Economic Inquiry

# YOUNG "STARS" IN ECONOMICS: WHAT THEY DO AND WHERE THEY GO

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*We construct a data set of job flyouts for junior economists between 2013 and 2018 to investigate three aspects of the market for "stars." First, what is the background of students who become stars? Second, what type of research does the top of the market demand? Third, where do these students take jobs? Among other results, we show that stars are more likely to be international and male than PhDs overall, that theoretical and semi-theoretical approaches remain dominant, that American programs both produce the most stars and hire even more, that almost none are hired by the private sector, and that there is a strong shift toward having pre-PhD full-time academic research jobs.* (*JEL* A11, A12, A23, J24)

## I. INTRODUCTION

Of the more than 1,200 new economics PhDs in the United States each year, and hundreds more doing research PhDs abroad, a small handful draw interest from the most desirable academic, government, and private sector jobs.[1] Who are these job market "stars"? Where are they from? What did they study, publish, and write about? Where do they wind up working? Do they all have top publications as students? Are postdocs a prerequisite? What is their gender balance? How have these features changed over time? How do these characteristics differ from the population of young economists at large? Although there is an extensive literature about how the job market for economists works overall (e.g., Cawley 2016; Coles et al. 2010; McFall et al. 2015; Siegfried and Stock 1999), we conjecture, and show, that the market for stars looks quite different.

Why do we care about the unique properties of the market for stars? The fairly rigid hierarchy of economics means that these students likely represent tomorrow's mid-career policy advisors, tenured faculty at top PhD granting institutions, chief economists at IGOs and in the private sector, journal editors, mentors, and drivers of the field's agenda. The nationality, gender, academic background, research taste, subfield of interest, and job preference of young stars today are therefore predictive of the same features at the top of the profession tomorrow.[2]

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1. The NSF Survey of Earned Doctorates shows that between 1,183 and 1,255 PhDs were awarded each year between 2013 and 2016 in the United States, the vast majority of which are research-focused degrees. We are unaware of a count of "research" PhDs internationally, as the standard under which the degree is granted varies widely across countries, and even within.

2. Similarly, scholars of entrepreneurship have begun to focus on ex ante "star" firms, as their impact on economic aggregates is much greater than the modal startup, and furthermore the star startups look very different in terms of their geographic concentration and growth rates (Guzman and Stern 2015).

**ABBREVIATIONS**

AEA: American Economics Association
AP: Assistant Professor
ASSA: Allied Social Science Association
CEMFI: Centro de Estudios Monetarios y Financieros
CERES: Centro de Estudios de la Realidad Económica y Social
CREI: Centre de Recerca en Economia Internacional
CV: Curriculum Vitae
IIES: Institute for International Economic Studies
IO: Industrial Organization
*JOE*: *Job Openings for Economists*
LSE: London School of Economics
NBER: National Bureau of Economic Research
RA: Research Associate
UBC: University of British Columbia
UCL: University College London
USC: University of Southern California



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Our measure of job market stars is derived from the initial public and quasi-public flyout lists at 44 top economics departments worldwide, between spring 2013 and spring 2018. We gather these flyout lists from departmental websites, augmented by individual e-mail queries, such that we have access to roughly 80% of top flyouts during this period. From the universe of students with at least one flyout in our sample—roughly 150 students per year—we focus on the roughly 40 students each year with a sufficiently large number of prestige-weighted flyouts; roughly, a student with flyouts at the equivalent of Chicago Booth, University College London (UCL), Penn State, and Toronto would be just above the cutoff for our final sample. The final sample includes 226 students over 6 years. We prefer flyouts instead of the eventual job accepted because a large part of our study concerns what type of job top students accept, and where. In Section II, we give further details on how the job market for junior economists works, and the extent to which using flyouts to identify stars is reasonable.

For each of these students, we contemporaneously gathered, using CVs, job market papers, and LinkedIn, each student's full academic and employment history, their self-reported primary field, the style (e.g., theoretical or reduced form) of their job market paper, demographic characteristics including gender and citizenship, and any prior publications or requested revisions. After the market concluded, we gathered data on initial job placement. In July 2018, we collected data on which young economists in this sample changed jobs in the interim.

In Section III, we discuss the background of star students. They are more international in terms of nationality, and (much) more male, than the PhD population at large. These students do their PhDs at 44 programs in 33 universities, including 11 universities outside the United States, yet nonetheless the vast majority of star students come from a very small number of departments. Star students nearly all studied economics or a technical field as undergraduates. Though undergraduate studies look similar for American and non-American stars, there is a large gap between the two in whether a master's degree was read before the PhD, and in whether the student worked before returning to academia.

In Section IV, we discuss what star students write. Though they are more likely than PhD students overall to publish during graduate school, about half of star students have no publication or public "revise & resubmit." Theoretical and theory-guided approaches continue to make up the vast majority of job market papers, with little change over the 6 years in this study. In terms of field preference, both Americans and women are nearly twice as likely to have Applied Micro as a primary field compared to non-Americans and men.

In Section V, we examine where star students go. The top 15 U.S. economics departments and top 10 U.S. business schools alone hire 68% of star students. In terms of geography, the fraction of star students who do their PhD outside the United States is *higher* than the fraction who take their first job outside the United States, with limited evidence that this has changed in the past half-decade. Academic inbreeding, where universities hire their own PhD students, is almost unheard of among economics stars. While IGOs, central banks, and policy schools occasionally hire stars, the private sector almost never does. Unlike in the hard sciences, postdocs are very rarely taken by stars before getting a permanent position, although postdocs accepted simultaneously with a permanent job are common. A total of 74% of students who accept a postdoc go to one of only 10 programs, and most top schools hire zero star students as postdocs.

In Section VI, we conclude by discussing which aspects of the "making of an economist" remain underexplored, and offer conjectural explanations of some of the unusual stylized facts discussed above.

## II. THE JUNIOR ECONOMICS JOB MARKET AND THE DEFINITION OF A STAR

In constructing a data set of top young economists, the challenge is in identifying who should be in that sample. The regimented nature of the economics job market offers four possible samples, so let us first describe the nature of the job market for junior economists. Readers familiar with the operation of the market can proceed directly to the "data" subsection below.

Until the 1970s, junior economics hiring was largely by word of mouth. In 1974, the Allied Social Science Association (ASSA) began printing a periodical, *Job Openings for Economists (JOE)* (Coles et al. 2010). For at least the last three decades, junior economics hiring has followed a four-step process. First, PhD students who are "on the market" apply for jobs listed in *JOE* or similar publications,

now largely online. In many cases, PhD-granting departments also prepare internal rankings of students which are communicated, informally or via reference letters, to hiring organizations. Second, organizations offer interviews for these economists at the annual ASSA meeting in early January. Third, organizations interview promising candidates in person at "flyouts." Fourth, offers are made, generally by March, and the market clears after jobs are accepted. In recent years, ASSA interviews have been offered not only by U.S. research universities, but by top universities on all six continents, private sector and governmental research jobs, think tanks, and private sector nonresearch jobs like economic consulting which mainly hire PhDs.[3] Recent changes to the job market largely involve reducing the difficulty of applying for jobs, and reducing information asymmetries via the American Economics Association (AEA) "signaling" mechanism (Bandyopadhyay et al. 2013; Cawley 2016; Coles et al. 2010).

