Can high school counselors help the economics pipeline?

Danila Serra

with
Melissa Gentry & Jonathan Meer
(Texas A&M University)

ASSA, Jan 2023
The Leaky Pipeline

Source: CSWEP Report (2021)
Contrary to other fields (e.g. STEM), we have made no progress in the last 20 years (Bayer and Rouse, 2016). Why should we care?
Related studies: What has been done?

- Primarily interventions with university students:
  - Information on wages, applicability, research topics, diversity: Bayer et al. (2019), Chambers et al. (2021), Li (2018), Halim et al. (2021), Pugatch and Schroeder (2021)
  - New curriculum or TAs: Bayer et al. (2020a, b)
  - Feedback on good performance: Li (2018)
  - Role models: Porter and Serra (2020)
  - College advising (faculty): Canaan and Mouganie (2021)

- This study targets high school students *indirectly* through the provision of information to their high school counselors/advisors
Motivation:

- Preferences for fields of study are largely formed before college (Buckles, 2019; Patnaik, Wiswall and Zafar, 2020);
- Experiences, information (and role models) and stereotypes formed/reinforced prior to college enrollment are important.

Research Question: Can providing high school counselors with information about the field of economics lead to greater diversity in the set of student interested in the major?
This study

• **Motivation:**
  - Preferences for fields of study are largely formed before college (Buckles, 2019; Patnaik, Wiswall and Zafar, 2020);
  - Experiences, information (and role models) and stereotypes formed/reinforced prior to college enrollment are important.

• **Research Question:** Can providing high school counselors with information about the field of economics lead to greater diversity in the set of student interested in the major?

• **Previous studies on advising by counselors in high school:**
  - Very few: counseling in high school can increase college enrollment and graduation (Barr & Castleman, 2021; Mulhern, 2022);
  - Can it affect/shape students’ majoring preferences?

• **High Potential** for impact at a lower cost than student-level programs.
Texas A&M University is a large land grand university
- over 55,000 undergraduate students
- over 15,000 graduate students
- Primarily from Texas (espec. undergraduates)

Student population
- About 50% women and nearly 30 % URM students
- 22% of students are Hispanic
- TAMU was designated a Hispanic-Serving Institution (HSI) by the Department of Education
Institutional Context

- **Texas A&M University** is a large land grand university
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  - over 15,000 graduate students
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- **The Economics major:**
  - Over 250 students graduate every year with an economics degree
  - About 25% are women, and about 20% percent from under-represented minority backgrounds (primarily Hispanic students)

- **Application process:**
  - TAMU requires students to select two majors at the **application stage**
  - Admitted students enroll at TAMU with a declared major
  - Especially desirable to intervene in high school

The Counselor Workshop Intervention

- In Summer 2019 we selected 234 high schools in Texas (high feeders);
- We randomly selected 120 schools to be our Treatment (T) schools

- Red = T schools
- Black = C schools
- Yellow = TAMU

Gentry, Meer and Serra (Texas A&M)
We invited guidance counselors in T schools to come to TAMU for a **Counselor Information Workshop** about the field of economics;
- One-day workshop on Sep. 6th 2019
- All expenses covered

We emailed counselors and principals a flyer

About 20% of the invited schools sent a counselor to the event
The Workshop:

- 9am to 3pm: Talks about economics from professors, students, advisors, college admissions representatives, undergraduate students.

Main messages:

- Economics is great
- Economics gives you tools that are applicable to many fields/jobs
- Economics is about human behavior
- Economics leads to high earnings
- Which kind of students would love the field and succeed in it
- Not explicit focused on gender or diversity, but undergrads primarily women and URMs.

Sent them home with a poster
Summary Statistics and Balance Tests

- School-level data: school size, average HH income by zip code
- Student-level (applicants to TAMU): gender, race, SAT or ACT score
- Balanced pre-workshop data (2019) for the 120 T schools and 114 C schools

<table>
<thead>
<tr>
<th></th>
<th>N. Enrolled Students</th>
<th>HH Income zip code ($)</th>
<th>Distance to TAMU</th>
<th>N. Applied to TAMU</th>
<th>N. Women Applied to TAMU</th>
<th>N. URM Applied to TAMU</th>
<th>Math SAT Score</th>
<th>% Top Performer</th>
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<tbody>
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<td>2,380.71</td>
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<td>48.20</td>
<td>30.34</td>
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<td>(21,209.48)</td>
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<td>Treated Schools</td>
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<tr>
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<td>(891.83)</td>
<td>(18,822.70)</td>
<td>(80.79)</td>
<td>(71.18)</td>
<td>(32.80)</td>
<td>(20.46)</td>
<td>(48.98)</td>
<td>(0.18)</td>
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<tr>
<td>H₀ : C = T (p-value)</td>
<td>0.923</td>
<td>0.363</td>
<td>0.418</td>
<td>0.843</td>
<td>0.622</td>
<td>0.829</td>
<td>0.637</td>
<td>0.837</td>
</tr>
</tbody>
</table>

