Social Media Exposure and Job Outcomes: Pre-analysis Plan

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1 Introduction

We conduct a field experiment to investigate the effects of social media exposure on job market outcomes. Although our sample includes any kinds of job market candidates, our focus is on individuals from under-represented groups (i.e., women, URM and LGBTQ+, denoted as "URG"). More specifically, we examine whether having economist influencers "quote tweet" (i.e., retweet with a comment) the job market papers on Twitter may help job market candidates achieve better success on the economics job market, including increasing exposure for job market papers (e.g., more impressions, retweets, URL clicks, detail expands, engagements, likes, replies on Twitter) and getting better job market outcomes (e.g., more job interviews, flyouts, job offers etc.). We also examine whether there are heterogeneous treatment effects for under-represented groups.

For our study, we recruit job market candidates who register on either the AEA's job openings for economists (JOE) or the European Job Market for Economists (EJME), or who are listed as job market candidates on their department websites on the 2022-2023 Econ Job Market [1]. We first send out a pre-market survey to collect candidates' demographics, job market paper summary, and the use of Twitter. Then we tweet the job market papers of all survey respondents on our Twitter account "Econ Job Market Helper" ((@*econ_jmp*)).

Given the relatively small sample size[2], we use a matched-pair design to lower the mean-squared error and the standard error (Bai, 2022). We first split

[1] We refer to the economics or relevant departments according from two sources: PhD Candidates in Economics listed on NBER (https://www.nber.org/career-resources/phd-candidates-economics); and EconJobMarket (https://econjobmarket.org/placementOfficers).

[2] Our sample size limitations come from two sources: 1) Only a subset of job market candidates who completed our pre-market survey submitted a complete tweet about their job market paper; 2) Only a subset of job market candidates' job market papers are available to be downloaded on their personal websites during the time when we collected our pre-market survey.

job market candidates into the URG group and the non-URG group based on their demographic information collected from our pre-market survey. Among the URG group (N=231) and the non-URG group (N=294), respectively, we order units (i.e., job market candidates) according to the number of their primary advisor's Google Scholar citations, and then pair the adjacent three units as triplets.

After stratified random assignment, we match job market candidates in the treatment group with academic economists with 4,500 or more Twitter followers ("influencers") by fields. Influencers are asked to quote tweet job market papers from the treatment group using templates provided by us and then we measure whether the quote tweets improve the visibility of job market papers of treated participants on Twitter (i.e., more impressions, retweets, URL clicks, detail expands, engagements, likes, replies etc.), and job market outcomes of treated participants (i.e., more job interviews, flyouts, job offers etc.).

We are focusing on job market candidates from under-represented groups because they typically do not have access to the same high-quality mentoring resources and professional networks as other candidates (Lundberg and Stearns, 2019; Bayer, Hoover and Washington, 2020). Amplifying the visibility of URG job market candidates may provide a low-cost alternative to help young economists, especially those from underrepresented groups succeed in the job market. More generally, our study will shed light on the causal effect of promoting research on social media on academic success.

In addition, we want to learn about the extent to which economist influencers can accurately predict the impact of our social media intervention. After we send out our post-market survey and finish the data collection and analysis, we will conduct a prediction study with the economist influencers who agreed to help with our field experiment earlier. We will ask how the treatment affects the number of job interviews/fly-outs/job offers. We will ask this question separately for URG and non-URG job applicants.

2 Research Strategy

Our experiment consists of three stages: (i) a pre-market survey, (ii) an intervention period, and (iii) a post-market survey.

Pre-market survey (late October to mid November, 2022): We compile a list of job market candidates who register on either the AEA's job openings for economists (JOE) or the European Job Market for Economists (EJME), or who are listed as job market candidates on their department websites on the 2022-2023 Econ Job Market. Then, we invite them to participate in the pre-market survey. The survey asks job market candidates questions about demographics, job market paper, and use of Twitter. We also ask participants to summarize their job market paper as a tweet.