While applications and interviews are largely nonpublic, flyouts are often publicly posted on department seminar lists, and accepted offers are of course publicly viewable on the hired student's vita.[4] This suggests two possible definitions of a "star": those who accept top offers, and those who are flown out to top places. The problem with the former is that one of the questions we would like to answer is where top students take jobs, and using the job accepted as a definition begs the question.

For this reason, our definition of a star is any economist within 8 years of beginning their PhD, who has never had a permanent job after graduating, and who has received a sufficiently large number of high quality flyouts.[5] We begin with a list of the top 25 U.S. economics PhD programs in the *U.S. News* 2013 rankings, then add eight top business schools which frequently hire economists in nonfinance positions, Harvard Kennedy's policy program, and 10 European and Canadian programs which regularly fly out top junior candidates.[6] For each of these 44 programs, we gathered flyout lists from departmental seminar websites each year between 2013 and 2018, and augmented these with e-mail requests to departments which do not post flyouts publicly. The combination allows us to recover roughly 80% of the programs listed above, encompassing nearly 900 students with at least one top flyout. We then assign consistent weights to a flyout at each program, with more prestigious flyouts receiving more weight, and consider a star any student who receives sufficiently many weighted flyouts.[7] Although there are of course differences in tastes across schools, economists famously have "more homogeneous standards of evaluation within, greater confidence in their judgment about research excellence even in other fields, and a higher likelihood to stick together as a group than panelists from other disciplines" (Fourcade, Ollion, and Algan 2015). A relatively homogenous evaluation standard means that flyout lists from schools that could reasonably attract a top candidate if they make an offer form a sort of sample reflecting the profession's overall evaluation of a student's promise. Between 31 and 42 students exceeded this cutoff each year, leaving a full sample of 226 "stars."

Using flyouts rather than interviews has benefits beyond practical data availability. McFall et al. (2015) survey job market candidates between 2007 and 2010, and find that while publicly observable information such as PhD program, field, and publications are highly predictive

3. The global homogeneity in hiring practices at departments that consider themselves part of the international research community is new. As David Colander noted a decade ago, "previously European economists were in large part a collection of rather disparate German, French, Italian, Dutch, British, etc., economists who were primarily trained in their home country in programs that reflected the distinct traditions of their country...[O]ver the last 20 years there has been a concerted attempt by some leaders in the European economics community to develop a more standardized European economics profession that competes favorably with the U.S. economics profession" (Colander 2008). The same pattern has shown itself recently as well for top departments in Asia, Australia, the Middle East, Eastern Europe, and Latin America.

4. Offers themselves are more unusual, as they are highly endogenous. The hiring side tends to move sequentially, with more desirable jobs making offers first, and less desirable jobs later, with the latter only making an offer if the student remains unmatched.

5. The 8-year requirement rarely binds, and merely allows a consistent handling of students whose job title makes it difficult to tell whether their first job was permanent or not. Omitting nonpermanent jobs means that we capture students coming off of postdocs in our data as well as fresh PhDs.

6. We rule out finance jobs since informal data collection for the 2010, 2011, and 2012 market suggests that the finance market often operates completely in parallel to the economics market, with many students who receive very top finance jobs getting no economics flyouts at all.

7. Since most students in the sample easily exceed the cutoff, the exact weighting scheme and the missing 20% data is relatively unimportant in terms of the aggregated analysis in the remainder of the paper. Further details of sample selection are in Appendix A.

of who gets interviews, it is almost entirely unpredictive in terms of who gets flyouts conditional on the interview. That is, flyouts appear to measure students who remain promising even after an important stage of private information has been revealed.

Two remaining worries are that using flyout data to identify stars rules out students who have a primary interest in nonacademic jobs, and students who take jobs without "going on the market." The centralized academic job market helps alleviate both concerns. First, nonacademic employers targeting PhD economists nonetheless advertise on *JOE* and interview at ASSA: in 2015, there were nearly 500 nonacademic jobs posted (Cawley 2016). This means that the marginal cost of applying for academic jobs is low even for students leaning toward governmental or private sector jobs. Students tend to apply widely, to an average of 107 positions for students on the job market between 2007 and 2010, and less than 7% of surveyed students in those years—potential stars or otherwise—stated that a private sector job was their first choice after graduation (McFall et al. 2015). Anecdotally, most students apply to jobs in academia, government, and the private sector simultaneously. There are a small number of students, however, who do not go on the market, in the sense that their job search is outside the centralized structure described above. To further alleviate the concern that we are missing "potential" stars who skip the centralized market altogether, we contacted colleagues in an attempt to find students who *could have*, conceivably, attracted attention from top research universities, but strongly preferred a private sector position. For cohorts between 2013 and 2018, we were able to identify only four such students, all of whom went to the private sector; these students would not be in our sample of stars, but their situation is unusual. Students who have a *preference* for the private sector, and who would consider competing offers from, for example, Michigan, Toulouse, the Federal Reserve, and Google, would still be in our sample since we observe the academic flyouts.

A second related concern is that some top students may obtain jobs without having to fly out to multiple schools. To alleviate this concern, we examined the roster of every active Assistant Professor at the London School of Economics (LSE), UCL, and the top 18 economics departments in the *U.S. News & World Report* rankings. Among those graduating in 2013 or later, only two APs at these departments were not in our larger data set containing any student with at least one top flyout. These two included one professor whose initial placement was in a criminology department, only moving to an economics department 2 years later, and one who was hired directly from a postdoctorate in the same department.[8] Both direct hires and top students interviewing solely on the nonacademic market are therefore very rare, and hence flyouts do appear to accurately track students who *could* draw interest as one of the top young candidates to hire.

### A. Data

For the 226 students who receive top flyouts in our sample, we contemporaneously collect exhaustive data on their background, their research, and their eventual job placement. In particular, we collect the following variables.

*Student Background.* Do they have an undergraduate/first degree major in economics? If not, what did they study? Do they have any master's degrees prior to beginning their PhD? If so, what field is it in? What is their gender? What is their nationality?[9] Did they complete a PhD within 6 years of obtaining their first tertiary degree? Did they work before graduate school, and if so, where?[10] Did they do a postdoc before their year as a "star" on the market, and if so, where? Note that though we observe country of citizenship, we do not observe race so cannot comment of broader issues of racial diversity in star hiring.

8. There were 41 other current APs at those 20 departments who did not pass the cutoff for being a "star" due to a limited number of top flyouts. One may worry that some of these students did "limited searches," applying only to jobs in specific geographic areas. Of the 41, 2 do not appear in our data at all as noted above, 24 have multiple geographically distinct flyouts in our data, and 4 have multiple top finance flyouts which we do not consider, as previously noted. For the remaining 11, the only flyout we track is the job they eventually accepted. That said, examining the CVs of those 11 students shows all 11 gave multiple geographically distinct seminars during the job market year at departments outside the set of 44 schools for which we track flyouts.

9. We use self-reported citizenship when available, which is true for most of the sample. When not available, or when students are dual citizens, we first look for markers of nationality on the basis of scholarships, native language, or the nation of the student's first university degree. There are no ambiguous cases in our sample.

10. As academic CVs often omit this information, we used LinkedIn to identify work histories for students with gaps in their academic progression. In nearly all cases, all but at most 1 year was accounted for.

