides here: https://www.airp3-africa.org/applied-quantitative-analysis-webinar-series
63	how can we construct the graph?	Hire Ashu as your RA.
64	I HOPE YOU WILL SHARE THE SLIDES	We have the slides already up on our website. Please access through this link: https://sites.google.com/view/airp3-africa/applied-quantitative-analysis-webinar-series
65	On slide 26, the comparison group is not subjected to any treatment or to any cash transfer program. Yet over time, the difference between before and after is 0.24. What's the explanation for the increase from before to after. Holding all factors constant, I expected a no difference between the before and after scenarios.	What if living conditions improved over the study period? Wouldn't the general population show improvements in quality of life? This is why it is super important to have a comparison group, to capture secular changes over time.
66	If possible, can we have the dataset and an excerpt questionnaire (even a hypothetical one or on the Impact of cash transfer program in Zimbabwe) where the dummy variables for the Beta parameters are extracted from. It will make it easy for me to visualize this data and connect the excerpt questionnaire to the data and to the matrix above on page 26.	WE will work on sharing some data

67	Other topics to consider: CGE model and panel data models	Are people still doing CGE models!? :) WE have a session on fixed effects
68	My question is what is Stata command use used to run Endogenous switching regression model and Multinomial endogenous switching regression model? Another question is that, considering that PSM and ESR models have some weakness. Is there any model which can be used and it solves all the weakness? If yes what is that model and Stata command?	Not sure this links to DID
69	I would enjoy to know if you will cover also the propensity score matching	Noted
70	On effect of orphan on child nutrition i.e age for height, age is going to have an inverse relationship with the z score. What does this mean to have an inverse relationship? Is it the same thing as to have a negative relationship? What is the difference between an inverse relationship and a negative relationship?	Yes, it is the same thing, sorry for not being clear.
71	I have one more question, how do we disentangle in 'did' if we have multiple treatments	We need an additional 'treat' variable, and then must interact it with POST (the time variable)
72	Thank you for the wonderful lectures. I am really enjoying them. I would like to ask if you can add Regression discontinuity design as an additional model for impact evaluation	Noted
73	My question is this, during the interpretation of DID estimation, which variable must we give much attention? Is it the treatment variable (or treat) or the DID (the interaction between treat and Post)?	The DID coefficient (treat*post) gives you the DID estimate. The coefficient of treat tells you something else--see slide 24 for an explanation of the meaning of the treat coefficient (B1).
74	Thank you for this opportunity to strengthen our knowledge of impact assessment. Also, for the bonus of the French translation, it's just wonderful! However, the site to access the video is not popular and therefore not easy to explore. Wouldn't it be better to put it on YouTube. I would like to request a course on GEM (general equilibrium model)	Noted

75	I kindly request for you to consider practical training for equity in health services analysis and benefit incidence analysis of health services.	This is a general quantitative methods webinar series.
76	Is it possible to include Propensity score matching? I really need to understand this PSM in relation to effects estimates.	Noted
77	Suggestion to have some session on endogeneity	There is a session in instrumental variables