A Gender Agenda

or

From the Lab to the Field to Policy

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Vertical Gender Segregation

- Gender differences in labor market outcomes persist despite significant female educational advances
- Vertical segregation particularly striking with high-ranking positions primarily held by men

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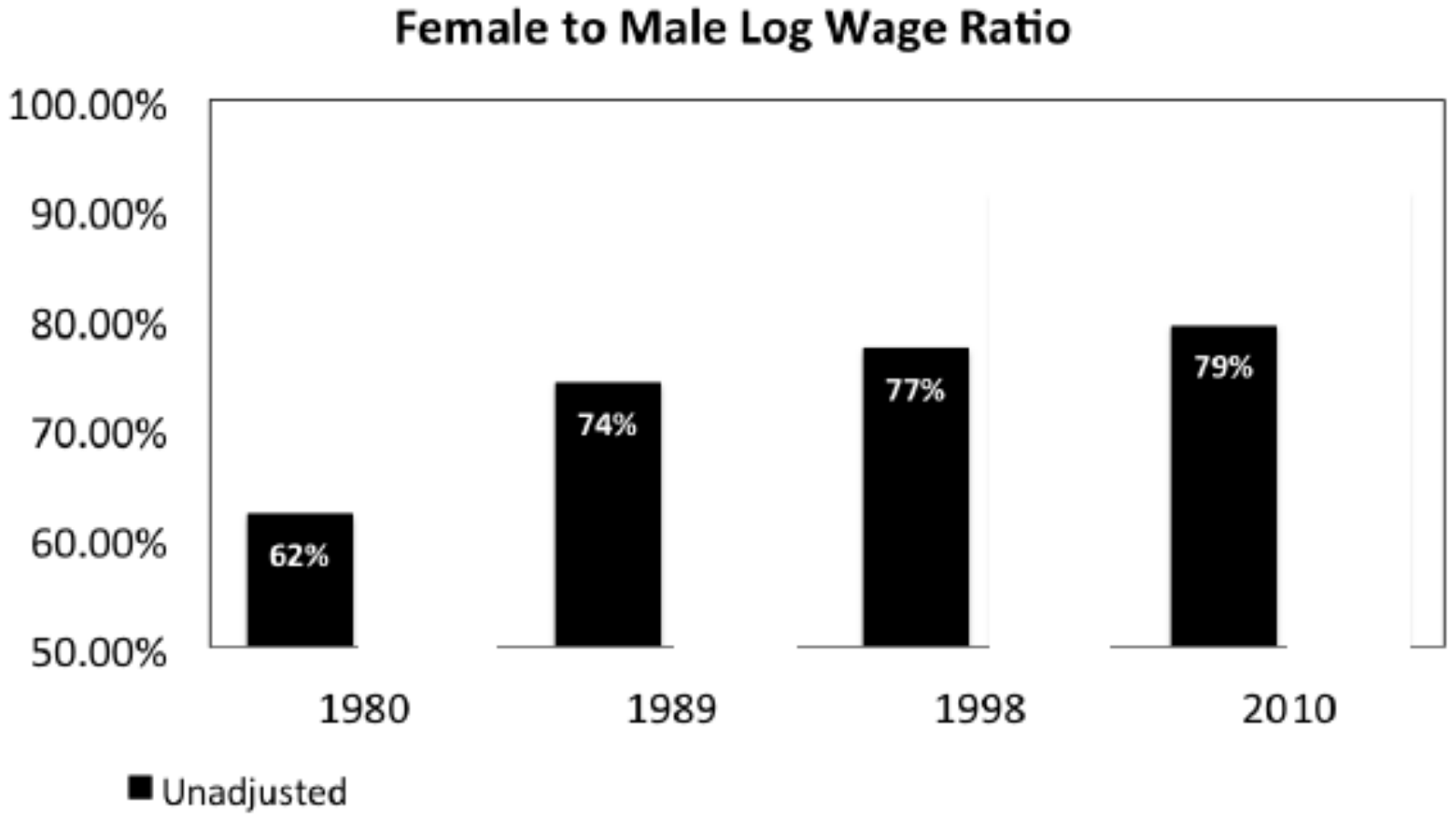
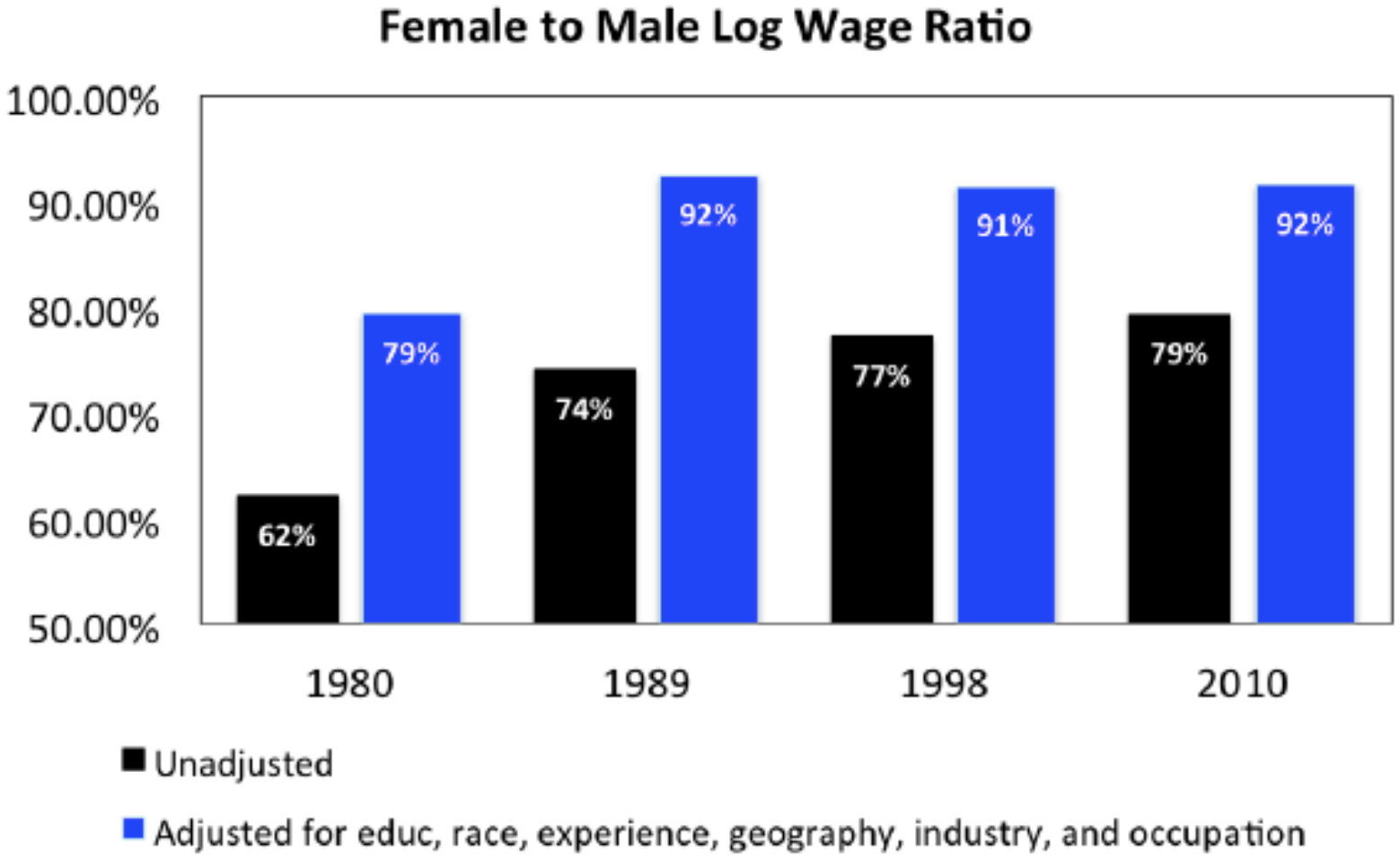
Corporate World

- 30% of MBAs at top-tier business schools are women
- US firms: women account for 2.5% of 5 highest paid executives
- Fortune 500 companies: women: 3.6 % of CEOs, 14 % of executive officers, and 16 % of board directors.
- EU: fewer than 14 % of board members are female

Earnings: Good news: Overall Gap has decreased (Blau and Kahn, 2016)



Earnings: Unclear news: Unexplained Gap persists (Blau and Kahn, 2016)



Horizontal Segregation: Education

Gender Differences in STEM education

- Europe: When given a choice: Girls often opt for less math intensive study profiles (Austria, France, Netherlands…)
- U.S. Schools: Girls take as many math classes as boys (Goldin et al, 2006) but are underrepresented among extremely high achieving math students (Ellison & Swanson, 2010).

