

# **When are appearances deceiving? The nature and evolution of the beauty premium**

## **Online Appendix**

**Tatyana Deryugina, University of Illinois<sup>+</sup>**

**Olga Shurchkov, Wellesley College<sup>++</sup>**

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<sup>+</sup> Department of Finance, University of Illinois at Urbana-Champaign, 1206 South Sixth St., Champaign, IL, USA.  
e-mail: deryugin@illinois.edu.

<sup>++</sup> Department of Economics, Wellesley College, 106 Central St., Wellesley, MA, USA.  
e-mail: olga.shurchkov@wellesley.edu.

## A1. Bidding behavior

In order to prevent bankruptcy, ~~employers'~~ total employer bids on workers in a given round of our experiment could not exceed a pre-specified maximum amount (125 or 175 points, depending on the session). In this section, we investigate whether the beauty premium differs when the maximum bid is binding. The inclusion of the date fixed effects accounts for the possibility that changing the maximum total bid from 125 to 175 in the later sessions may have resulted in higher subsequent wage bids on average. However, it does not account for the strategic implications of the binding of the maximum bid rule ~~-binding~~. For example, consider a subject for whom the sum of the optimal bids based on rational expectations of performance exceeded the limit. For such an employer, increasing the bid on one worker necessarily decreases the bid on some other worker. On the other hand, an employer for whom the sum of the optimal bids does not exceed the limit would not have to allocate wage bids in this “zero-sum” way. Thus, the strategic implications of the bidding environment would be different for these two employers. In order to explore the effects of the bidding strategies on the beauty premium, Table A1 decomposes the effects according to whether the maximum bid was binding for a given employer.

Table A1: Effects of strategic bidding on the existence of the beauty premium

Outcome variable:	Natural Logarithm of employer's wage bid in round 1							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	All Tasks	Data Entry	Data Analysis	Barg.	All Tasks	Data Entry	Data Analysis	Barg.
Attractiveness of worker & Maximum bid does not bind	0.139** (0.061)	0.039 (0.115)	0.065 (0.129)	0.367*** (0.105)	0.091* (0.051)	0.002 (0.104)	0.025 (0.128)	0.155 (0.095)
Attractiveness of worker & Maximum bid binds	0.125 (0.156)	-0.646* (0.355)	0.955** (0.422)	0.007 (0.197)	0.032 (0.165)	-0.606 (0.377)	0.823** (0.402)	-0.147 (0.223)
F-test p-value (equality)	[0.930]	[0.046]	[0.035]	[0.056]	[0.718]	[0.098]	[0.044]	[0.156]
F-test p-value (joint sign.)	[0.073]	[0.128]	[0.086]	[0.002]	[0.209]	[0.251]	[0.125]	[0.121]
Employer's performance prediction rank: 2nd					0.118 (0.135)	0.320 (0.206)	-0.143 (0.283)	0.186 (0.248)
3rd					0.257** (0.108)	0.078 (0.193)	-0.017 (0.220)	0.630*** (0.190)
Top prediction rank: 4th					0.517*** (0.061)	0.461*** (0.116)	0.429*** (0.124)	0.527*** (0.128)
Observations	685	232	225	228	685	232	225	228
R-squared	0.17	0.20	0.30	0.23	0.32	0.33	0.37	0.44

*Notes:* Round 1 data only. The attractiveness coefficient should be interpreted as the effect of a one standard deviation change in beauty on the outcome variable. The p-value for the F-tests for the coefficients on the bid binding interactions reported in brackets below the estimates. All regressions include a dummy for total maximum bid binding, an indicator for the sessions before the date when the bid maximum was changed, date fixed effects, indicators for student status (graduate or undergraduate), major, GPA range, self-reported abilities, race, and gender. In cases where we pool the data across multiple tasks, we also include a task fixed effect. Columns 5-8 include linear, squared, and cubed prediction terms. Robust standard errors clustered by employer in parentheses. Significance levels: \* 10 percent, \*\* 5 percent, \*\*\* 1 percent

Outcome variable:	Natural logarithm of employer wage bid in round 1							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
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When we do not control for the employer's performance predictions (Columns 1–4), the effect of bid-binding on the beauty premium differs by task. When we pool the data (Column 1) and in bargaining (Column 4), the positive beauty premium exists only when the total bid maximum does not bind. In bargaining, the coefficients on the interaction terms are both jointly significant (F-test p-value of 0.002) and are significantly different from each other (p-value of 0.056). In the data entry task, there is actually a marginally significant beauty *penalty* in the cases where the maximum bid binds (Column 2). In the data analysis task (Column 3), we find a significant beauty premium when the maximum bid binds. In both tasks, the coefficients on the interaction terms are statistically significantly different from each other in all specifications, but are only marginally jointly significant. This suggests that employers respond to the maximum bid limit by reducing their bids on less attractive workers in data entry and by increasing their bids ~~of~~ on comparatively more attractive workers in data analysis. In bargaining, the employers for whom the maximum bid binds do not bid more on comparatively attractive workers. Thus, the binding bid limit eliminates the beauty premium in bargaining.

When we include ~~the~~ employer's performance predictions in Columns 5–8 (rank out of 4 and polynomial terms), the beauty premium disappears in all cases, with the exception of data analysis (Column 7). The ~~F~~F-test reveals that the coefficients on the bid binding ~~that~~ interacted with the beauty rating are not jointly significant in any specification. This supports our main result that there is statistical discrimination based on biased beliefs about performance in our setting.

## A2. Linear specifications

As a robustness check, we present the results of our analysis of the effect of attractiveness on ~~the~~ employer predictions and worker performance using the linear specification.