**TABLE 1**
Country of Origin of Star Students, 2013–2018

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| USA | 80 | China | 10 | United Kingdom | 5 | Mexico | 4 | Denmark | 3 | Hungary | 2 |
| Germany | 20 | Argentina | 9 | Chile | 5 | Canada | 4 | Sweden | 3 | Uruguay | 2 |
| Italy | 15 | India | 7 | Iran | 5 | Spain | 4 | Brazil | 2 | Israel | 2 |
| France | 13 | Russia | 5 | Australia | 4 | Japan | 3 | Romania | 2 | | |

*Note*: 1 each for 17 countries: Albania, Austria, Belgium, Colombia, Hong Kong, Ireland, South Korea, Morocco, New Zealand, Philippines, Poland, Portugal, Senegal, Singapore, Slovakia, Turkey, and Thailand.

*Student Research.* What is their best publication, as of the time they went on the market, if any?[11] What is their primary field of interest? Is their job market paper theoretical, theory-guided, largely empirical with a light motivating model, fully empirical, or experimental? We denote a paper as theory-guided if the primary result of interest is an estimated parameter derived from a formal economic model. This includes fully structural models, calibrated models, and empirical work who interpret their main results via an explicit, detailed, economic model. We call papers empirical if the primary results are correlations, stylized empirical facts, or treatment effect estimates where identification is largely based on statistical features.[12]

*Student Outcomes.* What job did the student accept? Did the student accept a postdoc simultaneously, and if so, where? As of July 2018, has the student changed jobs?

## III. THE BACKGROUND OF STAR STUDENTS

The background of stars in economics is highly international, more male than the PhD student population overall, almost entirely drawn from students with technical undergraduate degrees, and involves radically different pre-PhD paths for Americans versus non-Americans. We consider each of these issues in turn.

The 226 star students come from 40 countries, of which 35% are American, 35.4% are European, and the remainder are from the rest of the world. Table 1 lists the number of star students by country of origin. Restricting to students who did their PhD in the United States, 61% are non-American, slightly greater than the foreign share among all US economic PhD students.[13] Eleven countries produce at least five stars: the United States, Germany, Italy, France, China, Argentina, India, Russia, the United Kingdom, Chile, and Iran. Since we will see that U.S. programs produce the vast majority of star PhD students, one may wonder whether U.S. students are disproportionately likely to become stars. The United States produces 0.245 star students per million residents. This is almost identical to Germany (0.243), Italy (0.248), the Nordic Countries (0.227), and Chile (0.279), and slightly higher than Argentina (0.205) and France (0.194). Among developed countries, Canada and Australia slightly underproduce (four stars each, instead of six and eight if they produced stars per population at U.S. rates), and Spain, Japan, Russia, the United Kingdom, South Korea, and Benelux even more so (4, 3, 5, 5, 1, and 1 stars, respectively, instead of 11, 31, 35, 16, 13, and 7 at U.S. rates).

While the national origins of star students are diverse, Table 2 shows that the PhD program diversity of students is less so. Totally 47% of star students come from only five PhD programs, and 84.5% came from only 11 universities, including students from all programs at those schools. Only 9.3% of stars—21 total—did their PhD outside the United States. That said, the tail is long, and there are many examples of students getting many top flyouts despite coming from a program that does not traditionally produce stars. Forty-four programs at 33 universities produce at least one star between 2013 and 2018, including 11 programs outside the United States. Although we do not formally analyze

11. We note "top 5s" or other publications, coauthored or not, published or simply R&R, giving eight classes of potential publication. We restrict to publications in peer-reviewed internationally known research journals, omitting student publications, book chapters, and the like.

12. In most cases, delineation is simple. A paper is theory-guided if the student motivates empirics by writing down a model and pointing to specific parameters to be estimated which are generated by that model. It is theoretical if data are used only as a motivating example, or a proof of concept.

13. IPEDS data for the years 2013 and 2016 show between 40% and 43% of economics PhD students are either citizens or permanent residents.

**TABLE 2**
PhD Program of Origin, 2013–2018 Stars

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| MIT | 31 | Chicago | 12 | Stanford GSB | 4 | Penn | 2 |
| Harvard | 25 | Northwestern | 11 | Michigan | 3 | Bonn | 2 |
| Princeton | 18 | NYU | 11 | NW Kellogg | 3 | UCSD | 2 |
| Yale | 16 | Columbia | 9 | Minnesota | 3 | NYU Stern | 2 |
| Stanford | 15 | LSE | 8 | UCL | 3 | Texas | 2 |
| Cal | 13 | Harvard Biz | 7 | Harvard Kennedy | 2 | UCLA | 2 |

*Note*: 1 each at 20 other programs: Arizona State, BU, Cal Ag, CEMFI, Chicago Booth, Columbia GSB, Duke, Edinburgh, EUI, IIES, Oxford, Penn State, Penn Wharton, Rochester, Sciences Po, Toronto, Toulouse, Wisconsin, Yale Environmental Econ, and Yale SOM.

data from 2011 and 2012 due to nonstandardized data collection in those years, nor do we analyze 2019 as that job market is in progress at publication time, the data we do retain shows that at least 13 more programs—UPF, Aalto, Boston University, Tilburg, University of British Columbia (UBC), University of Southern California (USC), Maryland, Caltech, Brown, UCLA Anderson, and the Paris School of Economics, Cambridge, and Virginia—would have produced a star as measured by the method in Section II during those 2 years.

It is of course not possible to identify atheoretically whether this concentration means the market is missing ex ante high-quality students. However, a Becker-type discrimination argument would suggest that, conditional on attracting any attention for flyouts at top schools, students from less prominent programs should be flown out more often. Alternatively, you may imagine that conditional on reaching the interview stage, underrated students from less prominent PhD programs will have their quality revealed and hence be flown out at more of the programs that gave them an interview. However, the average star student who did not attend one of the five PhD programs producing the most stars turns out to have 22% *fewer* weighted flyouts (one-sided Fisher exact test: $p < .01$). Looking further down the tail, comparing students outside and within the 11 universities that produce the most stars, students at lower-ranked PhD programs again see 19% fewer weighted flyouts (one-sided Fisher exact test: $p < .01$).

The limited number of stars from programs outside the United States may be due to the fact that non-American PhD cohorts are much less international. Recall that over 60% of stars from U.S. programs are not American, slightly higher than the overall foreign percentage among all U.S. economics PhD students. On the other hand, of the 21 stars at European and Canadian programs, only 1 was not European or Canadian. In the mid-2000s, Colander (2008) reports that 17% of European PhD economics students were non-European, so the stars are even more domestically concentrated.

Turning to gender, only 20.4% of star students are female, a percentage never exceeding 25% in any of the 6 years in our sample. Indeed, despite the attention paid to gender issues within economics at the 2018 AEA meetings, only 7 of 42 star students in 2018, or 16.7%, were female.[14] There is no statistical difference in the gender ratio between American stars, European stars, and stars from elsewhere in the world.

These numbers are substantially lower than the overall percentage of women pursuing economics PhDs, which in U.S. programs range between 30% and 35%, and the overall percentage of female APs, which in U.S. programs ranges between 25% and 30% (CSWEP 2017).[15] Indeed, 20.4% is lower than the 23.5% figure for *all* tenured and tenure-track economics professors in the United States, a figure that includes cohorts who graduated decades ago (Bayer and Rouse 2016).

This large gap between female job market stars and female economists overall is important to explain, particularly since it has some bearing on the infamous "leaky pipeline." As Bayer and Rouse (2016) among others have noted, even within PhD cohorts, the probability a man advances each stage from getting a PhD to getting an Assistant Professor (AP) job to achieving tenure is higher than that of a woman. But note that hiring "filters down": those denied tenure at higher-ranked schools are more likely to remain

14. Although 2019 data is preliminary at publication time, and hence not included in the overall analysis, there is a stark difference in that cohort: 20 of 43 stars, or 46.5%, are female.