Horizontal Segregation: Education

Gender Differences in STEM education

- Europe: When given a choice: Girls often opt for less math intensive study profiles (Austria, France, Netherlands…)
- U.S. Schools: Girls take as many math classes as boys (Goldin et al, 2006) but are underrepresented among extremely high achieving math students (Ellison & Swanson, 2010).
- College: Women in Science and Engineering (S&E) in US
  - Women are less likely to receive a BA in S&E:
    - 29% of female BA are in S&E compared to 38% of males.
    - Among equally gifted students girls are less likely to choose math heavy majors (Weinberger, 2005; for evidence on schools see Favara, 2012).
  - Percent of Women in S&E declines as degrees become more advanced
    - BA: 50%, PhD: 41%, Top 50 PhD: 38%, Stanford: 32%

Explaining Vertical and Horizontal Gender Segregation

Standard Explanations for labor / education differences

- Discrimination
- Differences in abilities
- Differences in preferences

Competitiveness

- Competitiveness: new behavioral trait
  - Design, Robustness
- Economic Relevance of Competitiveness
  - Can competitiveness predict education choices?
  - Can gender differences in competitiveness help account for gender differences in education choices?
- Behavioral Market Design: Policy Implications
  - Some institutional designs may reward competitiveness more than others
  - Unintended consequences for the gender gap in education choices
  - Reexamine effect of Quota-like Affirmative Actions
    - Gender gap in competitiveness may be reduced in single sex tournaments, affecting the costs and benefits of implementing quotas
  - Impact of Affirmative Action on performance
    - France implemented Affirmative Action at the top club level in 1990

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- Gneezy, Uri, Muriel Niederle, Aldo Rustichini, "Performance in Competitive Environments: Gender Differences", Quarterly Journal of Economics, 2003.
- Niederle, Muriel, and Lise Vesterlund, "Do Women Shy away from Competition? Do Men Compete too Much?," Quarterly Journal of Economics, August 2007, 1067-1101.
- Niederle, Muriel and Alexandra H. Yestrumskas, "Gender Differences in Seeking Challenges: The Role of Institutions", February 2008.
- Niederle, Muriel and Lise Vesterlund, "Gender and Competition", Annual Review in Economics, 2011, 601–30.
- Niederle, Muriel, Carmit Segal, and Lise Vesterlund, "How Costly is Diversity? Affirmative Action in Light of Gender Differences in Competitiveness" Management Science, 2013.

- Buser, Thomas, Muriel Niederle and Hessel Oosterbeek, "Gender, Competitiveness and Career Choices," Quarterly Journal of Economics, August 2014, 129 (3): 1409-1447.
- Fuchs-Schuendeln, Nicola, Muriel Niederle and David Yang "The impact of Education Design on Gender Differences in Outcomes" (in progress)
- De Sousa, Jose and Muriel Niederle "The impact of Affirmative Action on performance: The case of Chess" (in progress)

- Niederle, Muriel, "Gender" Handbook of Experimental Economics, second edition, Eds. John Kagel and Alvin E. Roth, 2016.
- Exley, Christine, Muriel Niederle, and Lise Vesterlund, "Knowing When to Ask: The Cost of Leaning In", working paper, 2016
- Coffman, Exley, Niederle "Taste-Based Versus Statistical Discrimination," WiP, 2016.

Establishing gender differences in competitiveness

Development psychology:

Boys spend more time at competitive games while girls play games with no clear endpoint.

Men describe themselves to be more competitive.

In a leveled playing field where choices have monetary consequences:

- Are there gender differences in competitiveness?

Establishing Gender Differences in Competitiveness

Advantages of experiments

- Control or use self selection issues.
- Measure performance.
- No issue of discrimination, or believed discrimination.
- No issue of “career concerns” or “time commitment”.

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- Control or use self selection issues.
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- Easy to replicate and check for robustness
  - Coffman and Niederle (2015)
  - Coffman, Niederle and Wilson (2017)

"Do Women Shy Away From Competition? Do Men Compete Too Much?"

(Niederle and Vesterlund, 2007)

80 college students from U. of Pittsburgh and CMU

- Groups of 2 women and 2 men perform a real task multiple times under different compensations
- Performance of others not known until end of experiment
- No mention of gender

Want to observe selection into competitive environments.

To observe selection into tournaments: Ideally have a task with little gender difference in performance.

Add up 5 two-digit numbers for 5 mn: Performance is the number of correct answers.

21	35	28	79	83	

Benchmark Performances

Task 1- Piece Rate:

50 cents per correctly solved problem.

Participants receive no feedback.

Task 2 – Tournament:

Groups of 2 men and 2 women (gender not mentioned)

The participant who solves the most (correct) problems in the group receives $ 2 per correct problem.

Other participants receive no payment.

Participants receive no feedback.

Task 3 Choice

Choose compensation scheme for the next 5-minute addition task:

- Piece Rate: 50 cents for each correctly solved problem
- Tournament: Performance is compared to task-2 tournament performance of the other participants.

  If the participant has the highest performance she or he receives $2 for each correct answer, otherwise no payment.

Individual decision making task: Choice of a participant does not impose externalities on any other participant.

Predicted Choices

In Task 3: participants decide whether to perform under a piece rate or under a tournament.

Given task 2 tournament performance:

- 30% of women and 30% of men could gain from entering the tournament.

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Who enters?

Predicted Choices

In Task 3: participants decide whether to perform under a piece rate or under a tournament.

Given task 2 tournament performance:

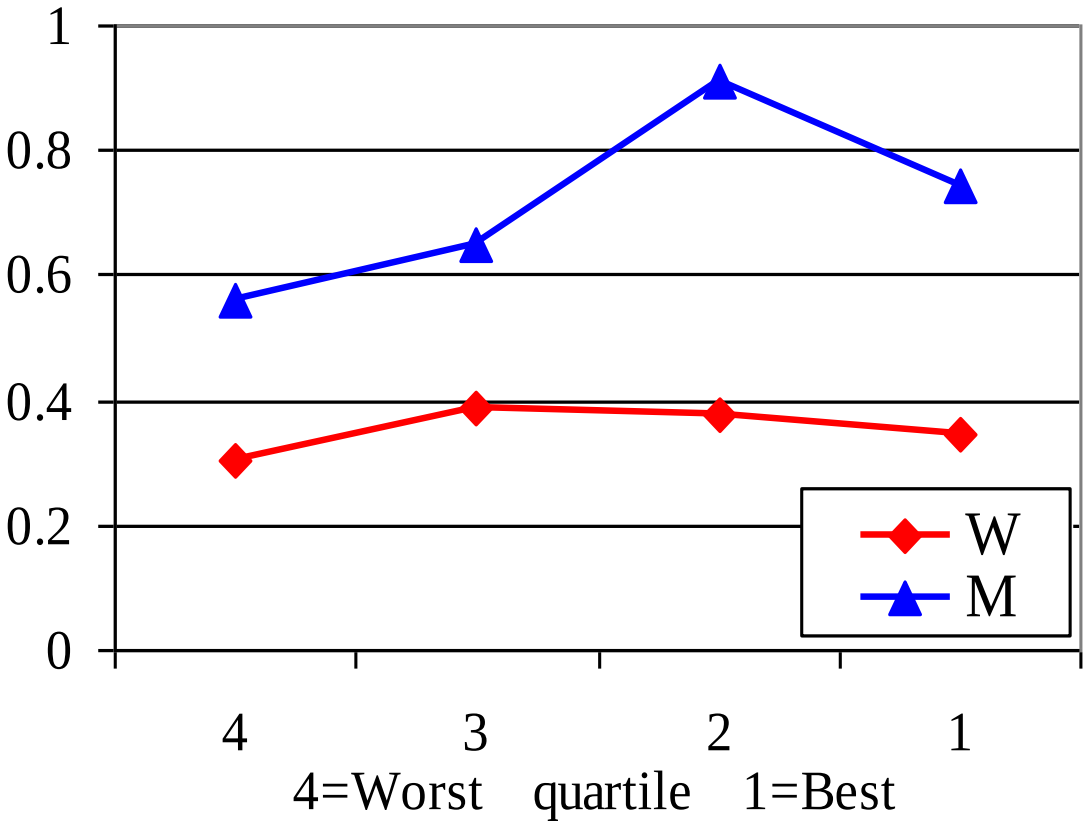
- 30% of women and 30% of men could gain from entering the tournament.

Who enters?

35% of Women and 73% of Men

Does performance predict entry?

Proportion of participants who enter the tournament for each performance quartile



- Performance does not predict entry for Women, weakly for Men
- Significant gender difference in tournament entry

What can Account for Gender Differences in Competitiveness?

Gender Differences in Confidence:

- Tournament decision is driven by *relative* performance, participants only know absolute performance.
- Is the decision driven by participants' beliefs about their relative performance?

Gender Differences in Risk Aversion:

- The tournament is not only more competitive but also more risky.
- Can gender difference in risk aversion account for the gender gap in competitiveness?

Beliefs on Tournament Performance

Participants guess their rank in the Task 2 tournament
Receive $1 if guess is correct.

	Men		Women	
Rank	**guess**	**wrong**	**guess**	**wrong**
1				
2				
3				
4				
Total	40		40	

Beliefs on Tournament Performance

Participants guess their rank in the Task 2 tournament
Receive $1 if guess is correct.

	Men		Women	
Rank	**guess**	**wrong**	**guess**	**wrong**
1	30		17	
2	5		15	
3	4		6	
4	1		2	
Total	40		40	

Men are different from women in their belief formation.

Beliefs on Tournament Performance

Participants guess their rank in the Task 2 tournament
Receive $1 if guess is correct.