Table A2: Relationship between employer's performance expectations and worker's attractiveness in round 1

Outcome variable:	Employer's performance prediction in round 1							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	All Tasks		Data Entry		Data Analysis		Bargaining	
	[63.6]		[72.2]		[55.5]		[63.0]	
Attractiveness of worker	0.822		0.057		-1.528		2.802***	
	(0.818)		(1.733)		(1.360)		(0.882)	
Attractiveness quintiles:								
2nd		0.077		-0.497		8.675**		-0.952
		(2.733)		(3.029)		(4.181)		(5.886)
3rd		0.526		2.029		2.122		1.535
		(2.273)		(5.253)		(3.111)		(3.933)
4th		1.838		-0.636		4.937		5.209
		(2.619)		(3.618)		(3.249)		(4.236)
Top attractiveness: 5th		1.833		-1.255		-0.447		8.461**
		(2.360)		(3.535)		(3.566)		(3.231)
F-test p-value (equality)		[0.801]		[0.741]		[0.175]		[0.044]
Observations	685	685	232	232	225	225	228	228
R-squared	0.25	0.25	0.35	0.35	0.26	0.27	0.27	0.28

*Notes:* Round 1 data only. Mean predicted performance (in points) for each task in brackets below the task type. The attractiveness coefficient should be interpreted as the effect of a one standard deviation change in beauty on the outcome variable. The p-value for the F-test of joint differences of the coefficients on the attractiveness quintiles reported in brackets below the estimates. All regressions include date fixed effects, indicators for student status (graduate or undergraduate), major, GPA range, self-reported abilities, race, and gender. In cases where we pool the data across multiple tasks, we also include a task fixed effect. Robust standard errors clustered by employer in parentheses. Significance levels: \* 10 percent, \*\* 5 percent, \*\*\* 1 percent.

Outcome variable:	Employer's performance prediction in round 1							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	All Tasks		Data Entry		Data Analysis		Bargaining	
	[63.6]		[72.2]		[55.5]		[63.0]	
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Observations	685	685	232	232	225	225	228	228
R-squared	0.25	0.25	0.35	0.35	0.26	0.27	0.27	0.28

*Notes:* Round 1 data only. Mean predicted performance (in points) for each task is reported in brackets below the task type. The attractiveness coefficient should be interpreted as the effect of a one standard deviation change in beauty on the outcome variable. The p-values for the F-tests of joint differences of the coefficients on the attractiveness quintiles are reported in brackets below the estimates. All regressions include date fixed effects, indicators for student status (graduate or undergraduate), major, GPA range, self-reported abilities, race, and gender. In cases where we pool the data across multiple tasks, we also include a task fixed effect. Robust standard errors are clustered by employer in parentheses. Significance levels: \* 10 percent, \*\* 5 percent, \*\*\* 1 percent.

Table A2 confirms that employers expect comparatively more-attractive individuals to perform significantly better in bargaining but not in the other two tasks in the first round. In fact, the relationship is even stronger than the one reported in the main paper that uses the natural log of the prediction.

Table A3 also confirms that ~~the~~-employer expectations are incorrect in the bargaining task: there is no significant effect of beauty on performance in any of the tasks in the first round.

Table A3: Relationship between worker performance and worker's attractiveness in round 1

Outcome variable:	Worker performance in round 1							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	All Tasks		Data Entry		Data Analysis		Bargaining	
	[63.8]		[89.5]		[35.8]		[66.1]	
Attractiveness of worker	0.537		-10.674		-0.384		3.117	
	(2.835)		(6.825)		(1.626)		(7.732)	
Attractiveness quintiles:								
2nd		2.062		-15.443		0.931		-9.33
		(10.004)		(28.233)		(1.268)		(35.452)
3rd		-3.176		-32.245		-0.283		6.207
		(10.182)		(24.553)		(1.138)		(34.957)
4th		9.627		-24.623		-0.099		21.043
		(8.496)		(30.811)		(1.055)		(37.372)
Top attractiveness: 5th		-0.745		-45.527		-0.191		13.28
		(11.170)		(28.284)		(1.478)		(31.346)
F-test p-value (equality)		[0.535]		[0.138]		[0.623]		[0.972]
Observations	177	177	59	59	59	59	59	59
R-squared	0.62	0.62	0.52	0.57	0.59	0.60	0.50	0.51

*Notes:* Round 1 data only. Mean worker performance (in points) for each task in brackets below the task type. The attractiveness coefficient should be interpreted as the effect of a one standard deviation change in beauty on the outcome variable. The p-value for the F-test of joint differences of the coefficients on the attractiveness quintiles reported in brackets below the estimates. All regressions include date fixed effects, indicators for student status (graduate or undergraduate), major, GPA range, self-reported abilities, race, and gender. Specifications (7) and (8) include an indicator for whether a trade was possible and control for the average difference between buyer value and seller cost across the three bargaining rounds. In cases where we pool the data across multiple tasks, we also include a task fixed effect. Robust standard errors clustered by worker in parentheses. Significance levels: \* 10 percent, \*\* 5 percent, \*\*\* 1 percent.

Outcome variable:	Worker performance in round 1							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	All Tasks [63.8]		Data Entry [89.5]		Data Analysis [35.8]		Bargaining [66.1]	
Attractiveness of worker	0.537 (2.835)		-10.674 (6.825)		-0.384 (1.626)		3.117 (7.732)	
Attractiveness quintiles:								
2nd		2.062 (10.004)		-15.443 (28.233)		0.931 (1.268)		-9.33 (35.452)
3rd		-3.176 (10.182)		-32.245 (24.553)		-0.283 (1.138)		6.207 (34.957)
4th		9.627 (8.496)		-24.623 (30.811)		-0.099 (1.055)		21.043 (37.372)
Top attractiveness: 5th		-0.745 (11.170)		-45.527 (28.284)		-0.191 (1.478)		13.28 (31.346)
F-test p-value (equality)		[0.535]		[0.138]		[0.623]		[0.972]
Observations	177	177	59	59	59	59	59	59
R-squared	0.62	0.62	0.52	0.57	0.59	0.60	0.50	0.51

*Notes:* Round 1 data only. Mean worker performance (in points) for each task is reported in brackets below the task type. The attractiveness coefficient should be interpreted as the effect of a one standard deviation change in beauty on the outcome variable. The p-values for the F-tests of joint differences of the coefficients on the attractiveness quintiles are reported in brackets below the estimates. All regressions include date fixed effects, indicators for student status (graduate or undergraduate), major, GPA range, self-reported abilities, race, and gender. Specifications (7) and (8) include an indicator for whether a trade was possible and control for the average difference between buyer value and seller cost across the three bargaining rounds. In cases where we pool the data across multiple tasks, we also include a task fixed effect. Robust standard errors are clustered by worker in parentheses. Significance levels: \* 10 percent, \*\* 5 percent, \*\*\* 1 percent.

### A3. Beauty premium based on the rank of attractiveness rating

Table A4 shows that our results are robust to estimating the beauty premium based on the rank of attractiveness rating within the group of four workers shown to a given employer. In round 1 (Columns 1–4), workers in the bargaining task that are rated most attractive relative to the other three in their group of four are getting earn significantly higher wages relative to the workers whose rank is the lowest in the group. Panel 1 shows that, in bargaining, a unit increase in rank increases increasing the wage bid by 14% (p-value of 0.058). Panel 2 shows that the beauty premium in bargaining is due to comes from the workers who are rated most attractive relative to their peers, who get-enjoy 65% higher wage bids than those rated lowest. The difference between those ranked at the top and those ranked second from the top is also statistically significant (F-test p-value of 0.008).