15. NSF IPEDS data report between 33.8% and 35.2% female PhD graduates over the past 4 years.

within academia than those denied tenure at less prestigious programs, and we have already seen that those who do their PhD at top programs are more likely to get top jobs. Can some of the difference in female success getting top flyouts when PhD students, and in getting tenured later in their career, simply reflect an idiosyncrasy of economics whereby top PhD programs are unusually male even compared to economics PhDs overall?

Indeed, there is some evidence for this. In the 2018 cohort, among the 11 programs that historically produce the most star students, there are 187 men and 50 women listed on those programs' job market websites. That is, only 21.1% are female. Though we did not track this statistic in previous years, Weeden, Thebaud, and Gelbgiser (2017) note that economics is unusually male-heavy in top programs, with men overrepresented in the top 10% of programs compared to the field at large by a factor of 1.27. Though a pattern of overrepresentation of men at the most and the least elite programs is common across fields, the extent of overrepresentation of men at the top in economics was an outlier in their analysis.

Beyond the simple fact that women are less common at top PhD programs, there are at least two other potential explanations for the low number of female stars relative to their overall proportion among PhD graduates. First, there could be taste-based discrimination against women, conditional on having an identical job paper and curriculum vitae (CV) as a man. Second, women could differ on observables, such as field, publication history, and so on. We return to the latter in the following section, where *even among stars*, there are enormous differences across research styles and fields between men and women.

On the question of discrimination, however, consider how many flyouts women get conditional on being a star. Of the 21, 10 candidates with the most quality-weighted flyouts in our full sample were female, and in every individual year in our data, they made up at least 2 of the top 6. Formally, conditional on being a star, the average woman gets more quality-weighted flyouts than the average man (one-sided Fisher exact test: $p < .05$). As a given candidate can get only one job, the fact that female star flyouts are more concentrated among the same students means that diverse flyout lists do not necessarily imply the same level of diversity in hiring. Further, again applying a Becker-type argument, this differential conditional treatment is consistent with taste-based discrimination against women before information is revealed at the interview stage.[16] We hesitate to make a stronger statement than "is consistent" because the data can also be explained by a policy of top schools to fly out at least two women, or the fact that women are much more concentrated in less technically specialized fields, hence fields with wider demand (a point we will discuss shortly).

**TABLE 3**
Undergraduate Degree of Job Market Stars, 2013–2018

| | Number of Students | % of Group |
|---|---|---|
| First tertiary degree is in economics | 171 | 75.7 |
| (of which, American) | 61 | 76.3 |
| (of which, non-American) | 110 | 75.3 |
| (of which, Male) | 133 | 73.9 |
| (of which, Female) | 38 | 82.6 |
| First degree not economics but in technical subject | 43 | 19.0 |
| (of which, Male) | 39 | 21.7 |
| (of which, Female) | 4 | 8.7 |

Turning to the pre-PhD educational and work background of students, the most striking fact is that job market stars almost universally studied economics or a technical field as their undergraduate degree (Table 3). Over 75% of all job market stars have an undergraduate degree in economics, and nearly 95% have an undergraduate degree in either economics or a technical subject (mathematics, statistics, operations research, physics, or engineering). Specifically, of the 55 star students who did not major in economics, 28 have a degree in mathematics, statistics, or OR; and of the remaining 27, 15 have an engineering or physics degree.[17] Since 12 of the 27 students who did not study mathematics or economics as undergraduates did pre-PhD master's programs in one of those subjects, only 15 students, or 6.6%, become stars without some form of economics or mathematics degree before their PhD.

These undergraduate backgrounds are not terribly different from the overall economics PhD population. Schlauch and Startz (2018) find

16. The only direct evidence of taste-based discrimination in PhD hiring in economics we are aware of is Krause, Rinne, and Zimmermann (2012), who anonymize applications at a European research university and find that, if anything, there was positive discrimination toward women. The caveat, of course, is that the experiment involves one university.

17. Of the remaining 12, 5 studied management, 2 studied international relations, and 1 each studied history and environmental science, history and international relations, political science, social studies, and industrial relations.

**TABLE 4**
Master's Degrees of Job Market Stars, 2013–2018

| | Number of Students | % of Group |
|---|---|---|
| Has master's in economics | 91 | 40.3 |
| (of which, American) | 5 | 6.3 |
| (of which, Non-American) | 86 | 58.9 |
| (of which, Europe/Canada/Australia) | 52 | 59.2 |
| (of which, Asia/Middle East/Africa) | 16 | 45.7 |
| (of which, Latin America) | 18 | 78.3 |
| Has other master's | 24 | 10.6 |
| (of which, American) | 7 | 8.8 |
| (of which, Non-American) | 17 | 11.6 |

that, among 2017 graduates at the top 50 U.S. PhD economics programs, 79% have an economics undergraduate degree, and only 12% did not major in either economics or mathematics. Regardless of the base rate, however, it is striking how rare it is to become a job market star with a nontechnical background; though some of the students above may have double-majored, the paucity of historians or sociologists or philosophers entering graduate economics courses and succeeding at the highest level is quite noticeable. This distribution is even more noteworthy given that undergraduate economics programs are heavily male-tilted, and engineering even more so (at U.S. universities, just over a quarter of undergraduate economics majors are female in the Avilova and Goldin 2018 data).

At the master's level, the most striking fact is the difference between American and non-American stars (Table 4).[18] While only five American stars did a master's degree in economics prior to their PhD, or 6.3%, nearly 60% of non-American stars did one (Fisher exact test: $p < .001$). Among the five Americans with a master's, four of them did one in the United Kingdom (at either Oxford or LSE) and only one read the degree in North America. Similar to undergraduate training, pre-PhD graduate work was also concentrated in technical fields: nine students have master's in mathematics/stats/OR, three in engineering, three have MBAs, two in public policy, two in environmental science, and one each in urban planning, political science, history, economic geography, applied physics, development studies, and computer science.[19] The underrepresentation of related fields like law, history, sociology, or philosophy is again striking. At both the undergraduate and graduate level, economics job market stars are more likely to have studied engineering and pure science than to have studied all social sciences (aside from economics) and humanities combined. Stars are yet more likely to have formal degrees in mathematics.

Beyond education, only 49% of star students spend a year or more outside of academia between beginning university and beginning their PhD, and only 28% spend more than a year (Table 5). Here again, there are large gaps: while half of American stars work for over a year pre-PhD, only 16% of non-American students do (Fisher exact test: $p < .001$). Women are slightly more likely than men to continue their education straight through without working, but the gender difference is not statistically significant.

More interesting is *where* students work pre-PhD. Of the 63 star students who worked full-time for over a year before their PhD, their longest-tenured jobs were in economics research (34), economics consultancy (6), management consultancy (6), finance (6), engineering (3), as a teacher (1), and at a startup (1). For six students, we cannot precisely code the nature of their work-based CV gap.[20] Just as we saw with pre-PhD academic study, pre-PhD work is concentrated in a very small number of fields.