	Men		Women	
Rank	**guess**	**wrong**	**guess**	**wrong**
1	30	22	17	9
2	5	3	15	10
3	4	2	6	5
4	1	1	2	1
Total	40	28	40	25

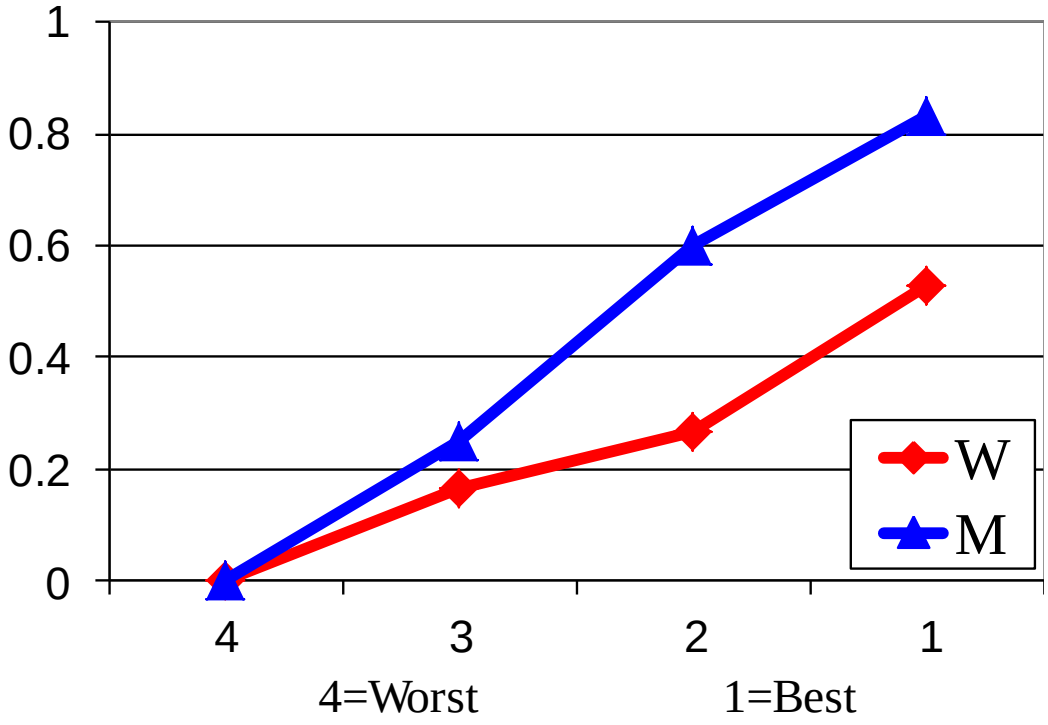
Men are different from women in their belief formation.

Why do Women shy away from Competition?

Can the overconfidence of men (compared to women) account for the gender difference in tournament entry?

Beliefs and tournament entry

For both, women and men, better beliefs predict more entry into the tournament



Conditional on beliefs, women enter the tournament significantly less than men.

What else can account for Gender Differences in Competitiveness?

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The Role of Risk Aversion

Several Approaches all point to a small role of risk aversion:

1. Task Similar to tournament entry but without competition: No gender differences in choices once we control for performance and beliefs
   - Submit piece rate performance to a piece rate versus tournament payment
2. Measures of risk aversion:
   - Including measures of risk aversion only slightly reduces the gender gap in tournament entry
3. Tournament entry where the task is to roll a dice (Grosse and Riener, 2010)
   - No gender differences in tournament entry

Why do Women Shy away from Competition?

Women decide not to enter tournaments because of

- Gender differences in Competitiveness
- Lack of confidence in one's ability (accounts for about 1/3 of the total effect)
- Only minor effect: Aversion to feedback about tournament performance and Risk aversion.

Robustness of the initial lab finding

Niederle and Vesterlund (2011)
Niederle (2016)

Lots of evidence: gender gap in tournament entry when controlling for performance, beliefs and risk aversion.

Replication:

Replication of NV 2007 (up to 2014)

- Papers with minor modifications: similar results: 13 (+ 3)
  - Cason, Masters, Sheremeta (2010), Healy and Pate (2011), Balafoutas and Sutter (2012), Balafoutas, Kerschbamer and Sutter (2012) Dargnies 2012, Kamas and Preston (2012) Mueller and Schwieren (2012) Price (2012), Cadsby, Servata and Song (2013), Niederle, Segal, Vesterlund (2013), Almas et al. (2014), Buser, Niederle and Osterbeek (2014), Dreber, von Essen and Ranehill (2014), Lee, Niederle and Kang (2014), Wozniak, Harbaugh and Mayr (2014) Sutter and Glaetzle-Ruetzler (2015).
  - Exception:
    - Price (2010): no gender difference in preference for competition, or beliefs in relative competitive performance.
- Different designs, also have circumstances where Women enter Tournaments less than Men (12)
  - Gneezy, Leonard and List (2009), Kamas & Preston (2009), Vandegrift and Yavas (2009), Ertac and Szentes (2010), Dohmen and Falk (2011), Booth and Nolen (2012), Cardenas et al (2012), Kamas and Preston (2012), Mayr et al (2012), Shurchkov (2012), Gupta, Poulsen and Villeval (2013), Andersen et al (2013).

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Replication: √

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Is Competitiveness Important?

Does competitiveness have ***external relevance***?

- Can competitiveness help account for vertical and horizontal job segregation?

Correlate laboratory measure with behavior outside of the laboratory:

- Can competitiveness account for (gender differences in) choices of STEM/math?

Gender, Competitiveness and Career Choices

Buser, Niederle and Oosterbeek, 2014

- Does Competitiveness correlate with educational choices?

- Can Gender Differences in Competitiveness help account for gender differences in educational choices?

The Environment: Dutch Schools System

Dutch secondary school: 20% of kids: pre-university track.

- After 3 years in pre-university track: (grade 9) kids choose one of 4 study profiles for the next 3 years.
  1. Nature and Technology: NT: MATH
  2. Nature and Health: NH: BIOLOGY
  3. Economics and Society: ES: ECONOMICS
  4. Culture and Society: CS: LITERATURE

The above is also the order of prestigiousness, math and science intensity.

Profile Choices by Gender

	NT	NH	ES	CS
Boys	43	17	35	5
Girls	23	26	32	18

Netherlands stats: Profile Choices differ by gender.

Debate to abolish CS as it attracts many girls, and seems like a trap. Resolution: leave it for now.

The environment

- 4 schools in and around Amsterdam
- In each school: all the 9th grade kids participate in the experiment.
- 397 students in total
- For 362 we have all the data (experiments plus grades plus profile choice)
- Experiments in March, April and May 2011
- Profile choices: End of June 2011

Experimental Design

Competition Measure a la NV 2007:

- Four 2-digit number for 3 min.
- Paper and pencil. 3 rounds: No feedback.
- Payment of one round selected randomly at the end, paid a week later (at which time they may learn their rank in the tournament.)

- Piece Rate, Tournament, Choice
- Compete against 3 random classmates.

Experimental Design

Confidence:

- Guess Round 2 Tournament rank: € 1 if correct

Risk Assessment:

- Choose one of 5 options
  - € 2 for sure, of 50/50 gamble of: 3 or 1.5; 4 or 1; 5 or 0.5; 6 or 0.
- "How do you see yourself: Are you generally a person who is fully prepared to take risks?"
  - 0: Unwilling to take risks, to 10: Fully prepared to take risks"

Experimental Design

Subjective Mathematical ability

1. Rank in Mathematics in their year. 1: best 25% - 4: worst 25%
2. "How difficult is it for you to pass the math class" 0: very easy, to 10 very hard.

What profile do you plan to select in June?

"Which profile do the best students select"

Administrative data received in the summer:

- Grades of Students
- Study profiles of students.

Descriptive Statistics of Boys and Girls

	Boys	Girls	Diff. *p*-value
GPA (1-10)	6.76	6.97	0.01
Math grades (1-10)	6.67	6.59	0.64
Math relative (0-1)	0.38	0.37	0.88
Math difficulty (0-10)	3.41	4.18	0.01
Math quartile (1-4)	1.97	2.25	0.00
Number of Observations	177	185	

Boys and Girls: academically similar,

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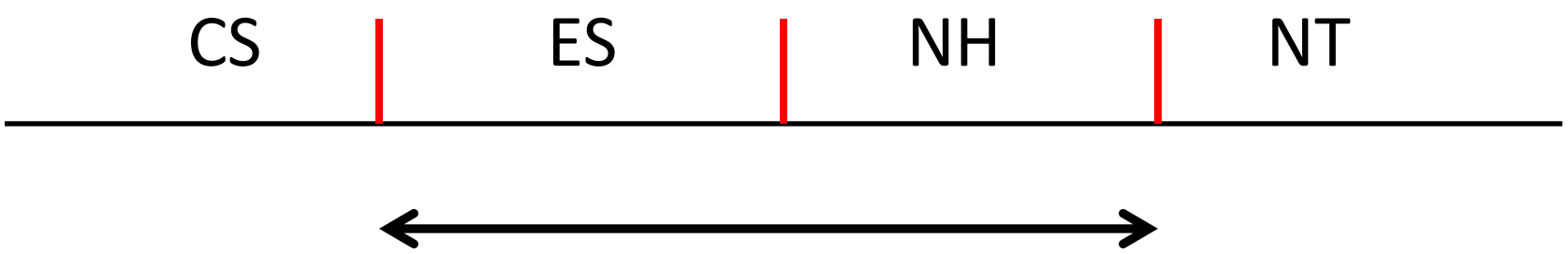
Profile Choices			
Math (NT)	0.40	0.17	
Biology (NH)	0.12	0.36	
Economics (ES)	0.39	0.32	
Literature (CS)	0.08	0.15	0.00
Number of Observations	177	185	

Boys and Girls: academically similar, different choices

Gender Differences in Academic Track Choice

- What is the role of gender in academic track choice?
- Run Ordered Probit Regression on Profile Choice, using: CS < ES < NH < NT
  - Literature < Economics < Biology < Math



Distance between choosing the most and least prestigious profile

Gender Differences in Academic Track Choice

Using ordered probit regressions:

- Being female bridges 15 to 22 percent of the distance between choosing the most and least prestigious profile
- To overcome the “being female” effect, it requires more than a standard deviation increase in GPA

Experimental Measure of Competitiveness

- 49% of boys and 23% of girls enter the tournament
- Controlling for performance […]: Boys are 23 percentage points more likely to enter competitions than girls are.
- One third is driven by gender differences in beliefs: Gap of 16 pp remains
- Another 20 % by gender differences in risk attitudes: Final gap of 12 pp

External Relevance of Competitiveness

- Does Competitiveness correlate with study profile choices?