- Number of Econ applicants also balanced

Gentry, Meer and Serra (Texas A&M)
Can high school counselors help the pipeline? 10 / 29
Participation rate: 20% (23 Treatment schools)

No differences in observables between attending and not attending schools in 2019 (pre-workshop)

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<th>Math SAT Score</th>
<th>% Top Performer</th>
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<tbody>
<tr>
<td>Schools that Attended</td>
<td>2,335.35</td>
<td>54,989.66</td>
<td>138.02</td>
<td>93.51</td>
<td>45.92</td>
<td>31.87</td>
<td>614.20</td>
<td>0.24</td>
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<tr>
<td></td>
<td>(929.55)</td>
<td>(19,282.37)</td>
<td>(84.28)</td>
<td>(72.39)</td>
<td>(33.18)</td>
<td>(19.88)</td>
<td>(51.05)</td>
<td>(0.19)</td>
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<tr>
<td>Schools that Did Not Attend</td>
<td>2,630.13</td>
<td>55,502.74</td>
<td>112.53</td>
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<td>46.17</td>
<td>27.04</td>
<td>620.20</td>
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<td></td>
<td>(676.97)</td>
<td>(17,138.94)</td>
<td>(61.36)</td>
<td>(67.39)</td>
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<tr>
<td>H₀ : C = T (p-value)</td>
<td>0.155</td>
<td>0.907</td>
<td>0.175</td>
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<td>0.973</td>
<td>0.311</td>
<td>0.600</td>
<td>0.662</td>
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</table>
**Data and Estimation Strategy**

- **Outcome Variable**: Listed Economics as one of the 2 major choices
  - Note: We can only look at students who applied to Texas A&M

- We estimate ITT effects using a difference-in-differences model:
  \[
  Y_{ij} = \beta_0 + \beta_1 A_{ij} + \beta_2 A_{ij} \times T_{ij} + \delta X_{ij} + \lambda S_j + u_{ij}
  \]

- Where:
  - \( Y_{ij} = 1 \) if applicant \( i \) from school \( j \) listed econ as major of choice, 0 otherwise;
  - \( A_{ij} = 1 \) if applied to enroll the year **after** the workshop (2020), 0 if before the workshop (2019);
  - \( \beta_2 \) is our coefficient of interest;
  - School fixed effects and SEs clustered at the school level;
  - Student-level controls: Gender, URM status, dummy for top performer in standardized test (SAT Math or composite ACT).

- Also: LATE using assignment to T as instrument for actual participation (TOT effects)
### Results: The Impact of the Counselor Workshop

<table>
<thead>
<tr>
<th></th>
<th>All (1)</th>
<th>Men (2)</th>
<th>Women (3)</th>
<th>URM (4)</th>
<th>All Top (5)</th>
<th>Top Men (6)</th>
<th>Top Women (7)</th>
<th>Top URM (8)</th>
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</thead>
<tbody>
<tr>
<td><strong>Year 2020 x Workshop</strong></td>
<td>0.002</td>
<td>-0.003</td>
<td>0.008</td>
<td>0.004</td>
<td>0.026**</td>
<td>0.020</td>
<td>0.029**</td>
<td>0.047**</td>
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<td></td>
<td>(0.006)</td>
<td>(0.010)</td>
<td>(0.006)</td>
<td>(0.008)</td>
<td>(0.011)</td>
<td>(0.015)</td>
<td>(0.014)</td>
<td>(0.024)</td>
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<tr>
<td><strong>Year 2020</strong></td>
<td>0.003</td>
<td>0.005</td>
<td>0.002</td>
<td>0.002</td>
<td>-0.006</td>
<td>-0.002</td>
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<td>-0.011</td>
</tr>
<tr>
<td></td>
<td>(0.004)</td>
<td>(0.007)</td>
<td>(0.005)</td>
<td>(0.006)</td>
<td>(0.008)</td>
<td>(0.011)</td>
<td>(0.011)</td>
<td>(0.017)</td>
</tr>
<tr>
<td><strong>Control Mean</strong></td>
<td>0.060</td>
<td>0.086</td>
<td>0.035</td>
<td>0.049</td>
<td>0.080</td>
<td>0.091</td>
<td>0.063</td>
<td>0.071</td>
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<td><strong>Observations</strong></td>
<td>42,439</td>
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<td>2,171</td>
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<td><strong>School-FE</strong></td>
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<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td><strong>Student-level Controls</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td><strong>Clusters</strong></td>
<td>234</td>
<td>232</td>
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<td>234</td>
<td>231</td>
<td>223</td>
<td>219</td>
<td>222</td>
</tr>
</tbody>
</table>