While work as a pre-PhD research assistant is common throughout our data sample, there is a trend in the very most recent cohorts for many stars to have had pre-PhD research experience working directly for academic economists full time. Fifty-seven students have full-time pre-PhD research assistant work on their CV.[21] For cohorts getting their PhD in 2013 and 2014, this Research Associate (RA) work is 100% at nonacademic employers (The World Bank, the Federal Trade Commission, various central banks, Center for Global Development, Brookings, the Urban Institute, the Environmental

18. Recall that American here refers to citizenship, not necessarily to the location of undergraduate or graduate coursework. Note also that the large difference in graduate degree attainment pre-PhD between Americans and non-Americans holds among economics PhD students more broadly (Schlauch and Startz 2018).

19. Numbers do not add up to 24 as two students have multiple non-economics master's degrees.

20. We use LinkedIn to fill in gaps on academic CVs, but for six students, a gap of more than a year remained. We do not break down the jobs of students with 1-year educational gaps because the missing data problem becomes more severe.

21. To compare with Table 5, of these 57, 34 worked as pre-PhD RAs for more than a year and did not work in some other field for a longer period.

**TABLE 5**
Pre-PhD Work Experience

| | Number of Students | % of Group | | Number of Students | % of Group |
|---|---|---|---|---|---|
| No pre-PhD work | 116 | 51.3 | ≤1 year work | 163 | 72.1 |
| (of which, American) | 29 | 36.3 | | 40 | 50.0 |
| (of which, non-American) | 87 | 59.6 | | 123 | 84.3 |
| (of which, male) | 96 | 53.3 | | 133 | 73.9 |
| (of which, female) | 20 | 43.5 | | 30 | 65.2 |

Defense Fund, and CERES Uruguay). In the 2015 and 2016 cohorts, aside from many of these institutional RAs, there is one star student who worked as an RA at the National Bureau of Economic Research, and one at Columbia Law School. 2017 and 2018 look very different: 17 star students in those cohorts worked as an RA at an academic institution, often working directly as a pre-doc for individual economists like Raj Chetty or Susan Athey. Given that our sample of stars includes roughly 40 students each year, 17 star students in 2 years with a particular background that was almost unheard of in previous cohorts is a striking change. We do not have any ability to identify whether this particular type of RA training is simply producing more capable future researchers, or whether it rather is substituting for extra "hidden" years in the PhD which permit more output compared to other job candidates, but the magnitude of the trend makes this worth further investigation.

Finally, and on a related note, Table 6 investigates when star students finish their PhD: 34% complete their PhD within 6 years of their first tertiary degree. Americans are slightly more likely to do so, and men as well, though the differences are statistically insignificant. As seen above, the reasons why Americans and non-Americans do not go straight from their undergraduate to PhD work are very different—Americans work, often as RAs, and non-Americans study at the master's level—but the net effect is that both groups delay going "straight through" from undergraduate study at a similar rate. We unfortunately cannot study the number of years *spent* in the PhD program alone because many CVs elide the exact starting date.[22]

22. This is the same reason why we focus on work experience exceeding a year above; gaps of 2 years are much more identifiable. Unfortunately, questions like "are stars more likely to finish their PhD in five years or to take a sixth?" remain beyond the grasp of our data.

**TABLE 6**
Completion of PhD within 6 Years of First Tertiary Degree

| | Number of Students | % of Group |
|---|---|---|
| All students | 77 | 34.1 |
| (of which, American) | 31 | 38.8 |
| (of which, non-American) | 46 | 31.5 |
| (of which, male) | 63 | 35.0 |
| (of which, female) | 14 | 30.4 |

## IV. WHAT STAR STUDENTS WRITE

We have seen where star students come from and what they do prior to their PhD. We will now show that they work in a variety of fields but that theoretical and theory-guided approaches continue to dominate among star job market papers. There are large gender gaps across fields and paper styles, and to a lesser extent a gap between American and non-American students on these factors. Publications, including revise and resubmits, continue to be far from a necessary condition for success.

Table 7 shows the number of stars by field. Although micro theory is the most common self-described field for stars, when we concatenate subfields into the broad categories of "applied micro," "macro," and "micro and econometric theory," applied micro is the primary field of 45.6% of stars. There is no time trend: indeed, 2018 had the lowest percentage of stars working in applied micro in 5 years. An important caveat is that "applied micro" does not at all mean "reduced form or experimental applied micro"; more on this shortly.

There are large differences in field between male and female stars. Over 67% of female stars have applied micro as their primary field; only 40% of men have the same (Fisher exact test: $p < .005$). This difference is largely driven by the overrepresentation of women among stars

**TABLE 7**
Self-Described Primary Field, by Number of Students

| | Number of Students | (%) | Male | (%) | Female | (%) | American | (%) | Non-American | (%) |
|---|---|---|---|---|---|---|---|---|---|---|
| Applied micro | 19 | 8.4 | 14 | 7.8 | 5 | 10.9 | 9 | 11.3 | 10 | 6.9 |
| Enviro | 3 | 1.3 | 2 | 1.1 | 1 | 2.2 | 2 | 2.5 | 1 | 0.7 |
| Experimental | 1 | 0.4 | 1 | 0.6 | 0 | 0.0 | 0 | 0.0 | 1 | 0.7 |
| Growth | 3 | 1.3 | 3 | 1.7 | 0 | 0.0 | 0 | 0.0 | 3 | 2.1 |
| Monetary | 2 | 0.9 | 2 | 1.1 | 0 | 0.0 | 1 | 1.3 | 1 | 0.7 |
| Development | 16 | 7.1 | 7 | 3.9 | 9 | 19.6 | 8 | 10.0 | 8 | 5.5 |
| Labor | 24 | 10.6 | 17 | 9.4 | 7 | 15.2 | 13 | 16.3 | 11 | 7.5 |
| History | 4 | 1.8 | 2 | 1.1 | 2 | 4.4 | 1 | 1.3 | 3 | 2.1 |
| IO | 24 | 10.6 | 19 | 10.6 | 5 | 10.9 | 15 | 18.8 | 9 | 6.2 |
| Theory | 35 | 15.5 | 29 | 16.1 | 6 | 13.0 | 8 | 10.0 | 27 | 18.5 |
| Metrics | 20 | 8.9 | 18 | 10.0 | 2 | 4.5 | 5 | 6.3 | 15 | 10.3 |
| Macro | 37 | 16.4 | 33 | 18.3 | 4 | 8.7 | 9 | 11.3 | 28 | 19.2 |
| Finance | 6 | 2.7 | 5 | 2.8 | 1 | 2.2 | 3 | 3.4 | 3 | 2.1 |
| Public | 12 | 5.3 | 10 | 5.6 | 2 | 4.4 | 4 | 5.0 | 8 | 5.5 |
| International | 15 | 6.6 | 13 | 7.2 | 2 | 4.4 | 2 | 2.5 | 13 | 8.9 |
| Political economy | 5 | 2.2 | 5 | 2.8 | 0 | 0.0 | 0 | 0.0 | 5 | 3.4 |
| Broad: Applied micro | 103 | 45.6 | 72 | 40.0 | 31 | 67.4 | 52 | 65.0 | 51 | 34.9 |
| Broad: Macro | 68 | 30.1 | 61 | 33.9 | 7 | 15.2 | 15 | 18.8 | 53 | 36.3 |
| Broad: Theory/metrics | 55 | 24.3 | 47 | 26.1 | 8 | 17.4 | 13 | 16.3 | 42 | 28.8 |

in development and labor. On the other hand, in the broad definition of macroeconomics, in which we include growth, monetary, pure macroeconomics, finance, international and political economy, there were only seven female stars over 6 years, representing barely 10% of macro stars in that period. An almost identical difference between American and non-American stars exists, with 65% of American stars working in applied micro, and 65% of foreign stars working in theory, econometrics, or macro (Fisher exact test: $p < .005$). In the American versus non-American case, the difference is driven not just by American overrepresentation in development and labor, but also in industrial organization (IO).[23]

