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Hello, as most of you know by now, my name is Yeabin Moon. I am delighted to be here. Thank you for having me. I am pretty excited to have this opportunity. This was my job market paper last year, and I have submitted this paper already. But I’d like to hear some comments from you, since I am building up another project based on this.

Alright. Let’s get started.

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There is a popular column: if you get a PhD, get an economics PhD by Noah Smith. He says economics PhDs get you both good job opportunities, intellectual fulfillment, and the lifestyle of an independent scholar. Nowadays the growing demand in price sector Econ jobs, especially at data science, make this claim even stronger.

As the quote from Dr Siegfried at Vanderbilt suggests, all the statistics point to bright outlook for the economics profession, but Covid situation taught us our profession is not immune to economic conditions. Especially, over the three years, the number of job postings in JOE have lowered more than 14 percent compared to 2019, which raises the question on how the recent graduates’ job market and their career.

There is a long literature on how the entry conditions would affect worker’s careers and how long the effects remain, which coined the term lost generation. But the same studies on economics PhD are rarely known.

So my research question is whether the entry conditions would affect economists’ career over time and their productivity. if yes, I am really wondering what’s the mechanisms driving the permanent effects. To do, I build a theoretical model to evaluate how the entry conditions affect the outcomes of economists, and test the model’s predictions empirically.

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The market for economists is in some sense an ideal setting to study the impacts of entry conditions.

First, there is a well defined market. That is, we have a centralized matching systems based on ASAA meetings every year. Most jobs are posted on Job Openings for Economists or EconJobMarket.org, and most PhD programs post their candidates on the web.

Second, we do not worry about unemployment as much as other fields, although the placement outcomes by occupation vary every year.

Third, the workplace environment is vastly different by occupation from other occupations. Consider academia and private sectors. Workers here are considered high skilled and more than half of people even trained in U.S. are internationals.

Fourth, for economics Ph.D.s, there is arguably one objective measure of productivity which is the number and quality of publications

We economists are very open to advertise ourselves on the web. That is, market candidates or most active economics PhDs did post their CVs on the web, so following ones’ careers and research outcomes are quite accessible. Also, either there are a lot of ranking measures for placements or journals so that it is relatively easier to have a comparison.

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Let’s think about the effect of entry condition. Literature pays attention to the initial mismatch between job seekers and employers when economy goes bad. Hence, the resulting the first job is an important source of explaining the long-term losses. And, how long the effects would remain depends on the ease of switching jobs. That is, switching sectors tend to solve the mismatch problems, and the degree of effects depends on how much options one would have in the labor market. So I am trying to apply this frame to the market for economists. I build up the model to explain what drives the loss especially in the long the run. As I said earlier, this is a good place to do since we have a productivity measure valued by both in academia and in practice. And then, try to empirically test whether the model’s predictions are correct in the short and long run. Tracking individual’s career seems dawning tasks, so I borrow some techniques in data science literature to resolve this issue.

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So here is the preview of my findings.

First, demand for economists is pro cyclical. And, I find the biggest drop comes from the tenure-track academic positions in US.

Secondly, entry conditions do affect the placement outcomes. The recessionary cohorts are less likely to start their careers at the academia. And the ranking of the placements would be affected by the initial conditions for those who start their job at universities. I follow up their work placements over time, and find that the entry effects remain but the degree of effect declined. So I found some evidence for initial mismatch assuming that economics Ph.D.s are research-oriented.

Third, recessionary cohorts did publish fewer journal articles in top 50 journals, and it also happened to those who started their careers at top research university

Lastly, these effects are mostly mediated through lack of mobility. Economists rarely switch occupations in response to economic shocks. I find evidence that one determinant of these switching costs is the development of task-specific human capital.

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Here is what I am going to going to do. I will briefly go over the literature and the contribution. And then I will talk about data preparation. And I will introduce the conceptual framework of the model and and its implications. Then we will talk about the empirics and then conclude the talk.

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As I said, there is a long literature on how entry conditions would affect worker’s labor market outcomes. And an increasing number of studies document that adverse labor market entry has effects on health and other outcomes like marriage, divorce, and women’s fertility. I just name a few.