Intervention period (mid November to early December, 2022): We use our Twitter account "Econ Job Market Helper" (@*econ_jmp*) to post the job market paper tweets of all job market candidates who fill out the pre-market

survey. After stratifying by URG/non-URG and ordering job market candidates according to the number of primary advisor's Google Scholar citations, we use the matched-pair design as described in the introduction section to randomly assign participants to the treatment or control group. Since we want more URG job market candidates to receive treatment for ethical reasons, URG job market candidates will have a higher probability (2/3) of being assigned to the treatment group compared to non-URG job market candidates, who have a 1/3 probability of being assigned to the treatment group. Those assigned to the treatment group will be matched with an influencer in their respective field. The influencers are then asked to quote tweet the original tweet according to a predefined time schedule. The texts in the quote tweets are randomly drawn from a list of templates. For example: "Retweeting a JMP from @*econ_jmp* to help publicize job market candidates in my field." Influencers can edit the sentence if they want to.

Post-market survey (April-June, 2023): The survey will collect data on each candidate's number of job applications and job market outcomes, such as the number of interviews, fly-outs and offers received from different types of jobs (e.g., tenure-track positions, non-tenure track positions, public-sector, contract research organizations, and private-sector etc.), as well as salary and additional compensation/perks.

Twitter data: In addition, after the intervention period we also collect intermediate outcomes generated by the job market paper tweets via Twitter API and Twitter Analytics, including the number of URL clicks of candidates' personal websites, the number of replies, likes, retweets, impressions, engagements, detail expands, etc.

3 Outcomes

- **Primary outcome measures**
  - Number of job interviews / fly-outs / job offers received for different types of jobs
- **Intermediate outcome variables**
  - Twitter influence index (impressions, retweets, URL clicks, detail expands, engagements, likes, replies etc.)
- **Secondary outcome variables**
  - Satisfaction with job placement
- **Additional descriptive variables**
  - Asian (including Asian American and Asian)
  - Gender
- **Long-term outcomes** (not included in this paper)

  - Number of citations of the job market paper within 2 years of the experiment
  - Number of co-authors within 2 years of the experiment
  - Publications (how many, journal ranks) within 2 years of the experiment

- **Key control variables**
  - Number of primary advisor's citations
  - Rookie (i.e., job market candidates who go on the Econ Job Market for the first time)
  - Did (doing) postdoc (or not)
  - Top 30 U.S. institutions (or not)
  - Top 30 institutions outside the U.S. (or not)
  - Research subfields
  - Sent job market signals (0, 1, 2)
  - Participation in job market scramble (or not)
  - Number of publications, RR, working papers
  - Number of jobs applied for multiple choice: 1-50 jobs, 51-100 jobs, 101-150 jobs, 151-200 jobs, 200+ jobs Types of jobs applied for 1 = primarily academic, 5 = primarily non-academic
  - Interest in different types of jobs likert scale rating 1-7: lecturer, postdoc, government, NGO, thinktank, industry
  - Interest in jobs in different locations binary: U.S., Other North America, Africa, Europe, Asia, Oceania/Australia/New Zealand, South America

- **Prediction Study**

  We will conduct a prediction study with influencers, where we ask them to guess how many more or less job interviews, fly-outs and job offers the job market candidates in the treatment group on average received relative to the control group.

  Focusing only on the candidates from underrepresented groups (i.e., women, underrepresented minorities, LGBTQ+), we will also ask influencers to guess how many more or less job interviews, fly-outs and job offers the job market candidates in the treatment group on average received relative to their counterparts in the control group.

4 Empirical Strategy

Anticipating one-sided non-compliance (on the side of influencers), we will estimate intent-to-treat (ITT) effects. We will estimate regression models of the following form using OLS:

$$lm(DV\ treat + URG + X) \tag{1}$$

$$lm(DV\ treat + URG + treat : URG + X) \tag{2}$$

Where "treat" is 1 if assigned to the treatment and zero otherwise, X is a matrix of pre-treatment covariates, and URG is a dummy variable for JMC from under-represented groups. We will also include matched-triplet dummies as controls. Standard errors are at the individual level. (See Bruhn and McKenzie (2009); Abadie et al. (2023); de Chaisemartin and Ramirez-Cuellar (2020) for the justification of our approach.)

Depending on the distribution of the outcome variables, we might perform robustness checks (e.g., negative binomial models for count data, log transformation for long-tail distributions etc.).