- Can Gender Differences in Competitiveness help account for gender differences in educational choices?

Competition and Career Choices

Competitiveness: Non-cognitive skill that

- Significantly correlates with choices of study profiles, after controlling for grades and feelings of mathematical ability.
- The coefficient is up to 130% of the size of the coefficient on gender.
- 0-1 Tournament entry is (in general) slightly more predictive of study track choices than 0-1 gender is.

Can Competitiveness help Account for Gender Differences in Career Choices

Can 0-1 tournament entry account for gender gap in track choices?

- Controlling for competitiveness reduces the gender gap in profile choice by 20 % when accounting for grades, and objective and subjective math ability.

External Relevance of Competitiveness

- Does Competitiveness correlate with study profile choices? YES
- Can Gender Differences in Competitiveness help account for gender differences in educational choices? YES
- What is the role of risk aversion and confidence (beliefs in tournament rank) in accounting for the effect of competitiveness

Competitiveness
Net of Confidence and Risk Aversion

Controlling also for confidence & risk attitudes reduces the role of competitiveness only a little

- Instead of accounting for 20% of the gender gap in track choices,
- Competitiveness accounts for 16% of the gender gap in academic track choices.

Confidence only

Measure of Confidence:

- Guessed Rank in the Task 2 tournament

Controlling for objective and subjective academic ability:

- Confidence is not correlated with prestigiousness of study profile choice

Risk Aversion only

- Students who opted for a more risky lottery enroll in more prestigious study profiles.
- What fraction of the gender gap in choices can risk aversion account for?
  - 16%
  - Only the lottery choice predicts education choices
- Effect of Risk aversion: less robust (and not always significant) in alternative specifications where it ranges from 6 to 18 percent.

Risk Aversion or Competitiveness ?

Competitiveness and risk attitudes are almost orthogonal.

- What fraction of the gender gap in choices can they account for?
  - Competitiveness only: 20%
  - Risk only: 16%
  - Competitiveness and Risk: 33%

Competitiveness in the Field

Competitiveness:

- An important factor in educational choices
- Can help account for the gender gap in choices

Bridge the gap between laboratory experiments and the field:

- Use outcome measure of a lab experiment to predict outcomes outside of the laboratory.

Establish ***external relevance*** of competitiveness.

Competitiveness and Education Choices

Similar findings by

Almås, Cappelen, Salvanes, Sørensen, and Tungodden (2016):

– Competitiveness predicts college track choice in Norway

Buser et al (2016):

– In Switzerland: competitiveness predicts choices of more prestigious tracks

External Relevance of Competitiveness

Reuben, Sapienza, Zingales (2015):

Chicago MBA's:

- Tournament Experiment a la NV 2007
- 2/3 men and 1/3 women enter tournament.
- Earnings two years later

Yearly earnings: First Job

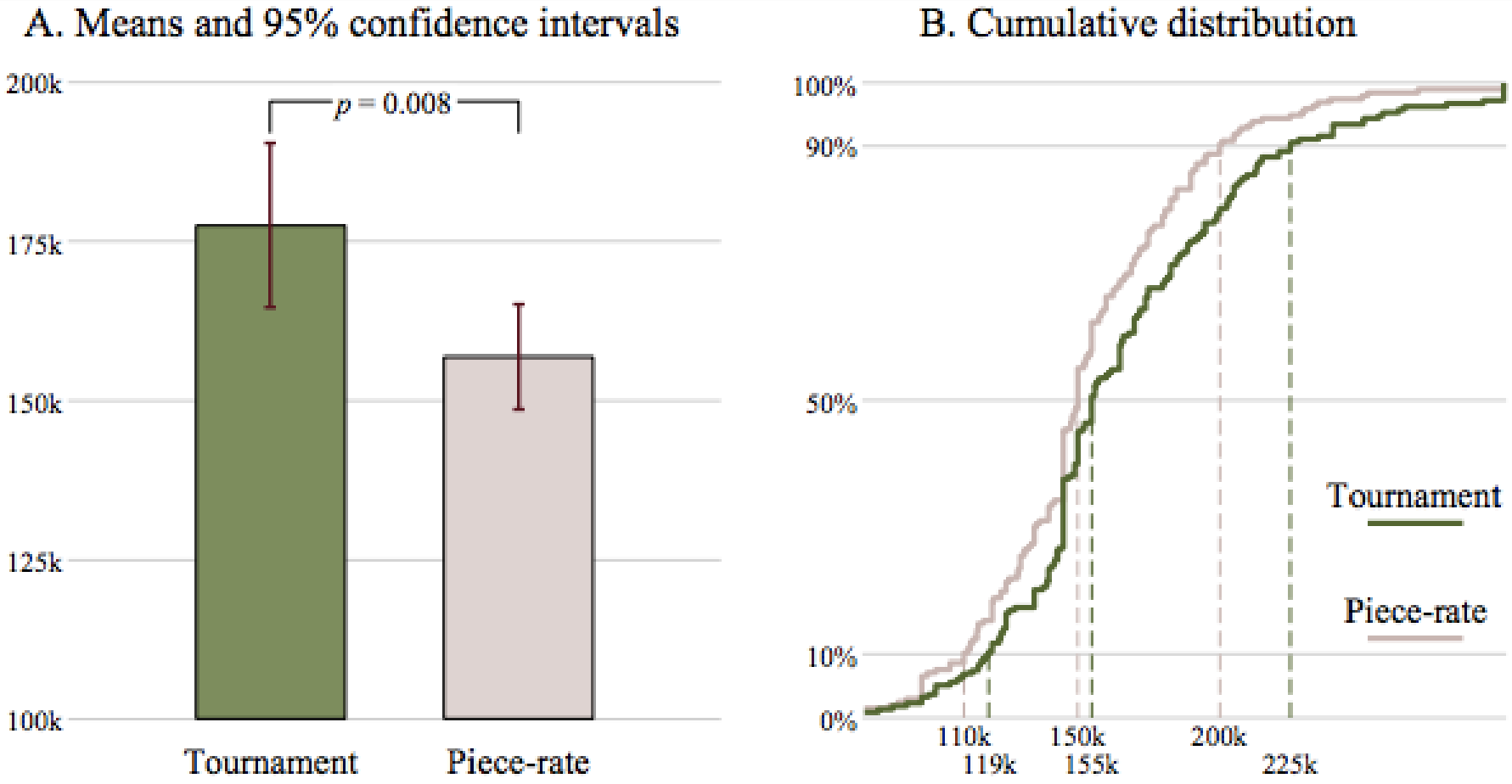


Figure 2 – Total yearly earnings in the first job after graduation by payment scheme choice

External Relevance of Competitiveness

Reuben, Sapienza, Zingales (2015):

- Competitive individuals earn 9 log points more (around $15k more per year)
- Effect is comparable in magnitude to the effect of gender.
- Competitiveness accounts for 10% of gender gap in earnings (about $ 2K)

External Relevance of Competitiveness

External relevance of competitiveness:

- Kamas and Preston (2015): college students in two US colleges who are competitive (and confident) earn more
- Berge, Bjorvatna, Pires and Tungodden (2015): "Competitiveness in the lab, successful in the field" business entrepreneurs in Tanzania
- Zhang (2015) competitive students in China take more exams.

External Relevance of Competitiveness Buser, Niederle & Oosterbeek, in progress

Liss panel: representative Dutch sample.

- In 2017: Questionnaire by 5268 LISS members (86%), can be linked to registry data.

Competitiveness:

- How competitive do you consider yourself to be? 0: 'not at all' to 10: 'very'.

Risk:

- How do you see yourself: Are you a person who is generally willing to take risks, or do you try to avoid taking risks? (scale from 0 to 10)

Confidence:

- Hypothetical task performance (adding up 5 two digit numbers for five minutes. How well do you think you would perform compared to other participants? In particular, compared to 10 randomly selected LISS panel members, do you think you would come 1st, 2nd, 3rd, . . . , 10th?
  - Hypothetical tournament entry question