Linear Probability Model (LPM). Robust standard errors, clustered at the school-level, in parentheses. The dependent variable is a dummy variable equal to one if the student was admitted to TAMU and listed economics as their first or second major choice. It is equal to zero if the student was admitted but did not list economics as their first or second major of choice. Student-level controls are: gender, URM status and a dummy for having a top SAT Math test score (in the 25th top percentile).

- 46% increase for top women and 66% for top URM students
- Larger LATE estimates
- Not driven by an increase in the # of top applicants to TAMU
- Similar treatment effects for admissions to TAMU

Gentry, Meer and Serra (Texas A&M) 
Can high school counselors help the pipeline?

13 / 29
We evaluated the impact of a **Counselor Workshop** intervention targeting high school counselors in Texas, through an RCT.

We used admin data on student applications to Texas A&M.

- Students need to list two majors of choice when applying.

**First Findings:**

- ITT estimates show a significant increase (33%) in interest in economics among top students.
- Effect driven by women (46% increase) and URM students (66% increase).
- This led to an increase in top students interested in economics among the admitted students → Potential to impact the pipeline.
In progress and next

- **Fall 2020**: Workshop via Zoom with half the Control set of schools (20% participation rate)
- **Fall 2022**: In-person workshop with the original T schools that did not participate in 2019 (20% participation rate)
- **In progress**:
  - Using TAMU data:
    - Impact of online workshop and new 2022 workshop on applications
    - Use enrollment data to study major at enrollment and at graduation (eventually)
    - Impact on major at graduation?
  - Next - Using the Texas Education Project data:
    - Major choices at other universities
    - Eventually: Labor outcomes.
  - Fundraising

- **In the future (conditional on funding)**: Expand to more schools? Collaborate with college counselor organizations? (TBD)
- **Bonus content**: Online Survey of Counselors

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Gentry, Meer and Serra (Texas A&M)  Can high school counselors help the pipeline?  15 / 29
THANK YOU

dserra@tamu.edu
Why should we care

- Gender diversity leads to better overall performance in **group-based problem-solving tasks** (Woolley et al., 2010; Hoogendoorn et al. 2013)

- Gender diversity in high-earning fields may reduce **gender-based earnings differentials**;
  - Increasing earning differentials between college majors in the past 30yrs

- Gender imbalances in fields of study (and careers) may result in **misallocation of talents** – where individuals are not pursuing their comparative advantages (Hsieh et al., 2019).

- Gender diversity in the field of **economics** may have a significant **impact on economic policy-making**:
  - May et al. (2014, 2018) find significant differences in male and female economists’ views on economic polices and outcomes.
You are cordially invited!

The Texas A&M Department of Economics is hosting a day-long conference to inform guidance and college counselors of the advantages to majoring in Economics. Economics is a valuable field of study that can lead to a multitude of successful career paths.

Travel and meals will be covered, as well as an overnight stay on Thursday, September 5 for one guidance or college counselor per school. Yours is one of only 120 schools in Texas that have been invited to participate - We hope you can send a representative.

Speakers will include Academic Advisors, current ECON graduate and undergraduate students, ECON faculty and staff, College of Liberal Arts and other Texas A&M personnel. Attendees will also receive material to share with colleagues and students.

Please RSVP by July 15th to Mr. Kurt Felpel: kfelpel@tamu.edu
**Why Major in Economics?**

Studying economics helps build analytical skills

Students use Mathematical and Statistical tools to evaluate and analyze behavior

Well prepared and highly competitive for law school, Master’s and PhD programs.

Reasoning skills highly sought after by potential employers

Understand policies and social problems from an economic perspective

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**Careers for A&M Economics Graduates**