We will also use our randomization as an instrument to estimate local average treatment effects (LATE):

$$ivreg(DV\ d + URG + X | treat + URG + X) \tag{3}$$

$$ivreg(DV\ d + URG + d : URG + X | treat + URG + treat : URG + X) \tag{4}$$

Where d represents the actual received treatment and "treat" refers to assigned treatment. Similarly, we will also include triplet dummies as controls. Standard errors are clustered at the individual level.

We might also explore t-tests and randomization tests based on Bai, Romano and Shaikh (2022) and Bai (2022). None of these tests need pair dummies or clustering, but they both need adjustment terms (which are in the form of "pairs of pairs") in the standard errors in order for rejection probability for large n to be 5%. Alternatively, we might also do covariate adjustment based on Bai et al. (2023).

5 Pre-market Survey

5.1 Academic background

1. Are you on the 2022-2023 job market?
    - Yes
    - No

→If "No" is selected, skip to the end of the survey

2. Is this the first time you are on the Economics Job Market?
   - Yes
   - No
3. If no: Which year did you go on the Economics Job Market the first time?
4. What is the name of the institution at which you (are expected to) finish your PhD?
5. Have you ever been a full-time research assistant (also known as "pre-doc") before entering your PhD program?
   - Yes
   - No
6. If yes: what is/are the name(s) of your pre-doc advisor(s)?
   - Advisor 1's name:
   - Advisor 2's name:
   - Advisor 3's name:
   - Advisor 4's name:

   Have you done (are you doing) a postdoc?
   - Yes
   - No

5.2 Field of specialty

1. Please indicate your research fields (You can identify at most three research fields).
   - Behavioral economics
   - Development economics
   - Econometrics
   - Economic history
   - Economics of education
   - Environmental/Agricultural economics
   - Financial economics
   - Health economics
   - Industrial organization
   - Information economics

- International economics
- Labor economics
- Law and economics
- Macroeconomics
- Microeconomics
- Political economy
- Public economics
- Urban economics
- Other, please specify

2. What are the names of your primary advisors?
   - Advisor 1's name:
   - Advisor 2's name:
   - Advisor 3's name:
   - Advisor 4's name:
   - Advisor 5's name:
3. Please upload the latest version of your CV:
4. Do you have a personal webpage?
   - Yes
   - No
5. If yes, what is the URL of your personal webpage?

5.3 Support from advisors

1. How satisfied are you with the support you received from your dissertation advisor(s) during your PhD? (1-7)
   Rating: Not at all satisfied (1) - Very satisfied (7)

5.4 The types & locations of jobs you are looking for

1. Please describe what types of jobs you are interested in / applying to:
   Rating: Not at all interested (1) - Very interested (7)
   - Assistant professor (tenure-track) at a college or university
   - Lecturer (non-tenure track) at college or university
   - Postdoctoral fellowship at college or university
   - Government, including central banks
   - Non-profit or quasi-governmental organizations (IMF, World Bank)

- Contract research organizations / think tanks (e.g., RAND, Mathematica, Research Triangle Institute)
- Private sector (e.g., banking, finance, tech, consulting, or other business/ industry)

2. In which geographic regions are you applying for jobs? You can select multiple choices.

   - U.S.
   - Other North America
   - Africa
   - Asia
   - Oceania/Australia/New Zealand
   - South America
   - Europe
   - Other, please specify

5.5 Twitter account

1. Do you have a Twitter account?

   - Yes
   - No

2. If yes: What is your Twitter handle?
   Your Twitter handle (e.g., @abc):

5.6 Demographics

1. What is your gender?

   - Woman
   - Man
   - Non-Binary
   - Prefer not to say

2. Do you consider yourself to be transgender?

   - Yes, I am transgender
   - No, I am cisgender
   - I do not consider myself either transgender or cisgender
   - Don't know / Not sure
   - Prefer not to say

3. Do you consider yourself to be...
    - Straight
    - Gay
    - Lesbian
    - Bisexual
    - Pansexual
    - Queer
    - Asexual
    - Prefer not to say
4. In what year were you born?
    - I was born in... YYYY
    - Prefer not to say
5. What is your country of citizenship? (If you have dual citizenship then please indicate your primary citizenship.)
   - - Select Country - -
6. Are you of Hispanic, Latino, or Spanish origin?
    - Yes
    - No
    - Prefer not to say
7. What is the primary ethnicity or race you identify with?
    - White
    - Black or African American
    - American Indian or Alaska Native
    - Asian
    - Native Hawaiian or Other Pacific Islander
    - Other, please specify
    - Prefer not to say
8. What was the highest level of education achieved by your mother?
    - Less than high school
    - High school diploma or equivalent
    - Associate's degree
    - Bachelor's degree
    - Master's degree