Table A4: Relationship between an-employer's bids and a-worker's attractiveness rank

Outcome variable:	Natural Logarithm of employer's wage bid							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	All	Data	Data		All	Data	Data	
	Tasks	Entry	Analysis	Barg.	Tasks	Entry	Analysis	Barg.
	ROUND 1				ROUND 2			
<i>Panel 1: Average effect of worker attractiveness rank</i>								
Average rank of attractiveness	0.008 (0.042)	0.005 (0.066)	-0.125 (0.080)	0.143* (0.074)	0.027 (0.051)	0.040 (0.085)	0.034 (0.079)	0.015 (0.090)
<i>Panel 2: Nonlinear effect of worker attractiveness rank</i>								
Rank of attractiveness category								
2nd	0.050 (0.133)	-0.018 (0.261)	-0.101 (0.194)	0.269 (0.224)	0.125 (0.150)	0.214 (0.266)	0.092 (0.242)	0.070 (0.248)
3rd	-0.184 (0.131)	0.126 (0.212)	-0.550** (0.221)	-0.127 (0.239)	0.051 (0.152)	-0.077 (0.277)	0.087 (0.246)	0.140 (0.266)
Top attractiveness rank: 4th	0.120 (0.133)	-0.037 (0.208)	-0.225 (0.248)	0.651*** (0.239)	0.116 (0.164)	0.244 (0.270)	0.113 (0.255)	0.010 (0.298)
<i>Common across panels 1 and 2</i>								
Log performance in round 1					0.81*** (0.085)	0.77** (0.358)	1.08*** (0.188)	0.66*** (0.135)
Observations	685	232	225	228	685	225	236	224
R-squared	0.16	0.20	0.28	0.22	0.20	0.23	0.35	0.28

*Notes:* Rank of attractiveness represents the rank of the beauty rating out of 4 workers in a given session. All regressions include date fixed effects, indicators for student status (graduate or undergraduate), major, GPA range, self-reported abilities, race, and gender. In cases where we pool the data across multiple tasks, we also include a task fixed effect. Robust standard errors clustered by employer in parentheses. Significance levels: \* 10 percent, \*\* 5 percent, \*\*\* 1 percent.

Outcome variable:	Natural logarithm of employer wage bid							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	All	Data	Data		All	Data	Data	
	Tasks	Entry	Analysis	Barg.	Tasks	Entry	Analysis	Barg.
	ROUND 1				ROUND 2			
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We also confirm that there is no significant beauty premium in any of the tasks in the second round (Columns 5–8), even in bargaining (Column 8).

## Rating procedure and instructions

All pictures were rated by at least 25 female and 25 male raters. Raters were students at a college in ~~a different~~ another state and were pre-screened to ensure that they were not familiar with students from the college of interest.

Raters were shown pictures of each student and asked to rate her physical appearance on a 1–10 point scale. Five of the numbers had descriptions ~~describing~~ indicating the level of attractiveness corresponding to that number (see experimental instructions on the next page). Raters were instructed to choose the numbers without descriptions if they felt the student's appearance fell ~~in~~ between the two descriptions.

Each rater was shown four sets of about 100 photos. The order of the photos within each set was randomized for each rater. In early stages of the experiment, we compared the means and standard deviations of ratings across ~~different~~ sets to see if having subjects rate 400 pictures led to fatigue. There was no significant difference in either the means or standard deviations of ratings for earlier and later sets, which led us to conclude that 400 pictures was not an excessive amount. We did not use data from three raters who chose 1's 40% or more percent of the time. The "1" option was the closest to the "Next" button. Thus, these subjects were most likely trying to get through the experiment as quickly as possible.

## Rater pool descriptive statistics

Each rating session lasted between forty minutes and one hour, including the reading of the instructions and payment. Raters were paid a show-up fee of \$5 and an additional \$7 payment for completing the task of rating all photos and providing demographic information. Table A2 summarizes our rater pool.

Table A2: Number of raters in each gender and race category

	Male	Female
White	30	39
Asian	32	32
Black	5	8
Hispanic	7	8
Native American	0	0
Pacific Islander	0	3
Total	66	80

*Notes:* The sum of the number of raters by each race category exceeds the total number of males in column 1 and the total number of females in column 2 because some raters identified with more than one race.

**Instructions for the experiment**

You are about to participate in an experiment involving the perception of appearance. Once the experiment begins, you will see a photograph of an individual along with the following prompt:

Rate this person's physical appearance using the following scale:

- 10 strikingly handsome or beautiful
- 9
- 8 good-looking (above average for age and sex)
- 7
- 6 average looks for age and sex
- 5
- 4 quite plain (below average for age and sex)
- 3
- 2 homely
- 1

Choose the number that best corresponds to your evaluation. Choose the numbers without descriptive text (1, 3, 5, 7, and 9) if you feel the person's appearance falls in between the descriptions found in the adjacent numbers.

After you have chosen a number, click "Next". You will then see another photograph and be asked to repeat the procedure. Continue selecting the number you feel best reflects your assessment of the individual's appearance until you are told to stop.

## **CONSENT TO PARTICIPATE IN NON-BIOMEDICAL RESEARCH**

### **Employer-employee matching**

You are asked to participate in one part of a multi-part research study conducted by Olga Shurchkov, an assistant professor in the Economics Department at Wellesley, and her collaborator, Tatyana Deryugina, a Lecturer in the Finance Department at the University of Illinois, Urbana-Champaign. You may participate in this research study if you are at least 18 years or older. You should read the information below, and ask questions about anything you do not understand, before deciding whether or not to participate.

- **PARTICIPATION AND WITHDRAWAL**

Your participation in this study is completely voluntary and you are free to choose whether to be in it or not. If you choose to be in this study, you may subsequently withdraw from it at any time without penalty or consequences of any kind. The experimenters may withdraw you from this research if circumstances arise which warrant doing so.

- **PURPOSE OF THE STUDY**

The purpose of this part of the study is to understand how individual characteristics affect matching in the labor market.