My work is most close to Oyer’s in 2006. He examined the economists’ career from 7 elite schools focusing on late 1990 cohorts.

My research is different from to Oyers. First, I am trying to understand the broad characteristics of PhDs covering 32 programs. And the cohorts are affected by Great Recession. I employ scarping techniques to analyze employment histories not restricted to academia. Furthermore, my research samples are more female and international and the demand from private sectors increases dramatically. Lastly, I try to test the potential mechanism underlying persistent career effects of initial conditions both theoretically and empirically.

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Next, my research address the human capital development and subsequent career choice.

One of the potential reason for persistent effect of the entry conditions relates to the skill acquisition process.

Consider the recession happened and the workers starts from bad match. Workers spend time at the unfavorable workplace and are forced to develop the skills according to it. Because of this investment, one would stay there even if one has option to switch

This is called task-specific human capital development, which I will talk about it later. My findings support the task-specific approach through analyzing mobility.

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I’d like to talk briefly about data.

The final data set set contains information on Ph.D. students from 32 universities in the United States who achieved the degree from 2004 to 2012. It has name, degree year, university info, employment histories, demographics, and a range of information on dissertations such as advisors or dissertation

classifiers.

The list of individuals are collected from the ProQuest Data base. Demographics, employment histories or other necessary information are collected from the corresponding CV, resume, LinkedIn profiles, and EconLit. EconLit is an online archive database for economics related journals.

For the demand, I collect information from JOE.

Let me explain a little bit of detail of how this works.

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I need some methods to compile all the information in one file. There is no unique identifier for individual or workplace so that matching multiple data entails an advanced steps.

Let’s go back to individuals.

Some departments show the history of job market candidates, but that’s really rare. And most department did not want to share the list of the candidates with me. So I found a different route.

Graduate students are identified from their dissertations posted in the ProQuest database since most doctoral students in the U.S. are required to submit their dissertations to it. ProQuest users have access to the name of the authors, Ph.D. institutions, and other information. So I initially scrape about 6,500 individuals from 32 universities between 2004 and 2012. Using this information, I automated search to collect the CV, resume or LinkedIn profiles on the web, and another search algorithm only for the EconLit to collect publication records. From the CV I further scraped information on individuals which ProQuest does not provide. For example employment histories and bachelor information. From the employment histories, I tried to covert it into the ranking or occupation code.

Compiling all these tasks require some sort of matching algorithm. For example, I need to match Yeabin Moon in the ProQuest to Yeabin Moon in the CV or publication records in EconLit. Also, to convert PhD program or workplace into the rank or occupation, I need to match the name of the program to the rank or occupation code. The problem gets worse since there are lot of variations in names such as Kate, Katherine. Even in the work placements: JP Morgan, JP Morgan Chase, or J.P. Morgan so and so forth. To manage this issues, I use one of the popular techniques in machine-learning literature, which is natural language processing. The name matching is like sentence matching since names consist of multiple strings. That is, it requires vectorizing a name and needs to have a vector search for finding the most similar vectors. For more detailed methods, please see my paper.

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Ok. I’d like to show you some summary statistics for economics Ph.D. The first column shows the overall summary, and the rest of the columns summarize individuals by rank of the PhD programs. Tier 1 consists of top 10 PhD programs in US, tier 2 is 11 to 23, and tier 3 is 24 to 45 based on 2004 econphdnet ranking. I intentionally cut the samples here to divide 10 programs in each bin. Also after the rank 45, it is very rare to be placed at US universities.

According to Oyer’s paper, the female is about 20 percent and more than 60 percent of individuals having US bachelor degree around 1990s, but you can see now there are more females and more international bachelor degrees.

On average, economics PhD publish 1.4 journal articles in top 50 economics journals which is about half compared to 10 years ago. Literature finds that getting published in top economics journals are getting tougher and tougher over time. Also, the number of publication has a positive relationship with the PhD program rank. But this does not necessarily mean that tier 1 has more potential since as you can see the initial placements, tier 1 graduates are more likely placed at research-heavy doctoral university, which is called R1 university.

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How about the demand of economists? I use the number of postings in the JOE as a proxy for the demand since All members of the American Economic Association have a professional obligation to list their job openings in JOE.