- Professional degree (e.g. MBA, J.D., M.D.)
- Doctoral degree (e.g., Ph.D., Ed.D.)
- Don't know
- Prefer not to say

9. How would you describe the financial situation of your family when you grew up?
    - High income / wealthy
    - Upper middle class
    - Middle class
    - Low income
    - In poverty
    - Prefer not to say

5.7 Instruction to write a tweet

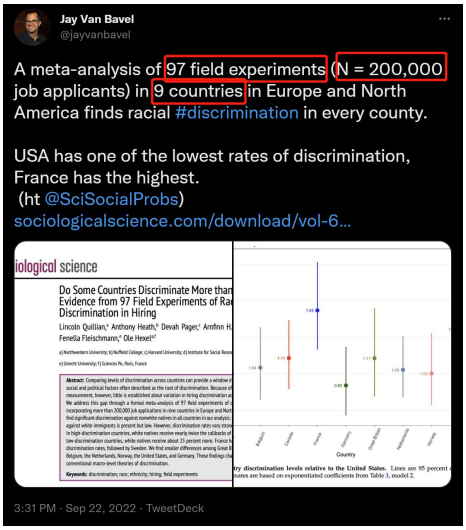
As a thank you for participation, we will post a tweet about your job market paper (JMP) on our Twitter account "Econ Job Market Helper" (@*econ_jmp*). This account is already followed by some influential economists.

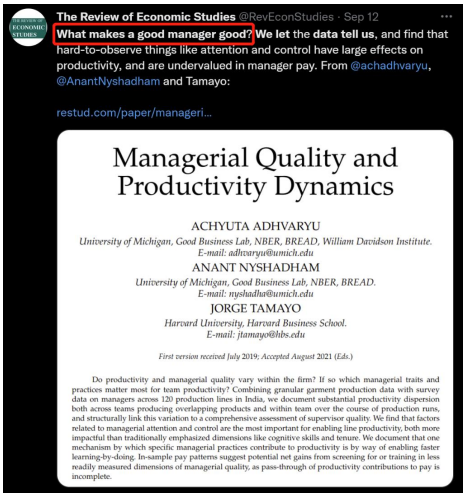
Because you know your JMP best, we are asking you to prepare the text that we will use verbatim for the tweet. It should describe the main idea and/or result of your job market paper. Note, the text limit is 280 characters. You can also use emojis (each emoji counts as two characters). Below are some guiding questions:

- What is the research question? Try to frame it in a broader context so that the tweet will create more interest.
- What data/method/modeling approach do you use and what is your main finding? Try to state your data/method/modeling approach and finding(s) in a precise way.
- Add a link to your personal website and, if you have a Twitter account, your Twitter handle (e.g., @abc).

Here are some additional tips to improve the quality of your tweet:
Do's:

1. Use numbers if applicable
2. Use open ended questions


Jay Van Bavel
@jayvanbavel
A meta-analysis of 97 field experiments (N = 200,000 job applicants) in 9 countries in Europe and North America finds racial #discrimination in every county.
USA has one of the lowest rates of discrimination, France has the highest.
(ht @SciSocialProbs)
sociologicalscience.com/download/vol-6...
iological science
Do Some Countries Discriminate More than
Evidence from 97 Field Experiments of Ra
Discrimination in Hiring
Lincoln Quillian,a Anthony Heath,b Devah Pager,c Arnfinn H.
Fenella Fleischmann,* Ole Hexel[d]
Country
3:31 PM · Sep 22, 2022 · TweetDeck