- **PROCEDURES**

If you volunteer to participate in this study, your photograph will be taken and may be viewed by other participants in this study. You will then be asked to fill out a short questionnaire, which will be the basis for building your “resume”. You will then be asked to perform several rounds of computer-based tasks or make hiring decisions, depending on your role in the experiment. At the end of the experiment, you will be asked to fill out another short questionnaire.

The experiment will last about one hour.

- **POTENTIAL RISKS AND DISCOMFORTS**

There are no foreseeable risks or discomforts in this study.

- **POTENTIAL BENEFITS**

There are no direct benefits for the participants beyond getting paid.

- **PAYMENT FOR PARTICIPATION**

You will be paid a show-up fee of \$10 regardless of your decision to participate. In addition, you will be paid based on your performance in the computer-based tasks or in making hiring decisions.

- **CONFIDENTIALITY**

All information, including your name and identifying characteristics, will remain confidential. All information, including photos, will remain in the possession of the experimenters at all times. Our experimental records will never have identifying information such as your name or contact information.

- **IDENTIFICATION OF INVESTIGATORS**

If you have any questions or concerns about the research, please feel free to contact: Olga Shurchkov, Wellesley College, [oshurchk@wellesley.edu](mailto:oshurchk@wellesley.edu) or Tatyana Deryugina, University of Illinois at Urbana-Champaign, [deryugin@illinois.edu](mailto:deryugin@illinois.edu). If you have any questions about your rights as a participant in this study or any concerns or complaints, please contact the University of Illinois Institutional Review Board at 217-333-2670 (collect calls will be accepted if you identify yourself as a research participant) or via email at [irb@illinois.edu](mailto:irb@illinois.edu). You may also contact the chair of the Wellesley College IRB (Committee for the Protection of Human Subjects), Nancy Marshall, [nmarshall@wellesley.edu](mailto:nmarshall@wellesley.edu).

**SIGNATURE OF SUBJECT**

I understand the procedures described above. My questions have been answered to my satisfaction, and I agree to participate in this study. I have been given a copy of this form.

\_\_\_\_\_  
Signature of Subject

\_\_\_\_\_  
Date

## Instructions for the experiment: Part I

You are about to participate in an experiment involving employer-worker matching in the labor market. This experiment is part of a research project financed by Wellesley College and Harvard University.

Please read the following instructions very carefully. You will receive all the information you require for participation in the experiment. If you follow these instructions, you will have an opportunity to earn real money that will be paid to you, privately and in cash, at the end.

**Communication between participants is absolutely forbidden during the experiment unless instructed otherwise by the experimenters!** Violations of these rules will force us to stop the experiment. If you have any concerns or do not understand something, please raise your hand quietly and wait for one of the experimenters to come to you.

Your payment in this experiment will be calculated in points at first. The total point score you earn during the experiment will be converted to US Dollars at the end of the experiment using the following exchange rate:

**10 points = \$0.40**

At the end, you will be paid the dollar equivalent of points you earned during the experiment plus a \$10 show-up fee in **cash**.

### **Stage 1: Resume**

You will now fill out a pre-experiment questionnaire which will be the basis for building your resume. Once you answered all the questions, press the “submit” button. Based on your answers, the experimenters will generate your resume. This may take a few minutes, so please be patient. Note that your resume may be viewed by other participants during the course of the experiment.

## Instructions for the experiment: Round I

The remainder of the experiment consists of **2 rounds**.

### **Employers and Workers:**

You have been randomly assigned to one of the following roles: **employer** or **worker**. Your role is written in bold at the top of these instructions pages. You will remain in the same role for the duration of the experiment.

### Employers

Employers will start each round with an endowment of 125 points that they may keep or use to “hire” workers, who will perform a task described below. To “hire” workers, employers will submit fixed wage offers. The better the “hired” worker(s) perform(s) the task, the more points the employer will earn.

Note that the task may or may not change between rounds. The description of the task given below applies to this round only. Instructions for the second round task will be provided once the first round task is completed. However, the “hiring” process will remain the same in both rounds.

In each round, employers will see pictures of all workers on the right computer monitor. To see a particular worker’s resume, the employer will click on the text box below the worker’s picture. To return to the worker’s picture, the employer will click on the text box again.

### *Performance Prediction*

Next, employers will be asked to make a prediction for the performance of *each* worker. The prediction will be subject to a prediction penalty. For each token earned by the worker above or below the prediction, we will subtract 0.25 points from the employer’s total payoff. When the number of tokens earned ( $Y$ ) is exactly equal to the prediction, the employer will not lose any points. So, the estimate that is the closest to reality will result in the highest earnings. In pilot trials for this task, the average number of tokens earned was 75 (see task description below for more detail). The prediction penalty for employers will be based on his or her total prediction error for the workers’ performance.

The employer’s estimates will not be revealed to any other subject at any point during the experiment.

### *“Hiring” Workers*

Next, employers will have 3 minutes to make all the wage offers. Employers will make wage offers on the left computer monitor. Note that a given employer may offer equal wages to two or more workers. However, the total value of the offers cannot exceed his or her endowment of 125 points. An offer of zero (0) is equivalent to an unwillingness to hire that worker.

Based on the wage offers, each employer may be matched with one or more worker(s). If more than one employer tries to hire (offers a non-zero wage to) the same worker, the employer with

the highest wage offer will hire that worker. Ties will be resolved by a random draw. There is a possibility that an employer will not be matched to any worker. In that case, his or her earnings for that round will be equal to the endowment of 125 points.

Although the employer with the highest wage offer for a particular worker will “hire” that person, he or she will only have to pay the worker the second highest wage (W) offered to that worker.

Example:

	Employer 1 Offers	Employer 2 Offers	Employer 3 Offers
Worker 1	70 points	40 points	10 points
Worker 2	30 points	30 points	37 points
Worker 3	0 points	0 points	35 points

Outcome of employer-worker matching for employers:

- Employer 1 hires Worker 1 and pays a wage of 40 points, keeping 125 – 40 points.
- Employer 2 does not hire anyone, keeping 125 points.
- Employer 3 hires Workers 2 and 3 and pays them wages of 30 and 0 points, respectively, keeping 125 – 30 points.

Outcome of employer-worker matching for workers:

- Worker 1 is hired by Employer 1 and receives a wage of 40 points.
- Worker 2 is hired by Employer 3 and receives a wage of 30 points.
- Worker 3 is hired by Employer 3 and receives a wage of 0 points.

Upon completion of the task, the employer will earn a payoff based on the performance of the worker(s) he or she hired (if any) and the wage he or she paid to the worker(s), as determined by the above procedure.