So I collect the number of postings on JOE, and it is shown in the blue line on the first panel. X-axis shows the cohort year, and the y-axis on the left presents the relative number postings based on 2004 and right axis presents unemployment rate. I use unemployment one year before gradation to reflect the timing of job market. Right panel dissects the the total number of postings. As you can see the overall patterns look pro cyclical to unemployment and the patterns mostly driven by academic jobs in US. Interestingly the number of postings for top 50 departments look not sensitive to unemployment. But that’s the only case for the top 50 departments.

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Ok. Now I want to talk about theory. A natural starting point for trying to understand the persistent effects of initial labor market conditions is to know the worker’s human capital formation.

As I said earlier, literature find that the first job is essential for the subsequent career, and the recovery from the bad start would largely depend on the availability of switching options.

When we think about mobility of a worker, we need to consider how much one’s experience are valued. Naturally, it would be more costly if one’s skills or experience only applicable to the certain situations.

To understand the persistent wage gaps, Gibbons and Waldman (2006) claim that workers can accumulate both general skills and task-specific skills. Individuals starting to work in recessions likely start at lower-type jobs. So when they got promoted to the higher type jobs, they have not enough high-type skills so it will create the persistent wage gaps compared to the luckier cohorts.

I apply this idea into the economics PhD market here more concretely. For example teaching skills vs research skills that would be dependent on the placements. And those skills are different to either general skills or firm specific skills.

The task specific human capital means the value of human capital depends on the tasks what the workers perform. So considering moving decisions, if the new occupations have the similar tasks, then the task specific human capital will be valued similarly.

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Based on this ideas, I propose a model to explain the mobility of economists. I build the model based on the concept of task-specific human capital proposed by Gibbons and Waldman (2004 and 2006). I modify the model in the following way.

1. The accumulation dynamics is just dependent on experience of the tasks. I do not put more functional assumption on speed and schooling

2. Secondly I follow the definition of occupation. All firms in the same occupation assign the same tasks to the workers. I explicitly add the task weights on each occupation.

3. Third, this is just a follow up the first two. I add the dynamics of task-specific human capital jointly determined by innately ability and labor market experience

4. The resulting model explains the task-specific output is determined by three match qualities: accumulated human capital, natural ability, and firm

5. Lastly I add an assumption onto the the match quality between innate ability and worker to reflect the initial economic conditions

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I provide a verbal overview of the model here and leave the formal representation of the model in the paper.

Following literature, occupation is a collection of firms having the same task. And each occupation differs by the importance of each task. For example, teaching college put more weights on teaching.

The output or productivity depends on how much a worker matched to the occupation and the firm. The occupation match quality comprises two sub qualities. The first part explains how much previous human capital this occupation values. The second part reflects how individual innate ability is matched to the tasks. This term partially captures the occupational preference. And the last part denotes the random match quality between a worker and a firm.

In other words, the output or productivity is determined by how much human capital are matched to the tasks and how much innate ability are matched to the tasks, and the match up quality between the individual and a firm.

In this set-up, when moving into different occupation, the effect of the change in the second terms, the match quality between innate ability and task, seems straightforward. In other words, if the research heavy jobs are available, the switching is an attractive option for research-oriented workers. However, now we need to think about the task tenure. If one’s task is mainly a teaching, then research-heavy task would not be an ideal fit. The model points out that this potential loss from the task-tenure is related to the two factors: how similar (or how different) those tasks are assigned to the workers. It would be more costly if one would face very different tasks. Second, the switching should be made early in their careers because the skill gaps would grow over time

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The model provides the testable implications on the characteristic of human capital for the economists. If economists’ human capital is not task-specific, the markets would be similar to the high skilled industry. If the initial mismatch happened at entry, the workers would solve it by switching, and hence the effect of entry conditions would be away soon. But if the economist’s human capital is task-specific, there are two more cases. Firstly, if the economist’s tasks are specialized (that is, distance between the occupations are large), then they would less likely switch because they might risk losing the human capital developed at the current occupation. If the initial matching is undesirable, the switching will happen early in their careers because of the potential loss of task tenure and switching costs. Therefore, the initial placement effects would be long-lasting. Secondly, if the economists’ human capital is task-specific but the industry is not specialized (distance between the occupation is small), then economists would more easily switch the occupation, and hence the initial placement effects are less likely permanent.