A star's primary field and their paper style may be very different, however. We code all job market papers as described in Section II by whether they are theoretical, theory-guided, empirical with a light explanatory model, purely reduced form, or experimental. Many authors have noted an "empirical turn" in economics over the past two decades. For example, Hamermesh (2013) shows that the fraction of custom-data empirical papers, inclusive of experiments, rose from 4% of articles in the *Journal of Political Economy,* the *Quarterly Journal of Economics,* and the *American Economic Review* in 1973 to 40% in 2011. Unlike many of these results, our delineation of paper styles is careful to separate purely empirical work, primarily concerned with finding treatment effects or other *statistical* or *statistically causal* features of data, from theory-guided work, primarily concerned with estimating an economic model in toto, in estimating specific parameters of an economic model, or in explaining empirical patterns using economic theory.

Table 8 shows job market papers by style. Over 85% of star job market papers are either purely theoretical or theory-guided. There is a slight, yet statistically insignificant, shift away from these more theoretical approaches: for job market stars in the 2013, 2014, and 2015 cohorts, 87.7% wrote a theoretical or theory-guided paper, while between 2016 and 2018, 83.3% did.[24] Nonetheless, at least among job market papers, the "empirical turn" has been minor indeed. Purely experimental approaches, whether in the lab or in the field, remain uncommon, though note that we code a field experiment analyzed in the context of a model as "theory-guided."

As with field choice, there are differences between male and female stars, and between American and non-American stars, but these gaps are much less substantive than the field differences. Women are 30% (8 percentage points) less likely to have a purely theoretical paper, though this difference is not statistically significant. American stars are 125% more likely than

23. The low number of Americans in macro, micro theory, and international among all economics PhD students goes back to at least the 1990s (Stock and Siegfried 2015).

24. Data from this annual table and all other nonreported tables are available on request.

**TABLE 8**
Job Market Paper Styles

| | Theory (%) | Theory-Guided (%) | Light Model (%) | Reduced Form (%) | Experimental (%) |
|---|---|---|---|---|---|
| All | 30.1 | 55.3 | 6.6 | 5.8 | 2.2 |
| Male | 32.2 | 53.9 | 5.6 | 6.1 | 2.2 |
| Female | 21.7 | 60.9 | 10.9 | 4.3 | 2.2 |
| American | 22.5 | 55.0 | 11.3 | 10.0 | 1.3 |
| Non-American | 34.2 | 55.5 | 4.1 | 3.4 | 2.7 |

**TABLE 9**
Best Publication, If Any, By Time Flyouts are Announced

| | Number of Students | % | Male (%) | Female (%) | Not Top 11 (%) | Top 11 (%) | American (%) | Non-American (%) |
|---|---|---|---|---|---|---|---|---|
| Top 5 solo | 3 | 1.3 | 1.1 | 2.2 | 0.0 | 1.8 | 1.3 | 1.4 |
| Top 5 coauthored | 19 | 8.4 | 8.3 | 8.7 | 5.9 | 8.3 | 10.0 | 7.5 |
| Top 5 R&R coauthored | 26 | 11.5 | 13.3 | 4.3 | 14.7 | 8.9 | 12.5 | 11.0 |
| Any top 5 including R&R | 48 | 21.2 | 22.8 | 15.2 | 20.6 | 18.9 | 23.8 | 19.9 |
| Other solo | 9 | 4.0 | 4.4 | 2.2 | 2.9 | 4.7 | 5.0 | 3.4 |
| Other coauthored | 49 | 21.7 | 23.3 | 15.2 | 23.5 | 18.9 | 26.3 | 19.2 |
| Other solo R&R | 4 | 1.8 | 1.1 | 4.3 | 0.0 | 2.4 | 0.0 | 2.7 |
| Other coauthored R&R | 5 | 2.2 | 2.8 | 0.0 | 2.9 | 2.4 | 1.3 | 2.7 |
| Any publication or R&R at all | 115 | 50.9 | 54.4 | 37.0 | 50.0 | 47.3 | 56.3 | 47.9 |
| No publication or R&R | 111 | 49.1 | 45.6 | 63.0 | 50.0 | 52.7 | 43.8 | 52.1 |

non-Americans to write an experimental, reduced form, or "light model" empirical paper than non-Americans (Fisher exact test: $p < .05$).

Publications prior to the job market are not a necessary condition for stars. Table 9 shows the best publication of stars, where "best" is ranked in order from a solo top five publication, to a coauthored R&R in any peer-reviewed journal that would conceivably bear any weight in a tenure decision at a mid-tier department. McFall et al. (2015) show that 27% of all PhD graduates between 2007 and 2010 had a publication when they went on the market. Job market stars appear to publish more—51% have a publication or an R&R.[25] That said, the flip side of this statistic is that half of job market stars have *no* publication or R&R at all, and 80% do not have a top five publication or R&R.

Looking at heterogeneity in publishing, female stars are 32% less likely to have a publication or R&R than men (Fisher exact test: $p < .05$). Non-Americans are slightly more likely to have a publication than Americans, though the difference is statistically insignificant. The fraction of stars with a publication in the 2013–2015 cohorts is almost identical to the fraction in the 2016–2018 cohorts. Surprisingly, there is essentially no difference in publications for stars who come from top programs (in this case, the 11 programs which make up the vast majority of star production, as noted in the previous section) versus those studying elsewhere. That is, the top of the market appears to be able to identify promising students from non-elite PhD programs even without the outside signal of quality a publication represents.

## V. WHERE STAR STUDENTS GO

The two key facts when it comes to where star students go is that American academia remains, by a huge margin, the chosen destination, and that unlike in many other academic fields, postdocs are largely unnecessary for students to get top flyouts.

We begin by looking at the initial job stars accept, in Table 10. To the extent that a student accepts multiple jobs simultaneously, such as a postdoc and a tenure-track job starting the following year, we count the permanent job in that table. A total of 64.2% of all stars take a job at a U.S.

25. Note that we are also stricter in what we code as a publication, ensuring that very low-ranked journals, nonpeer-reviewed journals, student publications, and noneconomics publications do not count.