The Review of Economic Studies @RevEconStudies · Sep 12
What makes a good manager good? We let the data tell us, and find that hard-to-observe things like attention and control have large effects on productivity, and are undervalued in manager pay. From @achadhvaryu, @AnantNyshadham and Tamayo:
restud.com/paper/manageri...
Managerial Quality and Productivity Dynamics
ACHYUTA ADHVARYU
University of Michigan, Good Business Lab, NBER, BREAD, William Davidson Institute.
E-mail: adhvaryu@umich.edu
ANANT NYSHADHAM
University of Michigan, Good Business Lab, NBER, BREAD.
E-mail: nyshadha@umich.edu
JORGE TAMAYO
Harvard University, Harvard Business School.
E-mail: jtamayo@hbs.edu
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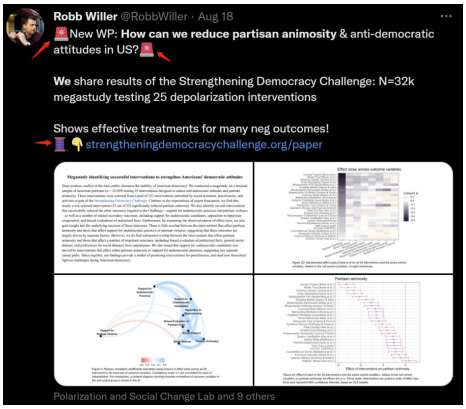
Do productivity and managerial quality vary within the firm? If so which managerial traits and practices matter most for team productivity? Combining granular garment production data with survey data on managers across 120 production lines in India, we document substantial productivity dispersion both across teams producing overlapping products and within team over the course of production runs, and structurally link this variation to a comprehensive assessment of supervisor quality. We find that factors related to managerial attention and control are the most important for enabling line productivity, both more impactful than traditionally emphasized dimensions like cognitive skills and tenure. We document that one mechanism by which specific managerial practices contribute to productivity is by way of enabling faster learning-by-doing. In-sample pay patterns suggest potential net gains from screening for or training in less readily measured dimensions of managerial quality, as pass-through of productivity contributions to pay is incomplete.

3. Use emojis



4. Focus on first and last words

5. Your tweet:

6. Please provide one keyword about your job market paper

7. Please upload a picture of the title page of your job market paper (this will be included in the tweet).

8. Please upload a picture of the main graph/table/theorem of your job market paper (this will be included in the tweet)

5.8 Participation in mentoring workshops open-ended questions

1. What mentoring workshops, summer programs or job market panels have you attended?
    - AEA Summer and Scholarship Program
    - AEA Mentoring Program (CSMGEP)
    - Association for Mentoring Inclusion in Economics (AMIE) Mentoring Program
    - CSQIEP LGBTQ+ Mentorship Program
    - *#econ_prosem*
    - Job Market Workshops by Economists for Ukraine
    - Panel on the Job Market by Committee on the Status of LGBTQ+ Individuals in the Economics Profession (CSQIEP)
    - Royal Economic Society (RES) Mentoring Programme
    - Russell Sage Foundation Summer Institutes
    - Southern Economic Association Mentoring Workshop
    - Other, please specify
    - I did not attend any workshops / summer program / job market panels
2. What questions do you want to ask the panelists regarding how to prepare for academic job interviews?
3. Do you have any comments or suggestions that you would like to share with the researchers who designed this survey? Is there anything you found unclear or confusing? Are there questions you wished we had asked? Please let us know what you think.

6 Post-market Survey

6.1 Personal background

1. What was your title or position in December 2022?
    (a) Ph.D. Student / Ph.D. Candidate
    (b) Postdoc
    (c) Lecturer
    (d) Assistant Professor
    (e) Other, please specify:

6.2 Number of jobs JMC applied for

1. How many jobs did you apply for?
   (a) 1-50 jobs
   (b) 51-100 jobs
   (c) 101-150 jobs
   (d) 151-200 jobs
   (e) 201+ jobs
2. Did you apply primarily for academic or non-academic jobs? [1 = primarily academic, 5 = primarily non-academic]
   (a) 1
   (b) 2
   (c) 3
   (d) 4
   (e) 5
3. Did you send AEA job market signals?
   (a) Yes, I sent one signal
   (b) Yes, I sent two signals
   (c) No
4. How many interviews or fly-outs or job offers did you receive from the institutions/employers to which you send signals?
   (a) Interviews: 0/1/2
   (b) Fly-outs: 0/1/2
   (c) Job offers: 0/1/2