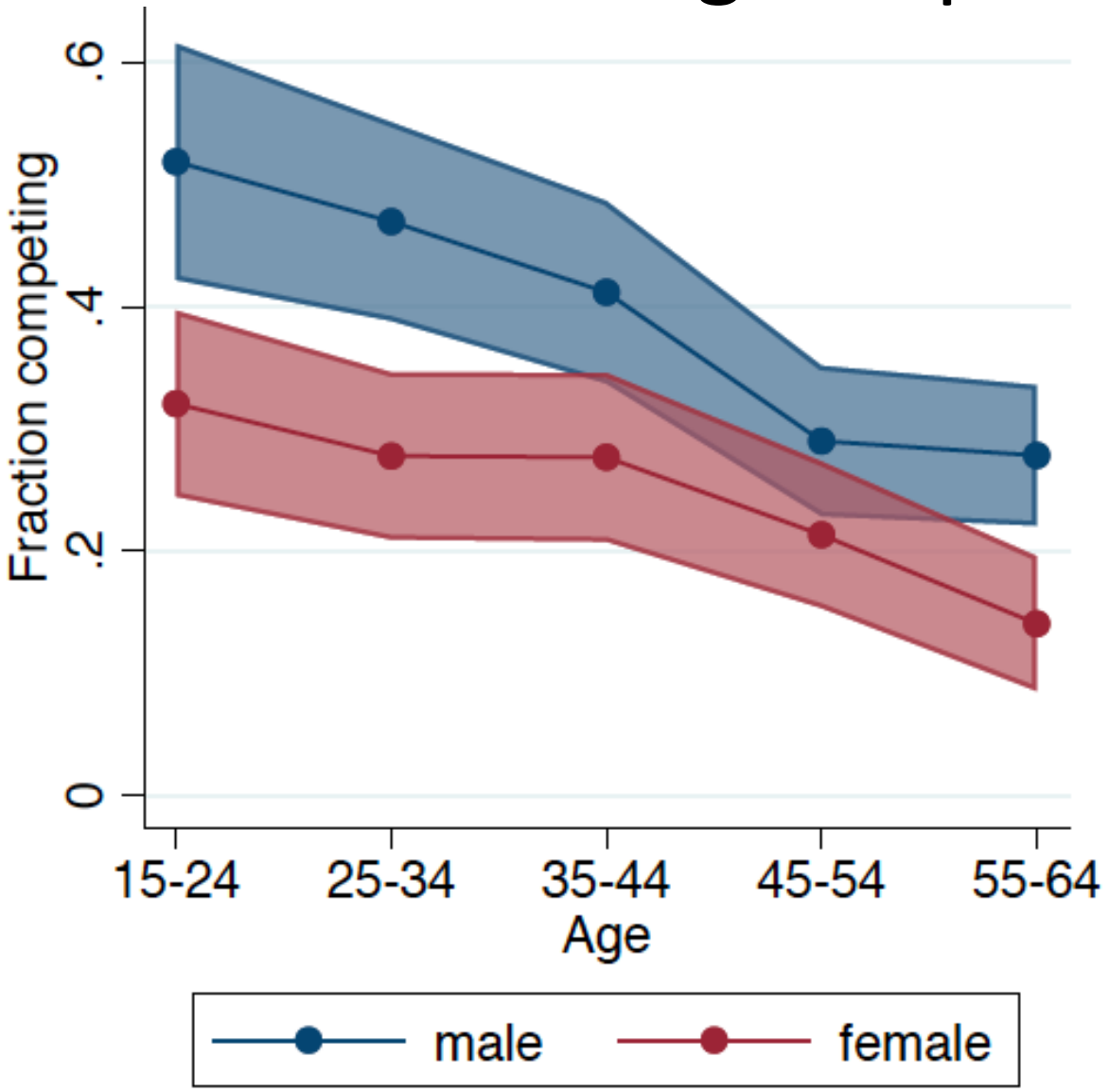
In 2018, a random subsample of 1680 respondents: experiment a la NV (2007).

- 3 rounds, 2 person competition, 40 cents piece-rate pay and 80 cents tournament pay, competition in round 3 is against current performance of randomly selected other participant).
- Task: In a 3x3 matrix of two-digit numbers, find the two numbers that add up to 100. Two minutes per round.

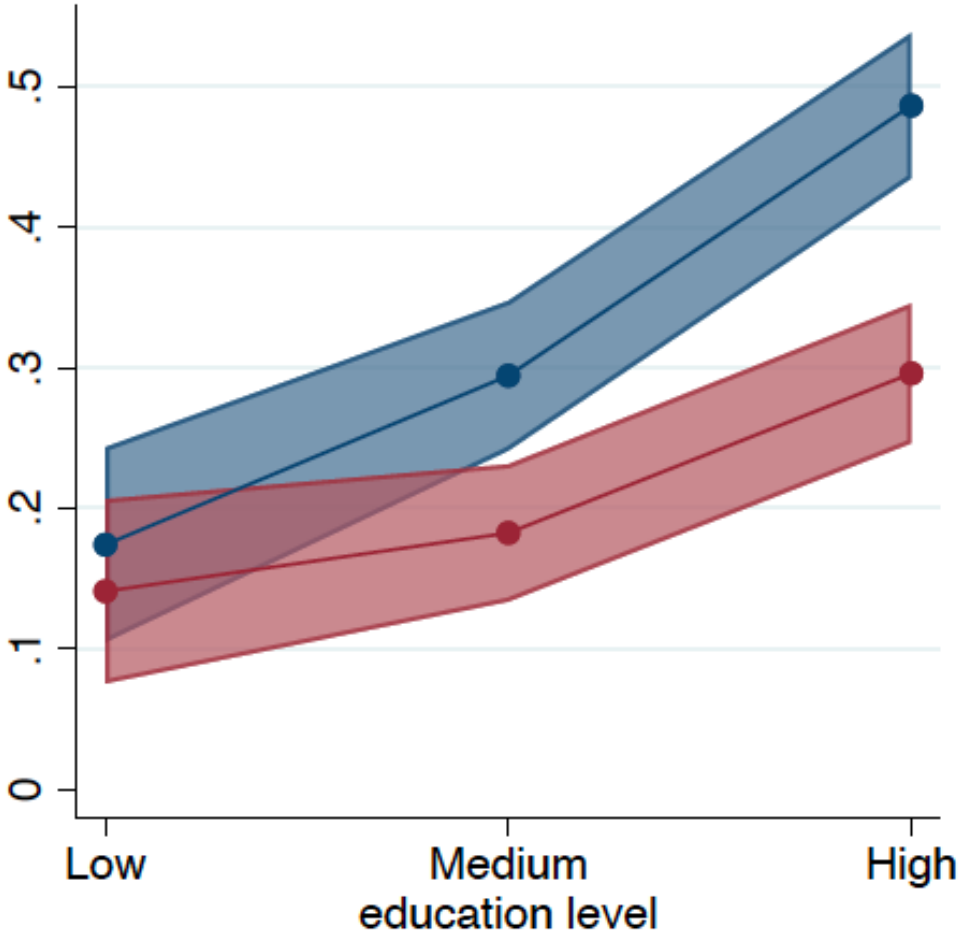
1. Competitiveness over the ages, education level