**TABLE 10**
Initial Job Accepted by Stars, 2013–2018

| | Number of Students | % | Male | % | Female | % | American | % | Non-American | % |
|---|---|---|---|---|---|---|---|---|---|---|
| Top 5 U.S. Econ | 39 | 17.3 | 31 | 17.2 | 8 | 17.4 | 13 | 16.3 | 26 | 17.8 |
| Top 6–15 U.S. Econ | 67 | 29.6 | 55 | 30.6 | 12 | 26.1 | 22 | 27.5 | 45 | 30.8 |
| Top 16–28 U.S. Econ | 33 | 14.6 | 26 | 14.4 | 7 | 15.2 | 13 | 16.3 | 20 | 13.7 |
| Other U.S. Econ | 6 | 2.7 | 3 | 1.7 | 3 | 6.5 | 3 | 3.8 | 3 | 2.1 |
| All top Econ | 145 | 64.2 | 115 | 63.9 | 30 | 65.2 | 51 | 63.8 | 94 | 64.4 |
| Top 10 U.S. b-school | 47 | 20.8 | 39 | 21.7 | 8 | 17.4 | 21 | 26.3 | 26 | 17.8 |
| Other U.S. b-schools | 2 | 0.9 | 2 | 1.1 | 0 | 0.0 | 0 | 0.0 | 2 | 1.4 |
| U.S. public policy | 5 | 2.2 | 3 | 1.7 | 2 | 4.3 | 1 | 1.3 | 4 | 2.7 |
| U.S. government/IGO | 5 | 2.2 | 5 | 2.8 | 0 | 0.0 | 2 | 2.5 | 3 | 2.1 |
| Non-U.S. academic | 17 | 7.5 | 12 | 6.7 | 5 | 10.9 | 4 | 5.0 | 13 | 8.9 |
| Non-U.S. government/IGO | 1 | 0.4 | 1 | 0.6 | 0 | 0.0 | 0 | 0.0 | 1 | 0.7 |
| All non-U.S. jobs | 18 | 8.0 | 13 | 7.2 | 5 | 10.9 | 4 | 5.0 | 14 | 9.6 |
| Private sector | 1 | 0.4 | 1 | 0.6 | 0 | 0.0 | 0 | 0.0 | 1 | 0.7 |
| Academic postdoc | 3 | 1.3 | 2 | 1.1 | 1 | 2.2 | 1 | 1.3 | 2 | 1.4 |

*Notes*: "Top X" rankings based on *U.S. News & World Report* 2018 rankings. "Top 16–28" includes the 16th to 25th ranked schools in USNWR, plus a 26th school since there was a tie at 25, plus Caltech and Dartmouth, two programs with highly regarded research faculty but without a formal economics PhD program and hence no way to be ranked by USNWR. IGO, intergovernmental organization; b-schools, business schools.

economics department, and 47% of stars go to the top 15 departments alone. Another 21.7% accept jobs at a U.S. business school, almost always at a top 10 school.

Among the 194 star students who take jobs at U.S. economics departments or business schools, only eight go to a program outside the top 25 *U.S. News & World Report* economics departments, the top 10 business schools, or Caltech and Dartmouth (unranked by *U.S. News* due to their lack of an economics-specific PhD program): one student each at Georgetown, Rice, University of Illinois–Urbana Champaign, USC, Washington, UC Davis, USC Marshall, and Washington University St. Louis Olin. Note that all students who take a U.S. Econ job therefore take one with high research prestige: idiosyncratic field, location, or school-type preferences are apparently unable to overcome the desire to work at a highly regarded department.[26]

For the 14% of star students who do not go a top U.S. Econ department or business school, 5 (2.2%) go to one of three top research policy schools (Kennedy, Columbia SIPA, and Chicago Harris), 5 (2.2%) go to the World Bank or a Federal Reserve research department, 17 (7.5%) go to a non-U.S. academic position, 1 goes to a non-American government position at the Banque de France, and 4 take postdocs, 1 of which is at Microsoft Research in the private sector. The non-American academic hires are geographically varied, with students going to LSE (4), UCL (2), Oxford, École des hautes études commerciales, Toulouse, Toronto, UBC, Bocconi, Tel Aviv, Hong Kong, Centre de Recerca en Economia Internacional (CREI), Centro de Estudios Monetarios y Financieros (CEMFI), and Institute for International Economic Studies (IIES).

What is notable here? First is the importance of business schools. Including non-US business school hires, just under a quarter of all star jobs are at business schools, making them a critical part of the economics supply side, particularly for Americans.

Second is the near-complete unimportance of the private sector at the top of the job market. The only star student in our sample who went to the private sector went as a postdoc, and has since returned to academia. It is important to remember our earlier caveat that our definition of "star" may rule out a small handful of potentially highly desired students whose preference for the private sector is so strong that they avoid the academic market altogether. Nonetheless, it is surprising, given how many fresh PhDs are hired by firms through the centralized AEA process, that not a

26. Note that we only observe final placements, not student preference, so when a student does not take an elite job, we have no way of knowing whether they had an offer that was turned down or not.

single star student for 6 years running has taken a permanent job in industry, a situation quite unlike that which prevails in biology, computer science, finance, and many other fields.

Third are the other classes of jobs that go completely unrepresented. Governments other than central banks and the World Bank hire no stars. Liberal arts colleges hire no stars (with the possible exception of the hybrid college-university Dartmouth). These figures are quite different from fresh PhDs overall; Siegfried and Stock (1999) found 16% of recent graduates going to the private sector, and 18% to government, and if anything private sector hiring has been rising over time (Stock and Siegfried 2014). The relative role of differences in salary versus prestige or other nonpecuniary job benefits versus continuation value in explaining why some types of jobs attract no stars is beyond the scope of the data here, though if anything government and private sector jobs among economics PhDs overall pay better than academia (Stock and Siegfried 2014).

Fourth is the relative difficulty non-American schools have in hiring stars. Recall that 21 star students did their PhD outside the United States, yet only 18 stars take a job outside the United States. That is, the top of the field is *more* concentrated in the United States at the AP level than at the PhD level. It is not the case that there are completely separate domestic labor markets at the top. Of the 21 stars who did a PhD outside the United States, only three take their first job outside the United States. Another way to put this is that 223 of the 226 stars either do a PhD or take their first job in the United States. Of the remaining three, two did postdocs in the United States, and the third was a visiting PhD student there for a year. There are therefore zero star students, by our measure, who did not study or work in the United States.

Who takes a job outside the United States, then? Of the 18 students who accept a job outside the United States, 11 are from the region (Canada, Europe, or Asia) where they take the job. Of the remaining seven, four go to either LSE or UCL, two are Americans who go abroad to Canada and Italy, and one is a European who goes to Canada. As in the data showing that most stars with a non-U.S. PhD were locals, non-U.S. departments as potential employers also appear to have trouble attracting nonlocal top candidates, with LSE and UCL being possible exceptions.

Academic inbreeding, where universities hire their own students, is incredibly rare at the top of the economics market, despite being widespread in many countries and even at the top of the international market in fields like law (Navarro and Rivero 2001). This is likely to the benefit of the profession since, as Horta, Veloso, and Grediaga (2010) and others have shown, inbreeding lowers the quality of scientific output. Of the 226 stars, only 6 take their first academic job at their home university. On two occasions, a university hired their own student following a Harvard Society of Fellows posting. On three occasions, a business school or policy department hired a student from the same university's economics program (in these cases, at Chicago Booth, Harvard Kennedy, and Stanford GSB). And in only one case, at Oxford, did a university economics department hire their own graduate.[27]

Though the statistics above are for initial placements, we also collected data on who had switched jobs as of July 2018. Nineteen students in our sample had moved on from their initial placement, among which 4 in the 2013 cohort, 9 in the 2014 cohort, 4 in the 2015 cohort, and 2 in the 2016 cohort. Of those, three were postdocs who took full-time tenure-track positions in the United States. One student appears to have left academia and we could not discover his current status. The remaining 15 switched from a U.S. tenure-track academic job to another U.S. tenure-track academic job.

Finally, consider the unusual role of postdocs for stars in economics. Fourteen students, or just over 5%, became a star on the market *following* a postdoc. In many cases, the postdoc was effectively a prestigious fellowship: four stars were Harvard JPAL Prize Fellows, one was at the Harvard Society of Fellows, one was a Harvard Bell Fellow, and two were at SIEPR. Two of the postdocs were the traditional European postdoc for students whose initial degree was 3 years in length. The other four postdocs coming before big success on the job market were at Berkeley, the Chicago Fed, the Becker Friedman Institute, and jointly at Harvard and Berkeley. That is, not only is it not necessary to do a postdoc before being competitive for top permanent jobs in economics, it is in fact rare to do so.