Workers

Workers will start each round with an endowment of 25 points.

*Performance Prediction*

Workers will first estimate the number of tokens they expect to earn in the task. Workers will be asked to make a prediction only for their *own* performance. The prediction will be subject to a prediction penalty. For each token earned by the worker above or below his or her prediction, we will subtract 0.25 points from the worker’s total payoff. When the number of tokens earned (Y) is exactly equal to the prediction, the worker will not lose any points. So, the estimate that is the closest to reality will result in the highest earnings. In pilot trials for this task, the average number of tokens earned was 75 (see task description below for more detail). The prediction penalty for workers will be based on the prediction error for his or her own performance.

The worker’s estimates will not be revealed to any other subject at any point during the experiment.

## *Getting “Hired” by an Employer*

Then, workers will wait until they are matched to an employer (if any). Each worker will then engage in a bargaining task with another worker, as described below. Upon completion of the task, workers will be informed of the fixed wage ( $W$ ) paid by their employer (if any). Workers will also get a summary of their earnings in the bargaining task. All wages and additional payoffs based on performance will be paid at the end of the experiment.

### **Tasks:**

#### Employers

Employers do not have any further tasks beyond offering the workers' wages and predicting worker performance, as described above. During the task completion phase, the employers are free to read or engage in other quiet activities. Do not use the lab computer until instructed again by us.

#### Workers

Each worker will be randomly chosen to be either a buyer or a seller. The task of the seller will be to sell a “widget” to a buyer for as much as possible, at a price that is at or above the cost to the seller. The task of the buyer will be to buy a “widget” for as little as possible, at a price that is at or below the buyer's assigned value of the widget.

### **Bargaining Task**

Read the following carefully to understand the nature of the workers' task.

#### Sellers

The goal of each seller is to sell a virtual widget for as much as possible, provided the price of the widget is greater than the cost of providing it. Widget cost,  $C$ , will be randomly assigned to each seller at the beginning of each bargaining period. This cost can range from 0 to 80. The cost will be deducted from the sale price if the seller sells the widget. For example, if a seller sells the widget for price  $P$ , the number of tokens earned by him or her in that bargaining period will be  $Y = P - C$ . A seller cannot offer or agree to sell the widget for a price smaller than  $C$ . If the seller does not agree to sell the widget before the time runs out, he or she will receive 0 tokens in that bargaining period.

#### Buyers

The goal of each buyer is to buy a widget as cheaply as possible, provided the price of the widget does not exceed its value to the buyer. Widget value,  $V$ , will be randomly assigned to each buyer at the beginning of each bargaining period. This value can range from 50 to 130. The sale price will be deducted from the value if the buyer buys the widget. For example, if the buyer buys the widget for price  $P$ , the number of tokens earned in that bargaining period will be  $Y = V - P$ . A buyer cannot offer or agree to buy the widget for a price greater than  $V$ . If the buyer does not agree to buy the widget before the time runs out, he or she will receive 0 tokens in that bargaining period.

## Bargaining procedure

Once the task begins, workers will see a screen that will notify them whether they are a buyer or a seller. Sellers will see their cost of providing the widget. Buyers will see their value from buying a widget. After viewing this information, workers should click “Next” (the private cost or value of the widget will also be displayed on the next screen).

Period	1 of 1	Remaining time [sec]: 17
--------	--------	--------------------------

You are about to start the bargaining task.

**You are a seller.**

**Your cost for the widget is 55.**

The seller will make the first offer.

The buyer can then either accept the seller's offer or make a counter-offer to the seller.

The players will take turns in this way until an offer has been accepted or until the time runs out.

Please click 'Next' to begin.

**Next**

Period	1 of 1	Remaining time [sec]: 27
--------	--------	--------------------------

You are about to start the bargaining task.

**You are a buyer.**

**Your value for the widget is 89.**

The seller will make the first offer.

The buyer can then either accept the seller's offer or make a counter-offer to the seller.

The players will take turns in this way until an offer has been accepted or until the time runs out.

Please click 'Next' to begin.

**Next**

Each seller will then see a photograph of the buyer they are bargaining with and each buyer will see a photograph of the seller. There will also be an interface for entering and accepting offers. Each bargaining pair will consist of one buyer and one seller.

The seller will begin the bargaining by entering a number of tokens for which he or she would like to sell the widget into the box marked "Offer" and clicking "Submit offer".

Period	1 of 1	Remaining time [sec]: 88
<b>It is your turn to make an offer. Please enter a price for which you would be willing to sell the widget.</b>		
<div style="border: 1px solid black; width: 200px; height: 100px; margin: 0 auto; text-align: center; padding: 10px;">Picture of your bargaining partner</div>	<div style="border: 1px solid black; padding: 5px;">BUYER'S OFFERS</div> <div style="border: 1px solid black; padding: 5px;">Offer:</div> <div style="border: 1px solid black; height: 100px; margin-top: 5px;"></div> <div style="text-align: right; margin-top: 5px;"><input type="button" value="Accept Offer"/></div>	<div style="border: 1px solid black; padding: 5px;">YOUR OFFERS</div> <div style="border: 1px solid black; padding: 5px;">Offer:</div> <div style="border: 1px solid black; height: 100px; margin-top: 5px;"></div>
<b>YOU ARE A SELLER</b> Your bargaining partner's picture is above. <b>The cost of the widget for you is:</b> 55 Enter a price for which you would be willing to sell the widget Offer: <input style="width: 50px;" type="text"/> <input type="button" value="Submit Offer"/>		

Period	1 of 1	Remaining time [sec]: 78
<b>It is now the buyer's turn. Please wait.</b>		
<div style="border: 1px solid black; width: 200px; height: 100px; margin: 0 auto; text-align: center; padding: 10px;">Picture of your bargaining partner</div>	<div style="border: 1px solid black; padding: 5px;">BUYER'S OFFERS</div> <div style="border: 1px solid black; padding: 5px;">Offer:</div> <div style="border: 1px solid black; height: 100px; margin-top: 5px;"></div> <div style="text-align: right; margin-top: 5px;"><input type="button" value="Accept Offer"/></div>	<div style="border: 1px solid black; padding: 5px;">YOUR OFFERS</div> <div style="border: 1px solid black; padding: 5px;">Offer: 90</div>
<b>YOU ARE A SELLER</b> Your bargaining partner's picture is above. <b>The cost of the widget for you is:</b> 55 Enter a price for which you would be willing to sell the widget Offer: <input style="width: 50px;" type="text" value="90"/> <input type="button" value="Submit Offer"/>		

The offer will then be visible to the buyer. At this point, the buyer will have two choices. He or she can accept the offer by first clicking on the actual offer amount on the screen and then clicking “Accept Offer.” Alternatively, he or she can reject the offer by entering a counteroffer into the offer box and clicking “Submit offer”.