- Environmental Economist
- Policy Advisor
- Supply Chain Analyst
- Money Management
- Local/State Politician
- Technology
- Business Risk Management
- Accountant
- Market Research
- Energy Markets
- Actuary
- Lawyer
- Healthcare Analyst
- Financial Advisor
- Cyber Security
- Government
- Actuary
- Transfer Pricing
- International Organizations
- Business Management
- Education
- Non-Profits
- Federal Policy Research Center
- Data Analyst
- Banking
- Commodities Trader
- Energy Markets
- Healthcare Analyst
- Federal Policy Research Center
<table>
<thead>
<tr>
<th></th>
<th>Number Applied to Economics</th>
<th>N. Women Applied to Economics</th>
<th>N. URM Applied to Economics</th>
</tr>
</thead>
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<tr>
<td>Control Schools</td>
<td>5.69</td>
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<td>1.48</td>
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<tr>
<td></td>
<td>(6.93)</td>
<td>(2.83)</td>
<td>(2.01)</td>
</tr>
<tr>
<td>Treated Schools</td>
<td>5.46</td>
<td>1.33</td>
<td>1.23</td>
</tr>
<tr>
<td></td>
<td>(8.62)</td>
<td>(1.97)</td>
<td>(2.01)</td>
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<tr>
<td>$H_0 : C = T$ (p-value)</td>
<td>0.819</td>
<td>0.270</td>
<td>0.345</td>
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</table>

Can high school counselors help the pipeline?
Overall Applications to TAMU

- School-level data
- Dep. variable: Number of applicants from each school

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<th>All</th>
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<th>Women</th>
<th>URM</th>
<th>All Top</th>
<th>Top Men</th>
<th>Top Women</th>
<th>Top URM</th>
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<tr>
<td>Year 2020 x Workshop</td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
<td>(5)</td>
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# LATE: Applications

<table>
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<tr>
<th></th>
<th>All</th>
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<tbody>
<tr>
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<td>0.014</td>
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<td>0.040</td>
<td>0.030</td>
<td>0.123*</td>
<td>0.111</td>
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<td>0.202**</td>
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<td>(0.030)</td>
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<td>(0.030)</td>
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<td>(0.011)</td>
<td>(0.010)</td>
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</tr>
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Results: The Impact of the Counselor Workshop

Similar treatment effects on admitted students

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<td>(2)</td>
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<td>(4)</td>
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<td>(8)**</td>
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<td>-0.007</td>
<td>0.014</td>
<td>0.004</td>
<td>0.026**</td>
<td>0.016</td>
<td>0.034**</td>
<td>0.060**</td>
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<td>(0.008)</td>
<td>(0.012)</td>
<td>(0.009)</td>
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<td>(0.012)</td>
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<td>(0.016)</td>
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<td><strong>Year 2020</strong></td>
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<td></td>
<td>(0.006)</td>
<td>(0.010)</td>
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<td>(0.013)</td>
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<td>(0.021)</td>
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<td><strong>Control Mean</strong></td>
<td>0.056</td>
<td>0.070</td>
<td>0.041</td>
<td>0.046</td>
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<td><strong>Observations</strong></td>
<td>23,370</td>
<td>11,553</td>
<td>11,817</td>
<td>6,316</td>
<td>12,031</td>
<td>6,936</td>
<td>5,095</td>
<td>1,870</td>
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<td><strong>School-FE</strong></td>
<td>Yes</td>
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<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<td>Yes</td>
<td>Yes</td>
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<tr>
<td><strong>Student-level Controls</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<td>Yes</td>
<td>Yes</td>
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<tr>
<td><strong>Clusters</strong></td>
<td>234</td>
<td>232</td>
<td>231</td>
<td>234</td>
<td>230</td>
<td>222</td>
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</table>
Online Survey of Counselors

- Who are these high school counselors?
- What do they know and how do they advise students?
- We implemented an online survey of counselors employed in the 234 schools in Spring/Summer 2021.
  - 1594 counselors were employed in our schools in Spring 2021 (from school websites)
  - We contacted all the head counselors or college advisors (234) and an additional randomly selected sample of counselors from each school (over 1000 invitations)
  - 10-minute survey for $20 gift card
  - 160 counselors filled in the survey, from 102 schools (44%)
Online Survey of Counselors

- Respondents: 38% college advisors, 53% counselors, 10% principals
- Who are they?
  - 81% women
  - 70% white, 16% Hispanic, 11% Black
- Their majors:

![Counselors' majors graph](image)
Online Survey of Counselors

Top 3 student majors by student gender

Percentage of Counselors reporting each major as one of the top 3 choices
By Student Gender (M vs F)

- STEM: M - 98, F - 69
- Business: M - 88, F - 63
- Economics: M - 4, F - 1
- Education: M - 2, F - 0
- Finance: M - 13, F - 5
- Humanities: M - 1, F - 0
- Journalism: M - 0, F - 2
- Psychology: M - 1, F - 40

Gentry, Meer and Serra (Texas A&M)
“In your opinion, what kind of information is most likely to influence female (male) students’ preferences with respect to their desired major?”
“In your opinion, what are the top 3 majors or fields of study in terms of post-graduation wages?”
“In your opinion, what is economics about?”