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In literature occupations indicates the collection of firms having the same tasks.

In fact, the occupational codes or industry codes in CENSUS reflect this in part.

But I am looking at the economics PhD market in which worker would work for one or two occupations according to the given industry code.

So I define the new occupation categories based on the tasks hoping that the tasks are substantially different among the occupations. Here are the lists. R1 university, which research-heavy doctoral universities in US, and all other universities in US, research organization or governmental agencies in US, and foreign institutes, and private sectors.

I distinguish this occupations using time usage survey of economics faculties, and analyzing frequency of the words in JOE job descriptions. I found there are significant difference in each category. You can find the further details on my paper.

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Now the second half of the presentation, I want to show what I tested empirically.

I first test whether the entry economic conditions predict the initial placement outcomes. I use the following specification to explore the connections. Department fixed effects capture time-invariant department characteristics which lead to permanent shifts in career paths for the department’s graduates.

Field of study fixed effects, theta, are necessary since e job prospects, and the following career would be dependent on what the new graduates majored in.

The dependent variable is whether the person started to to work at R1 university in full-time. Given that most graduates are research oriented, this dependent variable would indicate whether this individuals are away from the research tasks. I further test the quality of the placements using the rank of the academic placements. And then, I test whether the initial economic conditions would affects individuals occupational choice after the first placements. When analyzing job mobility, I focus on the cumulative status rather than on annual changes, as these variables present little year-to-year variation. I collapse multi waves of the panel into a single cross-section and

estimate the same specification.

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Table 2 test whether the entry economic conditions predict the initial placement outcomes. As I said The dependent variable is whether the individual held a tenure track position in R1 university.

[click]

The negative coefficient on unemployment indicates that, on average, the graduates are less likely to get hired by R1 university when the macroeconomic conditions at graduation are relatively bad. The -0.0214 coefficient on unemployment in the first column implies that when unemployment increases by one standard deviation (2.04 percentage points), the graduates would be 2 percent less likely to hold an assistant professorship in R1 university than it otherwise would have. The coefficient on the female indicator is positive but statistically insignificant but obtaining a bachelor’s degree in the U.S. is associated with a greater likelihood of working in R1 university.

The result in column (1) raises the questions on whether the entry effect would have a heterogeneous impact. So I examine whether the Ph.D. program rankings would lead to a differential effect of entry conditions on the placement outcomes. I convert the program rankings into a categorical variable, tier. Tier 1, tier 2, and tier 3 indicate the top 1–10, 11–23, and 24–45 programs as before.

[click]

In column (2), instead of department fixed effects, I add this variable interacted with unemployment. The coefficients on tier 2 and tier 3 are negative and statistically significant, implying that the graduates from tier 1 programs would have a premium on the academic placements. Note that the coefficients on the interaction terms are positive but insignificant so that there would be no differential effect for the graduates from tier 2 and tier 3 programs.

[click]

While I do not find the effect of being female on the placement outcomes or the differential effect of unemployment onto female graduates’ placement outcomes, the entry condition would have a differential impact on those who achieved bachelor’s degrees in the U.S. In all columns, the coefficient on US bachelor degree is positive and statistically significant, meaning that achieving the U.S. bachelor’s degree would have an advantage over those who earn the degrees outside the U.S.

In column (4), the coefficient on the interaction term further presents that the entry conditions would have less impact for U.S. degree holders.

The second panel tests the total effects of the entry condition on those who having US bachelor degree. It fails to reject the null, and hence the entry conditions would not affect US degree holders’ academic placements. The coefficient on unemployment captures the total effect on international degree holders. It is not surprising given that the graduates from the U.S. institutions would be better prepared for working at the U.S. institutions such as possessing language skills or their visa status. Also, the economic downturn would make international students try to find jobs outside the U.S. Therefore, the entry conditions would have differential impacts.