The screenshot shows a bargaining interface with the following elements:

- Top bar: "Period 1 of 1" and "Remaining time [sec]: 66".
- Message: "It is now the seller's turn. Please wait."
- Placeholder: "Picture of your bargaining partner" (represented by a white box).
- Section: "YOU ARE A BUYER".
  - Text: "Your bargaining partner's picture is above."
  - Text: "The value of the widget for you is: 89".
  - Text: "Enter a price for which you would be willing to buy the widget".
  - Form: "Offer:" with a text input field containing "70".
  - Button: "Submit Offer".
- Section: "SELLER'S OFFERS".
  - Text: "Offer:" with a value of "90".
  - Button: "Accept Offer".
- Section: "YOUR OFFERS".
  - Text: "Offer:" with a value of "70".

If the seller's offer is rejected and a counteroffer is made, the counteroffer will then be visible to the seller who will have the same choices as the buyer. He or she can accept the offer by first clicking on the actual offer amount on the screen and then clicking “Accept Offer.” Alternatively, he or she can reject the offer by entering a counteroffer into the offer box and clicking “Submit offer”.

Period 1 of 1 Remaining time (sec): 46

**The buyer has made an offer. Please accept the offer or make a counter-offer.**

Picture of your bargaining partner

**YOU ARE A SELLER**

Your bargaining partner's picture is above.

**The cost of the widget for you is:** 55

Enter a price for which you would be willing to sell the widget

Offer:

BUYER'S OFFERS

Offer:
70

---

YOUR OFFERS

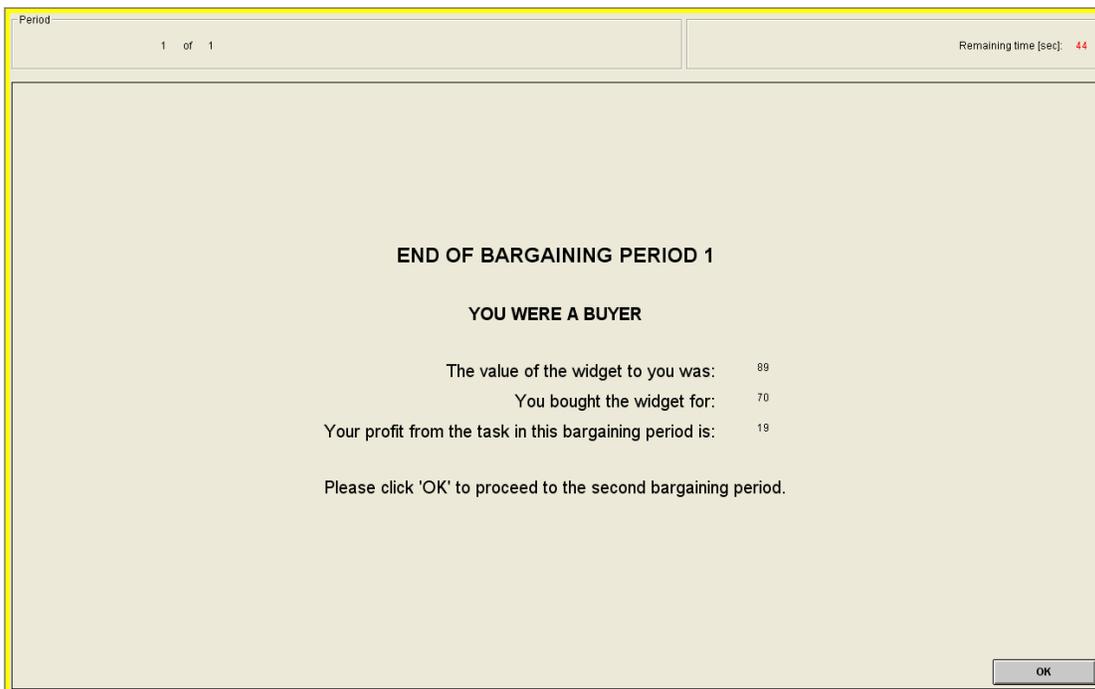
Offer:
90

This procedure will continue until an offer is accepted by either the buyer or the seller or until 90 seconds pass, whichever comes first. If an offer to sell/buy the widget for price  $P$  is accepted, the number of tokens earned by the seller will be  $Y = P - C$ . The number of tokens earned by the buyer will be  $V - P$ . If time runs out before any offer is accepted, both buyer and seller will have earned 0 tokens.

Period 1 of 1 Remaining time (sec): 38

**You have completed a transaction.**

Please click 'OK' to view the results from this bargaining period.



Throughout the bargaining process, a buyer will not know the seller's cost of providing the widget, and a seller will not know the buyer's value of owning a widget.

There will be a total of 3 bargaining periods. A given worker may be matched with the same worker in subsequent periods. The worker's role as buyer or seller will be randomly assigned and may change in subsequent periods.

**Within-Round Payoffs:**

## Notation Legend

125: initial employer endowment

25: initial worker endowment

Y: number of tokens earned by worker

W: wage paid to worker (second highest wage offered to worker)

Prediction Penalty (for employers): 0.25 times the total error in predicting the performance of workers

Prediction Penalty (for workers): 0.25 times the error in predicting own performance

The payoffs for each round will be calculated as follows:

### Employer who hired no workers:

$$\text{EmployerPayoff}_{\text{Round}T} = 125 - \text{Prediction Penalty}$$

### Employer who hired one worker:

$$\text{EmployerPayoff}_{\text{Round}T} = 125 + (1/3) * Y - W - \text{Prediction Penalty}$$

### Employer who hired two or more workers:

$$\text{EmployerPayoff}_{\text{Round}T} = 125 + (1/3) * Y(1) - W(1) + (1/3) * Y(2) - W(2) + \dots - \text{Prediction Penalty}$$

$(1/3) * Y(1) - W(1)$  are the net earnings from the first “hired” worker,  $(1/3) * Y(2) - W(2)$  are the net earnings from the second “hired” worker, and “...” represents the net earnings from the rest (if any) “hired” workers.