2. Correlation with income, holding a management position and college education.

Competitiveness and Age: Experiment



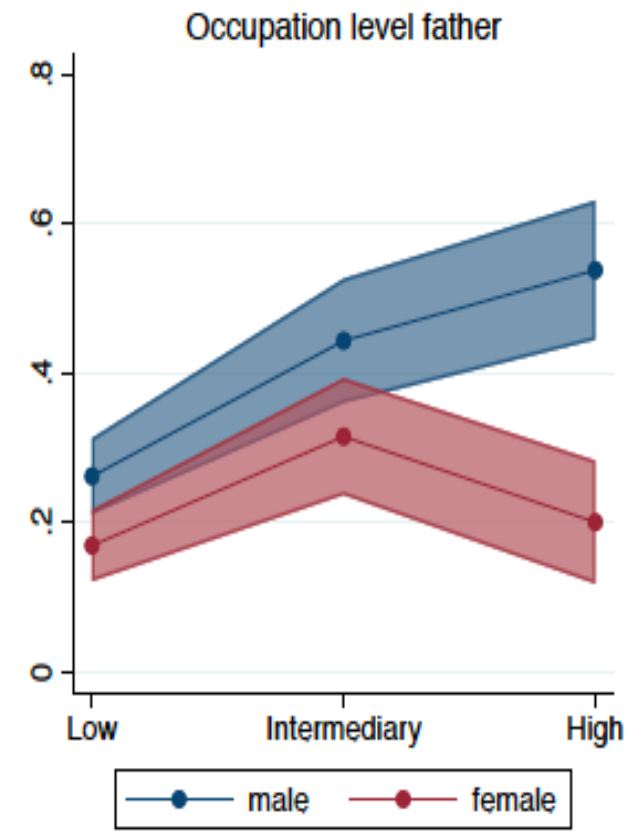
Competitiveness and Education: Expt



Controlling for age. Sample: age above 25

Occupation

Father



Education

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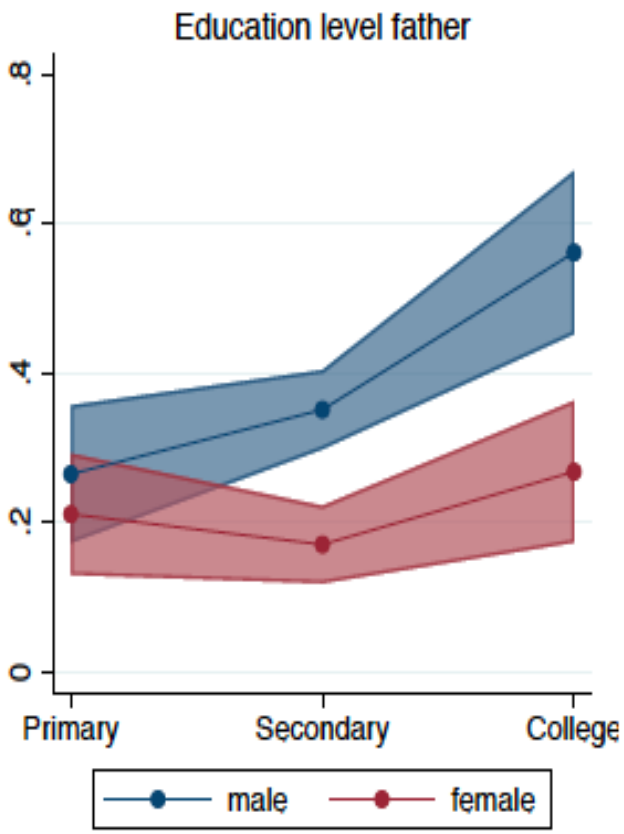
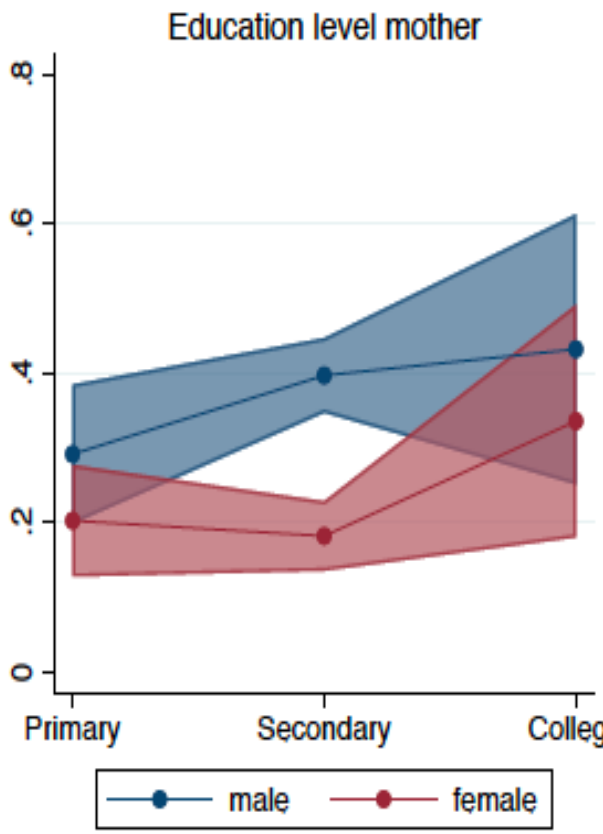


Mother

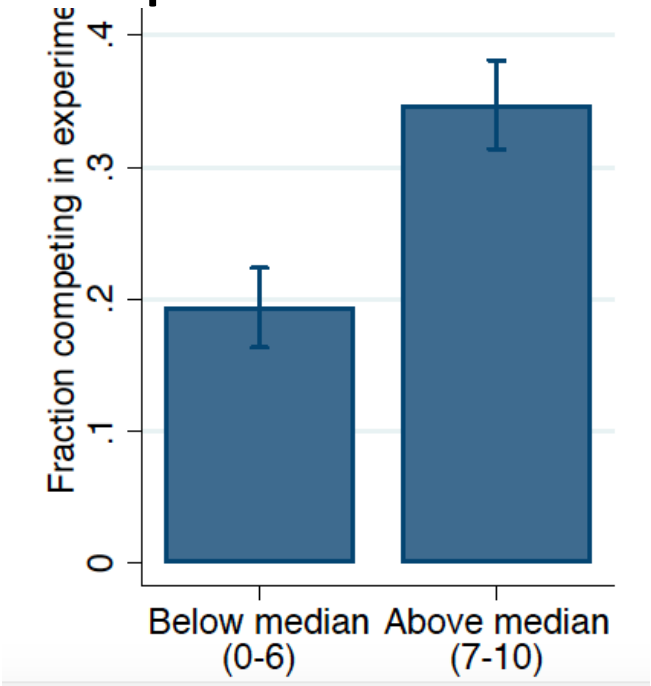


External Relevance of Competitiveness

- Competitiveness correlates with income, whether individuals hold a management position, go to college
- Effects persist when controlling for Big 5.
- Single competitiveness 0-1 variable: amount of variance explained is about 1/3 of that of multi-question Big 5

Verbal Competitiveness measure

- Correlates with experimental measure



- Effects on income, holding a management position, college education similar to the incentivized measure

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  - Impact of Affirmative Action on performance
    - France implemented Affirmative Action at the top club level in 1990

Policy Implications

Extreme measure:

"Changing the Women" (Lean in)

Can we manipulate/affect competitiveness and would it change educational choices?

- What else does competitiveness affect?
- Caution: Sometimes lean in can backfire, see Exley, Niederle and Vesterlund, 2016.

Behavioral Market Design
Policy Implication

- Educational institutions may differ in how they reward competitiveness
  - Even when we want to select on ability
- This may have (unintended) consequences on how many women study math

Different School Systems

- Netherland School system
  - Once-and-for–all choice: very inflexible
  - Large gender gap in math education
- US School system:
  - Flexible
  - No gender gap in Math Education

Choosing the Hard Task

Niederle and Yestrumskas (2008)

How do women and men decide whether to choose a hard or an easy task?

- What institutional designs affect those choices?

Experiment:

- Subjects perform in an easy version of a task
- Subjects choose difficulty level for the next two tasks
  - only one counts for payment: randomly determined

Treatment 1: Once-and-for-all choices (Dutch system)
Treatment 2: Sequential choices (US system)

Choosing Challenging and Hard Tasks

Need: Easy and Hard Task

- Want this to be common knowledge

For each participant: Measure performance level

- **High:** on average **higher earnings** from **hard** task
- **Low:** on average **higher earnings** from **easy** task

Challenge:

1. Create such an environment
2. Measure performance level of participants without them learning their performance level.

Treatment 1: Once-and-for-all choices (Dutch system)
Treatment 2: Sequential choices (US system)

Policy Implication: Institutional Changes

Niederle and Yestrumskas (2008)

Among high performing participants:

- Large gender differences in choosing the hard task when choices are once-and-for-all rigid choices (like education choices in the Netherlands)
- Almost no gender differences among high performers when choices are gradual (like education choices in the US)

Policy Implication

Should we change the education system in Europe to be less rigid?

Fuchs-Schuendeln, Niederle, Yang (in progress): Are more rigid school systems correlated with

- (i) fewer women going to university,
- (ii) fewer women studying math and science

First “dirty” cross-country regression suggests yes!

Policy Implication

Should we change the education system in Europe to be less rigid?

Fuchs-Schuendeln, Niederle, Yang (in progress): Are more rigid school systems correlated with

- (i) fewer women going to university,
- (ii) fewer women studying math and science

First “dirty” cross-country regression suggests yes!

- This would be a LARGE policy change…

Affirmative Action

Niederle Vesterlund (2007): Tournament entry:

- suboptimal,
- no issue of discrimination in selection of winners

Questions:

- Does affirmative action affect the decision to enter a tournament?
- Does this result in Affirmative Action to be less costly than predicted?

AA-quota tournament

Niederle, Segal and Vesterlund, 2013

Standard tournament: 2 best of 3 men and 3 women win.

AA Tournament: Best woman wins, best person of the remaining five (2 women and 3 men) wins.

- A woman wins if she is *either* among the best women or among the top performers
- A man wins if he is *both* among the best men and among the top performers

AA-quota tournament

Why might AA tournament attract more women?

- Change the probability of winning
- Gender specific competition (yes)
  - Beliefs within gender differ from those across gender.
  - Gender specific competition can alter the *pleasure or fear* of competition.
- Mention of AA (some)

Effect of AA tournament

What are the effects of Affirmative on Tournament Entry?

Consider the pool of tournament entrants under the standard tournament and the AA tournament.

To describe changes: Think of this pool as the set of applicants to a competitive job.

Compare costs of a quota when

- Quota is secretly implemented (using standard tournament entrants)
- Quota is announced (using AA tournament entrants)

Effect of Affirmative Action

- Affirmative action, when not announced:
  - Very costly.
- Announcing Affirmative Action changes the gender composition of tournament entrants:
  - More high performing women enter the tournament.
  - Lower than expected cost of affirmative action due to supply effect.

Quota Affirmative Action Conclusion

Affirmative Action can have positive effects on the decision of women to enter competitive environments.

Positive effects of Affirmative Action in an environment in which there is no discrimination.

New view of Affirmative Action due to new insights into preferences for competitive environments of women and men.

From the Lab to the Field

Niederle, Segal Vesterlund: 2013

- Laboratory
  - also a real world, just a different one: real money involved, real people…
- No investment into skills
  - This could magnify or reduce positive effects of announced affirmative action
- No discrimination

Question: Can positive benefits mirroring those in the lab be found in the field?

Affirmative Action in the Field

NSV(2013) Quota Affirmative Action changed the applicant pool.

In a field setting does affirmative action lead to

- Better selection into the applicant pool?
- Higher investment into ability, performance (and not just because the women got selected to be promoted)?

Very hard to document and measure ability and investment: lots of null results…

Bertrand, Black, Jensen and Lleras-Muney: Breaking the Glass Ceiling? The Effect of Board Quotas on Female Labor Market Outcomes in Norway

Affirmative Action in the Field

Want to find an area where there is

- Clear and announced affirmative action policy
- Where we have a good measure of “ability” or “performance”.

Chess

De Sousa and Niederle (in progress)

- ELO rating: Great measure of ability.
- Huge female "problem"
  - Of 1530 Grandmasters: 2% are female
  - Dec 2017: Best female chess player is No 66 in the world ranking and the second best is … No 414
  - Judit Polgar: Only woman to qualify for a World Championship tournament. First, and to date, only woman entering the top 10, with Elo rating above 2700, her peak was 2735 (would put her in Oct 2016 as No. 25) and peak world ranking was No. 8.
- Attitudes towards female chess players:
  - Kasparov about Judit Polgar "She has fantastic chess talent, but she is, after all, a woman. It all comes down to the imperfections of the feminine psyche. No woman can sustain a prolonged battle."
  - "My sister Susan -- she was 16 or 17 -- said that she never won against a healthy man. After the game, there was always an excuse: 'I had a headache. I had a stomach ache.' There is always something" Judit Polgar, 2001.
- Would the introduction of Affirmative Action lead to there being more good female chess players?