[if some one asks on tier effects, ask them to see the effect of tier is too large to tell whether the entry conditions would have a differential impact]

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I now focus on academic careers and test for the effect of entry economic conditions on the quality of the placements for those who start their careers at R1 research university. Note that higher the rank means low quality institution.

I found the similar findings here. The positive coefficient on unemployment indicates that, on average, the graduates are more likely placed at the low-quality university in R1 when the economic conditions at graduation went bad, and the relationship is significant at 5 percent level. An increase in 1 standard deviation in the unemployment rate increases the placement ranking by 12.3 on average. In paper, I find that , faculties in doctoral universities tend to spend more time in research than non-doctoral universities, and similar patterns are observed within the doctoral universities.

So From Table 2 I find that the entry conditions would negatively affect the placement outcomes at R1 university. Given that most graduates are research-oriented, the bad entry conditions would result in an occupational mismatch. Table 3 further presents that the quality of the placement even within the R1 university placements is also lowered by the bad economic conditions. Note that faculties in more prestigious institutions tend to spend less time teaching. It would imply that the adverse labor market would result in the task mismatch even within R1 university compared to good entry conditions.

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Next, I test whether the entry economic conditions predict one’s career trajectory. The model predicts that one would not likely switch the occupation if one developed task specific human capital. Since I find the occupational mismatch in the beginning during the economic downturn, it is natural to ask whether the affected individuals would stay at their initial placements. I use the same specification to examine whether one works at R1 university 5 and 9 years after graduation as an extension of the previous findings.

[click]

Comparing the coefficients on unemployment between columns (1)–(3) in Table 4, it shows that the entry economic conditions have a negative and statistically significant effect on the R1 placement at the moments, but the magnitude declines over time compared to the impact on the initial placement. It might imply that graduates would switch occupations from the initial placements, but it would not be enough to overcome the mismatch driven by the entry conditions. I would not find the heterogenous effects of program rankings.

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Next, I turn to analyze the effect of entry conditions on the economists’ productivity. I approximate the economists’ productivity using the cumulative number of publications in top economics journals. Here I further include the labor market experience fixed effects, tau, where ‘exp’ represents the number of actual years of experience. It is necessary to pick up the average effect of experience on the outcome variable here.

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The main measures of research output for academic economists are the publication records. Success in academic jobs is mainly dependent on the number of publications. Most economics departments in doctoral universities place high value on quality publications, and tenure decisions would be based on the number of publications on the top journals. The dependent variable here is the cumulative number of articles published in the top 50 economics journals.

The first four columns use the full samples. The negative coefficient on unemployment in column (1) indicates that, on average, the individuals are less likely to publish the articles when entry economic conditions worsen, and the estimate is significant at a 5 percent level. The -0.0213 coefficient on unemployment implies that an increase in 1 standard deviation in unemployment rate at graduation would result in 2.31 percent fewer publications for the graduated cohorts. The negative coefficient on being female is not surprising since literature finds that female workers would underachieve in academic careers in which long-term human-capital investment is required

I further examine whether the ranking of the Ph.D. programs would lead to heterogeneous effects of entry conditions on the publication outcomes. As before, I add the categorical variable tier and interact with the unemployment rate in column (2). The magnitude of the coefficient on unemployment is about 3.7 times larger in absolute value and statistically significant at any level. Both tier 2 and tier 3 graduates publish fewer journals than tier 1 graduates on average, and the coefficients on interaction terms imply that the entry conditions differentially impact them. In other words, the entry conditions

would mainly affect the productivity of the graduates from the tier 1 programs compared to other tier graduates. In column (3), I examine the differential effect of the entry conditions on the female graduate’s publication records. Female graduates would publish fewer publications than male graduates, but the interaction term is positive and statistically significant at any level. It would imply that the entry conditions would mainly affect the productivity of the male graduates compared to female graduates. I find no differential impact of having U.S. degrees on the publications.

Columns (5)–(8) examine those who started their careers at R1 university using the same specification. I find similar findings compared to columns (1)–(4), but the size of the coefficients on unemployment increases in absolute value.

In columns (2) and (6), I find that the entry conditions would mainly affect tier 1 graduates’ publication records. One possible explanation is that placements in R1 are very tough for graduates in tier 2 and tier 3 programs. Hence, if the individuals from tier 2 or tier 3 programs were landed at academic placements during the bad economic times, they would be outstanding students.