### Workers:

$$\text{WorkerPayoff}_{\text{Round}T} = 25 + (2/3) * Y + W - \text{Prediction Penalty}$$

Example: Employer hires one worker. The second-highest wage offered to the worker is  $W = 40$ . Number of earned tokens (Y) in round  $T = 45$ ; Worker’s prediction of Y is 40; Employer’s total prediction error is 6. The employer’s payoff in round T is \_\_\_\_\_. The worker’s payoff in round T is \_\_\_\_\_.

### Rounds:

There will be 2 rounds consisting of wage offers made by employers to hire workers, performance predictions by the employer and worker, and subsequent task completion by the worker.

After the first round, each employer will receive the following information:

- Total number of tokens earned by each worker, even if the employer did not hire him or her.
- Own payoff for the round

Each worker will receive the following information:

- Total number of tokens he or she earned
- Own payoff for the round

The final payoff for the experiment will be calculated as follows:

**Final payoff (\$)** =  $\text{Payoff}_{\text{Round1}}(\text{points}) * 0.04(\$/\text{point}) + \text{Payoff}_{\text{Round2}}(\text{points}) * 0.04(\$/\text{point}) + \text{Show-up fee } (\$10)$

## Instructions for the experiment: Round I

### Are there any questions?

The remainder of the experiment consists of **2 rounds**.

### **Employers and Workers:**

You have been randomly assigned to one of the following roles: **employer** or **worker**. Your role is written in bold at the top of these instructions pages. You will remain in the same role for the duration of the experiment.

### Employers

Employers will start each round with an endowment of 125 points that they may keep or use to “hire” workers, who will perform a task described below. To “hire” workers, employers will submit fixed wage offers. The better the “hired” worker(s) perform(s) the task, the more points the employer will earn.

Note that the task may or may not change between rounds. The description of the task given below applies to this round only. Instructions for the second round task will be provided once the first round task is completed. However, the “hiring” process will remain the same in both rounds.

In each round, employers will see pictures of all workers on the right computer monitor. To see a particular worker’s resume, the employer will click on the text box below the worker’s picture. To return to the worker’s picture, the employer will click on the text box again.

### *Performance Prediction*

Next, employers will be asked to make a prediction for the performance of *each* worker. The prediction will be subject to a prediction penalty. For each question answered correctly by the worker above or below the prediction, we will subtract 1.25 points from the employer’s total payoff. When the number of questions answered correctly (Y) is exactly equal to the prediction, the employer will not lose any points. So, the estimate that is the closest to reality will result in the highest earnings. In pilot trials for this task, the average number of questions answered correctly was 8 (see task description below for more detail). The prediction penalty for employers will be based on his or her total prediction error for the workers’ performance.

The employer’s estimates will not be revealed to any other subject at any point during the experiment.

### *“Hiring” Workers*

Next, employers will have 3 minutes to make all the wage offers. Employers will make wage offers on the left computer monitor. Note that a given employer may offer equal wages to two or more workers. However, the total value of the offers cannot exceed his or her endowment of 125 points. An offer of zero (0) is equivalent to an unwillingness to hire that worker.

Based on the wage offers, each employer may be matched with one or more worker(s). If more than one employer tries to hire (offers a non-zero wage to) the same worker, the employer with the highest wage offer will hire that worker. Ties will be resolved by a random draw. There is a possibility that an employer will not be matched to any worker. In that case, his or her earnings for that round will be equal to the endowment of 125 points.

Although the employer with the highest wage offer for a particular worker will “hire” that person, he or she will only have to pay the worker the second highest wage (W) offered to that worker.

Example:

	Employer 1 Offers	Employer 2 Offers	Employer 3 Offers
Worker 1	70 points	40 points	10 points
Worker 2	30 points	30 points	37 points
Worker 3	0 points	0 points	35 points

Outcome of employer-worker matching for employers:

- Employer 1 hires Worker 1 and pays a wage of 40 points, keeping 125 – 40 points.
- Employer 2 does not hire anyone, keeping 125 points.
- Employer 3 hires Workers 2 and 3 and pays them wages of 30 and 0 points, respectively, keeping 125 – 30 points.

Outcome of employer-worker matching for workers:

- Worker 1 is hired by Employer 1 and receives a wage of 40 points.
- Worker 2 is hired by Employer 3 and receives a wage of 30 points.
- Worker 3 is hired by Employer 3 and receives a wage of 0 points.

Upon completion of the task, the employer will earn a payoff based on the performance of the worker(s) he or she hired (if any) and the wage he or she paid to the worker(s), as determined by the above procedure.

Workers

Workers will start each round with an endowment of 25 points.

*Performance Prediction*

Workers will first estimate the number of questions they expect to answer correctly in the task. Workers will be asked to make a prediction only for their *own* performance. The prediction will be subject to a prediction penalty. For each question correctly answered by the worker above or below the prediction, we will subtract 1.25 points from the worker’s total payoff. When the number of questions answered correctly (Y) is exactly equal to the prediction, the worker will not lose any points. So, the estimate that is the closest to reality will result in the highest earnings. In pilot trials for this task, the average number of questions answered correctly was 8

(see task description below for more detail). The prediction penalty for workers will be based on the prediction error for his or her own performance.

The worker's estimates will not be revealed to any other subject at any point during the experiment.

### *Getting "Hired" by an Employer*

Then, workers will wait until they are matched to an employer (if any). Each worker will then answer a series of analytical questions about several data tables, described below. Upon completion of the task, workers will be informed of the fixed wage (W) paid by their employer (if any). Workers will also get a summary of their earnings in the data evaluation task. All wages and additional payoffs based on performance will be paid at the end of the experiment.

### **Tasks:**

#### Employers

Employers do not have any further tasks beyond offering the workers' wages and predicting worker performance, as described above. During the task completion phase, the employers are free to read or engage in other quiet activities. Do not use the lab computer until instructed again by us.

#### Workers

The workers will have 12 minutes to answer as many questions as possible correctly. There is a total of 30 questions. Workers will have 6 minutes for the first 15 questions and 6 minutes for the second 15 questions. Workers will be paid 5 points per correctly answered question.

### **Sample Data Evaluation Task**

Read the following carefully to understand the nature of the workers' task.

Below is a sample table of the kind of data workers will be asked to evaluate. The workers' task will be to answer a series of questions about the data. A physical copy of the actual data has been placed face down on the workers' desks. Workers should not look at the data until the task begins. Some questions may require mathematical calculations. Calculators can be found on your desk. Workers are to pay attention to rounding instructions and answer units whenever applicable. Workers should not round answers unless otherwise specified.