6.3 Interviews/fly-outs/offers received by types

1. How many interviews did you receive for the following types of jobs?
   (a) Tenure-track positions (or equivalent) at a college or university
   (b) Non-tenure track positions at college or university, such as postdoc positions
   (c) Public-sector: Government, non-profit and quasi-governmental organizations, such as central banks, IMF, World Bank
   (d) Contract research organizations / think tanks, such as RAND, Mathematica, Research Triangle Institute)
   (e) Private-sector: banking, finance, business, industry, consulting

2. How many fly-outs (on-site visits) did you receive for the following types of jobs?
   (a) Tenure-track positions (or equivalent) at a college or university
   (b) Non-tenure track positions at college or university, such as postdoc positions
   (c) Public-sector: Government, non-profit and quasi-governmental organizations, such as central banks, IMF, World Bank
   (d) Contract research organizations / think tanks, such as RAND, Mathematica, Research Triangle Institute)
   (e) Private-sector: banking, finance, business, industry, consulting
3. How many job offers did you receive for the following types of jobs?
   (a) Tenure-track positions (or equivalent) at a college or university
   (b) Non-tenure track positions at college or university, such as postdoc positions
   (c) Public-sector: Government, non-profit and quasi-governmental organizations, such as central banks, IMF, World Bank
   (d) Contract research organizations / think tanks, such as RAND, Mathematica, Research Triangle Institute)
   (e) Private-sector: banking, finance, business, industry, consulting
4. (Optional) If you kept a record of your job applications, including the interview invitations, fly-out invitations, and job offers you received, and you are willing to share with us, could you upload your record here? We will never share the file outside of the research team.
5. Did you receive any very early or short-duration offers that made it hard to wait for other interviews/fly-outs/offers?
   (a) Yes
   (b) No
6. Did you register for and participate in the AEA scramble?
   (a) Yes
   (b) No

6.4 Job offer acceptance

1. Did you accept a job offer?
   (a) Yes
   (b) No

2. What type of job offer did you accept?
   (a) Academia (college, university)
   (b) Government, including central banks
   (c) Non-profit or quasi-governmental organizations (e.g., IMF, World Bank)
   (d) Contract research organizations / think tanks (e.g., RAND, Mathematica, Research Triangle Institute)
   (e) Private-sector: tech, banking, finance, business, industry, consulting
   (f) Other, please specify___
3. What is the name of the institution or organization at which you will be working?
4. Which of the following best describes your position?
   (a) Tenure Track Assistant Professor
   (b) Lecturer
   (c) Adjunct
   (d) Visiting Professor
   (e) Postdoctoral Fellow
   (f) Research Scientist
   (g) Other, please specify___
5. In what country is your new job?
   (a) –Select Country–
6. How satisfied are you with your job placement?
   Rating: Not at all satisfied (1) - Very satisfied (7)
7. (Optional) At your new job, what will be your annual pre-tax salary for the coming year? If your base salary is not in USD, please report the approximate value in USD.

6.5 Twitter

1. Did you promote your JMP on Twitter? (check all that apply)
   (a) Yes, I wrote a separate tweet about my JMP BEFORE the Econ Job Market Helper tweeted my JMP
   (b) Yes, I wrote a separate tweet about my JMP AFTER the Econ Job Market Helper tweeted my JMP
   (c) Yes, I retweeted/quote-tweeted my JMP tweet posted by the Econ Job Market Helper

(d) No, I did not promote my JMP on Twitter (exclusive choice)

2. Did anyone else besides Econ Job Market Helper tweet about your JMP? (for example, your department placement officer, your advisor)

   (a) Yes, my placement officer
   (b) Yes, my advisor(s)
   (c) Yes, my co-author(s)
   (d) Yes, one or more renowned researcher
   (e) Yes, one or more researchers that I do not know
   (f) No, I am not on Twitter / I am not sure

6.6 Academic background

1. As of November 2022, what was your research record?

   (a) Number of working papers: _____
   (b) Number of articles published or forthcoming in peer-reviewed journals or proceedings: _____
   (c) Number of R&R (Revised and Resubmitted, or under revision for resubmission) articles in peer-reviewed journals or proceedings: _____

2. Please upload the latest version of your CV as .pdf:

3. Please upload the latest version of your job market paper as .pdf:

4. What is the URL of your personal webpage?

   - My personal webpage URL is _____
   - I don't have a personal webpage.

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