Chess in France

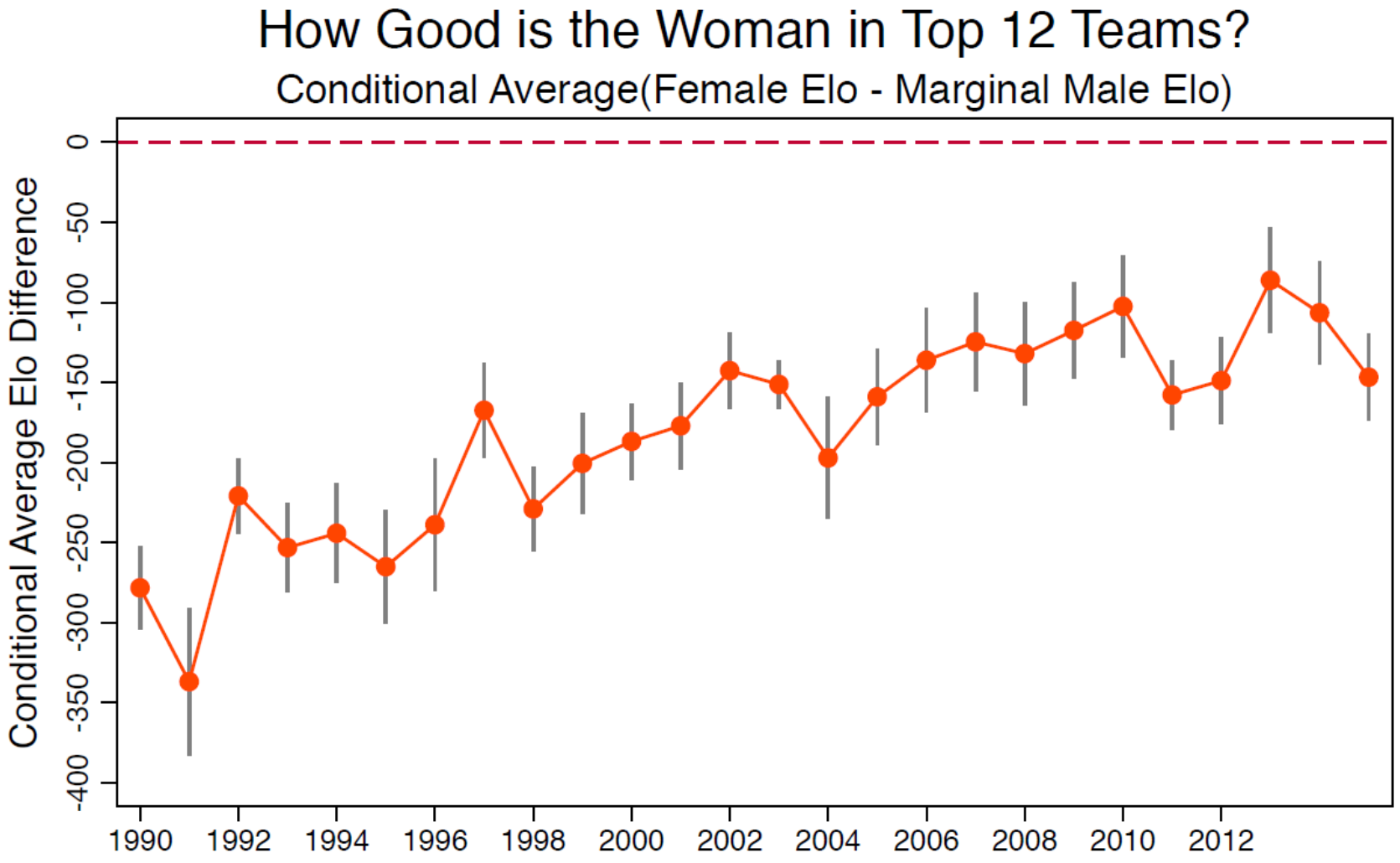
- Chess players in France (and elsewhere) play for clubs.
- Club competitions: Play against each other once a year
  - 8 players of a club compete against 8 of another.
  - Basically: Best plays against best etc…
- Top level: 12 best clubs.
- In 1990: Introduce Affirmative Action: Top level: Every club had to bring 9 players and at least one had to be a French female player.
- For a long time, the female player would be 9th (lowest ranked in her club team)

"Cost" of affirmative action
Changing French chess landscape…

Compare the Elo ratings of **best female** in the team to the **marginal male** (i.e., #8).

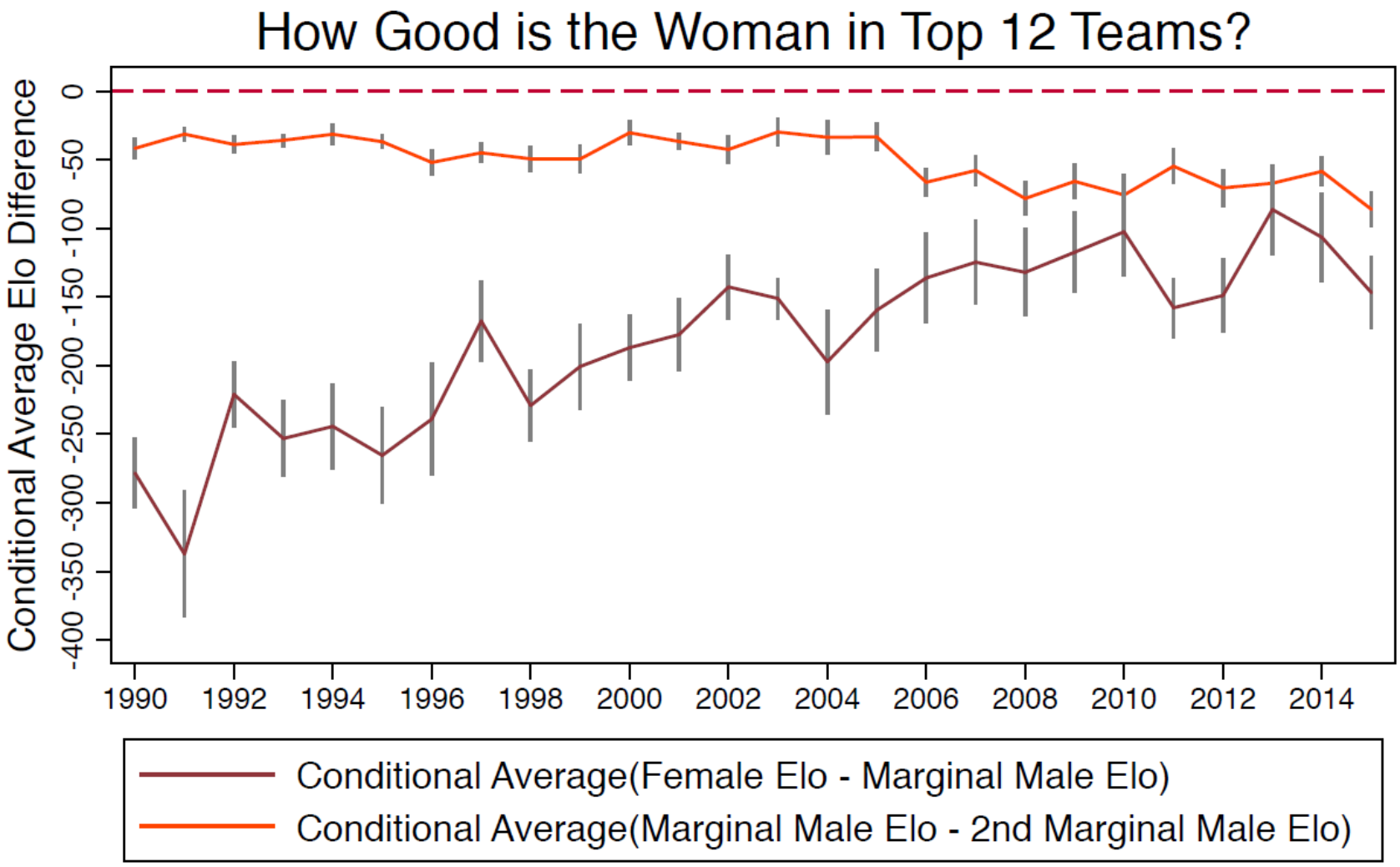
- We condition the Elo ratings on age and a rich set of fixed effects: club's city, player's federation and year.

“Cost” of affirmative action



Notes: We focus on the Top 12 clubs from 1990 to 2015. Each match is played between two teams of 8 or 9 players. The number of players per team changed over time: 9 from 1990 to 2005, then 8 from 2006 onwards. We discard 226 team-match with more than one woman and focus on the 6,508 team-match with a unique woman. As a consequence, we always compare the female player to the 7th rated male player, called the 'marginal male'. We condition the Elo difference on age, city fixed effects and player's country fixed effects.