Why does the economics market not use postdocs to help reveal candidate quality before making a tenure-track offer, as is common in other fields? Theoretically, whether postdocs appear depends on the push and pull of two factors. On

27. Note, however, that the "college" system at Oxford is very different than at many other universities, and hence this hire was not by the "same" department.

the one hand, as Tervio (2009) explains, when firms (or university departments) bid on agents whose quality is revealed over time, they do not have aligned incentives to do the socially optimal amount of experimentation. On the other hand, when markets are thin and stars are rare, we can see market timing unravel such that hiring is done inefficiently early, when very little information has been revealed. The relative balance of supply and demand in economics may prevent the first effect from swamping the second, at least at the top of the market where postdocs remain rare.

The story is different when we look at postdocs accepted *after* showing oneself to be a star; 39.4% of star students accept a postdoc or fellowship at the same time as they accept a permanent job (in four cases in our data, a star student accepts a postdoc without accepting a permanent job at the same time).[28] What is intriguing here is that most top economics departments and business schools never take a single star student as a postdoc. Indeed, 74% of the postdocs stars are accepted into only 10 programs: The Chicago Becker Friedman Institute, SIEPR, the Minneapolis Fed, the NBER, the Harvard Society of Fellows, Yale Cowles, Princeton Industrial Relations, Princeton IES, the Princeton economics department, and Microsoft Research. Only four students accepted postdocs outside the United States: two at Cambridge INET, and one each at Toronto Rotman and Bonn.

## VI. CONCLUSION

It goes without saying that the data in this paper generate stylized facts, not casual mechanisms. Whether a student *should* take a postdoc, or whether a university *should* bother trying to recruit a certain type of student, is beyond the bounds of this study. In many cases, base rates for various covariates and sources of causal variation are unavailable, and indeed even defining the relevant base of students "susceptible" to becoming a star is challenging. Nonetheless, when we think about the efficiency of the economics job market, or consider how to achieve certain equity goals, it is necessary to understand the basic facts of how the top of this market operates. It should now be clear that the top of the economics market has a number of surprising features: publications appear to be relatively unimportant, the distributions of gender, primary field, and job market paper style are quite different from the full population of PhD economists, the uses of postdocs are entirely different, and so on. And a decade from now, having data on flyouts will permit the quantitative investigation of what future stars universities may have wrongly passed on, and why. In future research, of course, we ought to understand better why certain research topics and backgrounds are desired by both sides of the market.

The centralized nature of the economics profession, both in terms of the PhD programs and the first jobs of star students, is striking. Prior research has noted how "sticky" the programs at the top of the profession appear to be (e.g., McPherson 2012; Tervio 2011). Tracking students from their initial market through their early career up to tenure can help distinguish efficient sorting from a more sociological explanation (e.g., Burris 2004). In particular, sociologists might see economics hiring as a form of "social closure," as in Max Weber's "The Brahman and the Castes." As Weber (1948) notes,

> *Does this mean that scholarly productivity is irrelevant to the reproduction of academic status hierarchies? Certainly not. There is nothing in the preceding argument that contradicts the notion that most academic hiring decisions are at least broadly consistent with meritocratic principles. The important point, however, is that even the most rigorous application of meritocratic principles in academic hiring still leaves significant room for choice and inevitably calls for subjective judgments of scholarly quality or potential.*

Tervio (2011) finds that almost 80% of the faculty at a top 10 economics department did their PhD in a top 10, compared to 58% in mathematics and 63% in the literature. Podolny (1994) sees hiring from known quantities to be rational among juniors, but argues that when seniors are also highly concentrated, it is a sign that some social process is inhibiting talented researchers who begin outside the core from entering it. In economics, it does appear that senior faculty at some top departments have a more diverse background than juniors. Chicago alone has faculty with PhDs from Oslo, Wyoming, Purdue, and CREST/Paris I, while Princeton has faculty from St. Gallen and Copenhagen. That said, to whatever extent social closure or other forms of irrational path dependence restrict the entry and diffusion of potentially important new

28. This figure does not include "postdocs" taken at the same institution where a tenure-track job is taken, as many schools artificially extend tenure clocks by categorizing their new hires as postdocs in year one.

researchers, we ought to be especially concerned about the process by which the next generation of gatekeepers is chosen. Further investigation into the causal determination of junior economics hiring will prove useful in understanding the extent to which there are remaining inefficiencies or distortions.

## APPENDIX A

Our sample is derived from flyouts to 44 programs, collected via online flyout listings and attempts at recovering flyout listings by e-mail for schools who do not publicly post flyouts. We then assign between 1 and 5 points per flyout, and count a student as a "star" if they have at least 7 points. Students in our star sample have an average of 14, and a median of 11, points, so the exact cutoff for determining a star, and missing data from non-public flyout lists, generally are not critical. We restrict to students within 8 years of beginning their PhD, who have not previously held a full-time, non-temporary, post-PhD job.

In particular, we attempt to collect flyout lists from: MIT, Harvard, Chicago, Princeton, Stanford (5 points each), Columbia, Northwestern, Berkeley, Yale, Penn, NYU, LSE, Booth Micro, Booth Macro, Booth Econometrics, Stanford GSB Economics, Stanford GSB Political Economy (3 points each), Duke, Brown, UCLA, UCSD, Michigan, Wisconsin, Minnesota, Caltech, HBS NOM, HBS Tom, HBS Entrepreneurial Management, Stern Economics, Haas EA&P, Kellogg MEDS, Kellogg M&S, Sloan TIES, Wharton BEPP, Wharton Real Estate, Kennedy Economics, UCL (2 points each), Cornell, BU, Johns Hopkins, Carnegie Mellon, Penn State, Maryland, UPF, CREI, Toulouse, Bonn, Oxford, Toronto, UBC, Yale SOM Economics (1 point each). Note that we do not collect flyout information from finance programs, and we do not collect flyout information from business school programs in years where they do not interview and flyout students from AEA interviews.

An alternative definition of a star would be any student that has four or more flyouts from that set of schools. Since we do not observe flyouts from almost a quarter of the schools, three observed flyouts is equivalent to four flyouts in expectation. In our data, 90.3% of students with three observed flyouts are tagged as a star, and only 13.3% of our stars have fewer than three observed flyouts (meaning they have two flyouts of sufficiently high weighted quality to cross the threshold anyway). This means that 77% of our sample remains the same even if we use a strict "more than N observed flyouts" with no weighting.

Over 900 students have at least one flyout; however, we only collect more detailed information for students above the star cutoff. In early spring, for each student above the cutoff, we examine job market papers, CVs, and student LinkedIn accounts to extract the data listed in Section II. Most data are unambiguous. For citizenship, many students are dual citizens or do not explicitly list citizenship; in these cases, we attempt to uncover their country of origin via Google, and take the country of secondary schooling if possible. For job history, many students have a gap of 1 year or less on their CV, hence we report continuity of education under conditions of no gap in education, and under conditions of one or fewer years of work.

For placement, we check in the fall following the job market which job the student is working, both as listed on their own CVs and on their PhD program placement website. We then confirm the student's job history and any changes as of July 2018; we were unable to trace one student who appears to have left academia.

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