In other words, the dire economic conditions would positively select the best students from tier 2 or tier 3 programs, and their publications records would represent their qualities in part. Therefore, the entry conditions would not lower their publication records compared to tier 1 graduates.

The findings are in line with the model’s predictions. Column (1) presents that the bad entry conditions would lead to a loss in economists’ research productivity over their careers. Table 2 shows that the entry conditions would result in an occupational mismatch at the beginning. The model predicts that if economists develop task-specific human capital, occupational switching would be costly. So, even if the bad conditions would make them start at the undesirable occupation, they would not be likely to switch, and hence, the effect of mismatch would remain in the long run. Column (5) indicates that entry conditions would lead to productivity loss even to those placed in R1 university. Some might argue that those who started their careers at R1 university during bad economic times would be positively selected. However, the finding in column (5) would confirm my model. Table 3 presents that the entry conditions would lead to lower quality placements in R1. The lower-quality institutions tend to require more teaching load to their faculties, and hence the human capitals the recessionary cohorts accumulate would be different from or undesirable from the surrounding cohorts who started at R1 university. The academic profession would discourage early switching than any other occupations economists possibly could work. Hence, the bad entry conditions would have left permanent effects on the economists’ careers, as the model predicts

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The mechanism driving the permanent effect of entry conditions in the model is the job mobility of individuals. Workers tend to solve the initial mismatch problem by switching jobs. I argue that economists acquire task-specific skills in the occupations, making the economists unwilling to switch occupations.

I analyze the transition probabilities from the initial occupation to ‘the occupation nine years after graduation’. I select two cohorts from the good and bad times each to see whether the patterns are notably different. Panel a summarizes the whole samples, panel b summarizes the good cohorts, and panel c summarizes the bad cohorts. In every occupation, more than 64 percent of individuals stay at the initial occupation 9 years after graduation. It is unusually high rates compared to other U.S. workers or inflexible markets such as the Netherlands. I do not find notable differences between the cohorts, and it might imply the switching patterns are hardly dependent on the entry conditions for economists. In paper, I further test whether the entry economic conditions would affect one’s mobility decision, and the results are inline with my model.

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In the analysis above, I assumed that the macroeconomic conditions at the time of graduation represent an exogenous labor demand shock. That is, I assume the average quality of graduates who enter the market is not systematically associated with the economic conditions. Note that the five years of study is arguably the norm of the economics Ph.D. programs. My data allows me to examine whether graduates adjust their timing of graduation to labor market conditions partially.

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The dependent variable is an indicator of whether one studies longer than five years in Ph.D. programs. The estimates in all columns except column (2) present that the entry conditions would not affect graduation timing on average. In column (2), instead of department fixed effects, I add the categorical variable tier and create an interaction with unemployment. Then, the coefficient on unemployment is positive and significant at the 10 percent level. It might imply that the entry conditions would lead to delay in the

graduation. And, the joint F-tests to examine whether the total effects are equal to zero for tier 2 and tier 3 graduates show that they are less likely to get affected by the entry conditions. Although the t-tests for both interaction terms are not significant, it raises the concern on whether the entry conditions would only affect tier 1 graduates, It makes sense intuitively because the extra years of study are costly for the Ph.D. programs, and therefore only selected programs could provide this opportunity to their students.

If the individuals in tier 1 programs would have options to delay graduations, the quality of graduates from the tier 1 programs would be associated with the entry conditions. To test this conjecture, I re-run all the regressions using the samples without the individuals from tier 1 programs, but I found that the result is not much different from the original regressions.

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There are some limitations.

The research is based on the individuals’ C.V. or resume, which is entirely subjective. It is possible that those who post a complete C.V. would be more successful economists. Also, the research has inherent attrition problems. However, assuming that those missing individuals are less likely successful, I believe my findings would provide the minimum effects of the entry conditions on the economics Ph.D.’s career and productivity. To conclude, the transition from education to the labor market in a recession would threaten the economists’ careers. Their occupational outlook would not be more

promising than surrounding cohorts, and the productivity loss is expected on average.

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THANK YOU