“Cost” of affirmative action



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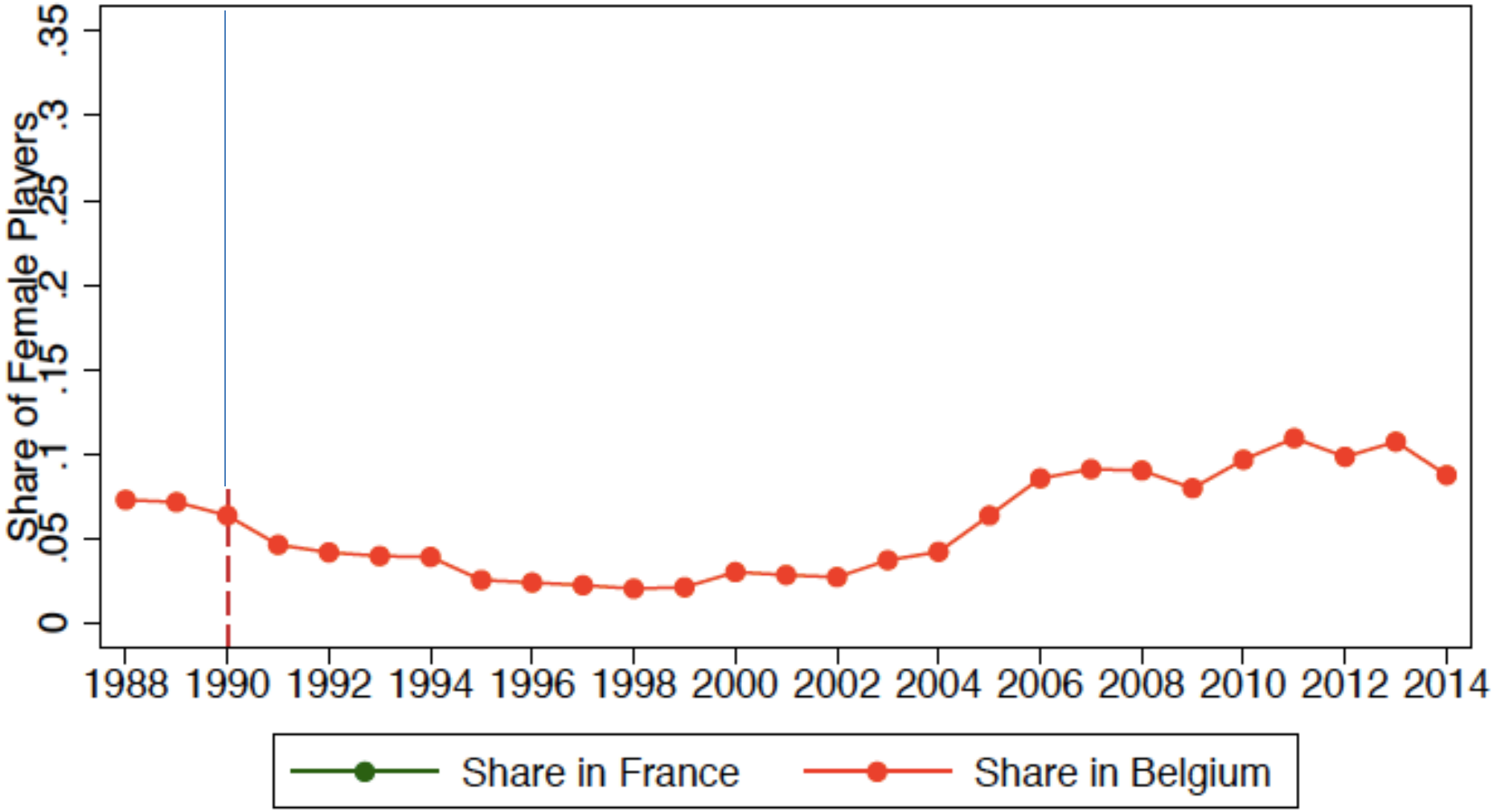
An International Comparison

- What is the evolution of French female chess players over time, and how does this compare to Belgium?

Share of Top Female National Players

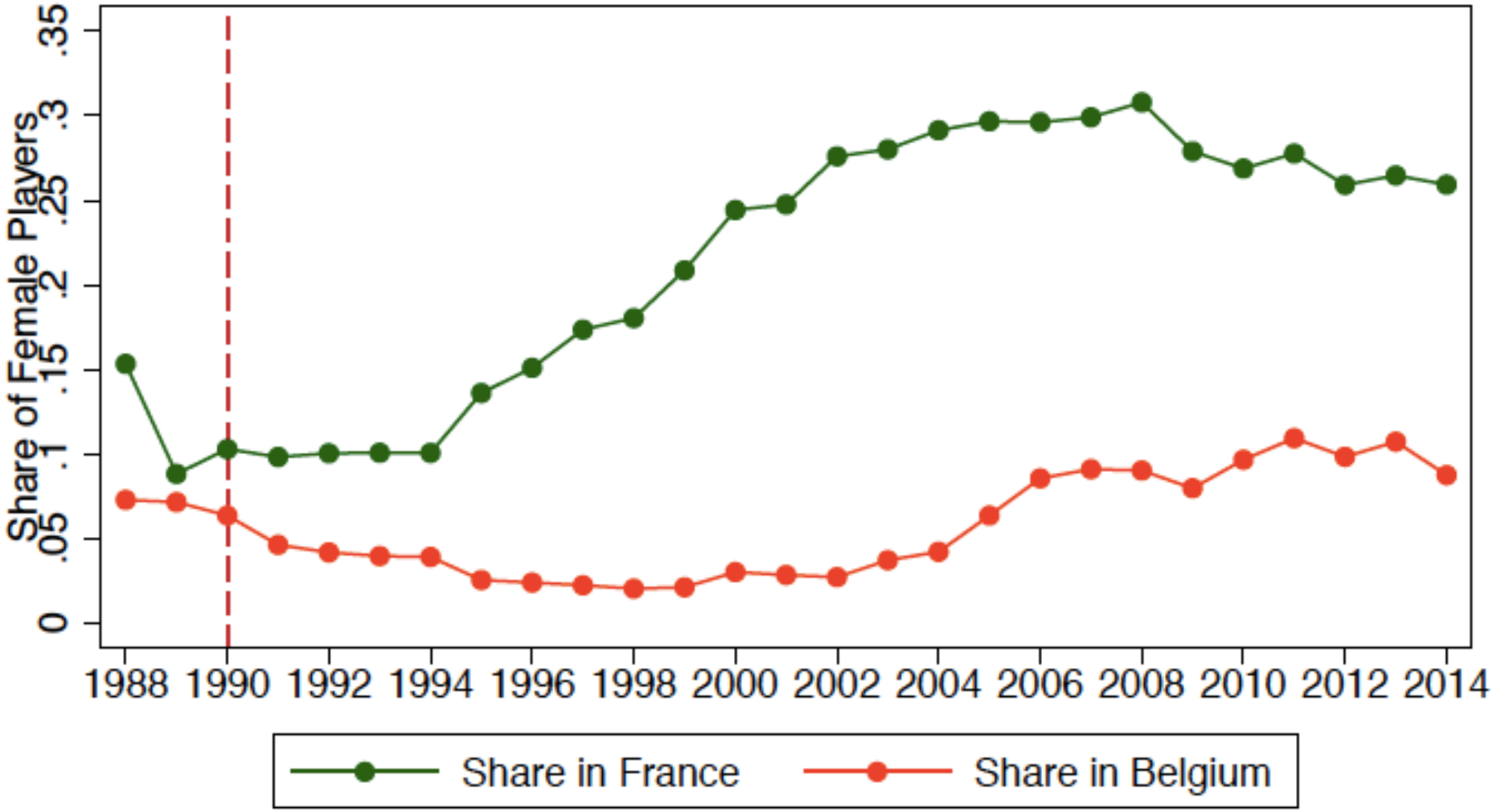
France and Belgium -- 1988 - 2014



Notes: Vertical dashed line indicates the first year of the affirmative action in favor of French female pl
Only active, top rated and national players in each country.
Top rated players are defined as Elo>=1805 for females and Elo>=2205 for males.

Share of Top Female National Players

France and Belgium -- 1988 - 2014



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Affirmative Action in Chess

- Chess: very special, but has the clear advantage of having a great performance measure
- Implementation of a gender affirmative action in 1990.
- Large increase of French female chess players at high levels but especially also at the very top!
  - Large supply side effect of affirmative action.
- Increase in female Elo rating is not a “mechanical effect” of playing national league games.
  - Team events represent at most 11 games per year.
  - And by playing these games women loose rating points! On average 2 Elo points per season

Where to go next?

- Relating competitiveness to other traits
  - Ambition, Grit, Choosing Hard Task
- Gender differences in belief formation
  - Mobius, Niehaus, Niederle, Rosenblat (2012)
- Gender Differences in Negotiation
  - Exley, Niederle, Vesterlund (2016)
- Discrimination: Is it all about gender?
  - Coffman, Exley and Niederle (2016)
- Paternalism: Are we more paternalistic towards women?
  - Some evidence in Exley, Niederle, Vesterlund (2016)
  - Dykstra, Exley, Niederle ($_{\text{in progress}}$)
- Costs of sexism/discrimination on individuals
- Impact of role models in textbooks

Competitiveness
From the Lab to the Field and to Policy

- Competitiveness: new behavioral trait
  - Design, Robustness
- Economic Relevance of Competitiveness
  - Competitiveness predicts education choices
  - Gender differences in Competitiveness help account for gender differences in education choices
- Behavioral Market Design: Policy Implications
  - Some institutional designs may reward competitiveness more than others
  - This could lead to unintended consequences for the gender gap in education choices
  - Reexamine effect of Quota-like Affirmative Actions
    - Gender gap in competitiveness is reduced in single sex tournaments, affecting the costs and benefits of implementing quotas
  - Impact of Affirmative Action on performance
    - France implemented Affirmative Action at the top club level in 1990: Large boost for French female chess players

Other work I am happy to tell you about

- Cognitive reasoning, Contingent reasoning and what makes it so difficult.
  - Power of Certainty
  - Ramification for behavior in games
  - Ramification: selecting among lotteries, choices over time…
  - Do people even have well defined strategies, and how much more room is there for new behavioral models ?