Workers will have a total of 12 minutes to answer as many questions as possible correctly. There is no penalty for answering a question incorrectly. There are no time limits per question. Some questions are more difficult than others, but the questions are not arranged in any particular order.

#### Sample questions and answers:

**Question 1:** In which year did real income in the Russian Federation increase the most, in relative terms?

Answer 1: 2000

Explanation 1: real incomes went up by 111% in the year 2000 (row 1, column 5), the largest relative increase for that measure.

**Question 2:** How many instances are there of positive real wage growth in Ivanovskaya Oblast?

Answer 2: 2

Explanation 2: Real wages grew (were more than 100 percent of previous year's wages) in 1996 and 2000.

**Question 3:** What were the real pensions in Ryazanskaya Oblast in 1997, as a percent of 1994 pensions (rounded to the nearest percentage point)?

Answer 3: 84

Explanation 3: To find the answer, multiply the percentages (as fractions) for Ryazanskaya Oblast in the years 1995, 1996, and 1997. The calculation is  $0.73 \times 1.12 \times 1.03 = 0.842128$  or 84% when rounded to the nearest percentage point.

The explanations above are for information only. Workers will not be asked to provide an explanation during the data evaluation task, only a numeric answer.

#### 4. Population Living Standard

##### 4.1 Changes in Income

	Real income (percent of previous year)					Real wages (percent of previous year)					Real pensions (percent of previous year)				
	1995	1996	1997	1999	2000	1995	1996	1997	1999	2000	1995	1996	1997	1999	2000
<b>Russian Federation</b>	<b>84</b>	<b>101</b>	<b>106</b>	<b>87</b>	<b>111</b>	<b>72</b>	<b>106</b>	<b>105</b>	<b>78</b>	<b>121</b>	<b>87</b>	<b>108</b>	<b>103</b>	<b>95</b>	<b>131</b>
<b>Central Federal Region</b>															
Belgorodskaya Oblast	84	103	92	83	104	72	103	98	80	117	89	104	101	92	131
Bryanskaya Oblast	76	102	97	82	107	68	97	102	78	116	77	108	101	94	134
Vladimirskaia Oblast	77	102	108	89	100	77	105	108	82	122	83	112	104	95	140
Voronezhskaya Oblast	90	87	122	82	97	71	103	104	80	117	85	105	100	96	130
Ivanovskaya Oblast	89	99	103	75	106	76	102	97	73	117	83	107	104	93	143
Kaluzhskaya Oblast	82	87	99	82	102	70	104	108	80	126	76	111	106	98	135
Kostromskaya Oblast	85	89	100	92	104	77	105	101	83	111	81	110	104	96	134
Kurskaya Oblast	78	98	111	86	98	70	101	103	76	111	81	109	105	90	132
Lipezkaya Oblast	84	108	95	90	112	76	106	101	78	122	80	111	98	89	131
Moskovskaya Oblast	74	102	114	89	108	75	106	114	85	120	97	112	108	95	134
Orlovskaya Oblast	76	105	99	85	103	69	109	108	87	122	85	108	110	93	136
Ryazanskaya Oblast	76	95	105	85	103	72	93	102	79	118	73	112	103	93	137
Smolenskaya Oblast	83	101	102	91	106	66	101	108	79	116	83	113	101	89	133
Tambovskaya Oblast	77	94	106	94	106	69	97	102	79	112	82	109	100	90	132
Tverskaya Oblast	79	95	99	90	103	81	104	101	80	116	75	110	103	92	135
Tul'skaya Oblast	82	94	112	88	105	80	106	102	83	121	88	103	102	92	133
Yaroslavl'skaya Oblast	81	91	99	90	111	73	108	104	83	125	86	105	103	97	137
Moscow City	77	106	107	82	109	53	108	112	75	110	81	108	103	87	132
<b>Northwest Federal Region</b>															

#### Within-Round Payoffs:

#### Notation Legend

125: initial employer endowment

25: initial worker endowment

Y: number of questions answered correctly by worker

W: wage paid to worker (second highest wage offered to worker)

Prediction Penalty (for employers): 1.25 times the total error in predicting the performance of workers

Prediction Penalty (for workers): 1.25 times the error in predicting own performance

The payoffs for each round will be calculated as follows:

Employer who hired no workers:

$\text{EmployerPayoff}_{\text{Round}T} = 125 - \text{Prediction Penalty}$

Employer who hired one worker:

$\text{EmployerPayoff}_{\text{Round}T} = 125 + (1/3) * Y * (5 \text{ points per question}) - W - \text{Prediction Penalty}$

Employer who hired two or more workers:

$\text{EmployerPayoff}_{\text{Round}T} = 125 + (1/3) * Y(1) * (5 \text{ points per question}) - W(1) + (1/3) * Y(2) * (5 \text{ points per question}) - W(2) + \dots - \text{Prediction Penalty}$

$(1/3) * Y(1) * (5 \text{ points per question}) - W(1)$  are the net earnings from the first “hired” worker,  $(1/3) * Y(2) * (5 \text{ points per question}) - W(2)$  are the net earnings from the second “hired” worker, and “...” represents the net earnings from the rest (if any) “hired” workers.

Workers:

$\text{WorkerPayoff}_{\text{Round}T} = 25 + (2/3) * Y * (5 \text{ points per question}) + W - \text{Prediction Penalty}$

Example: Employer hires one worker. The second-highest wage offered to the worker is  $W = 40$ . Number of correct answers ( $Y$ ) in round  $T = 10$ ; Worker’s prediction of  $Y$  is 8; Employer’s total prediction error is 6. The employer’s payoff in round  $T$  is \_\_\_\_\_. The worker’s payoff in round  $T$  is \_\_\_\_\_.

**Rounds:**

There will be 2 rounds consisting of wage offers made by employers to hire workers, performance predictions by the employer and worker, and subsequent task completion by the worker.

After the first round, each employer will receive the following information:

- Number of correct questions  $Y$  answered by each worker, even if the employer did not hire him or her.
- Own payoff for the round

Each worker will receive the following information:

- Total number of questions he or she answered
- Number of correct questions  $Y$
- Own payoff for the round

The final payoff for the experiment will be calculated as follows:

**Final payoff (\$)** =  $\text{Payoff}_{\text{Round1}}(\text{points}) * 0.04(\$/\text{point}) + \text{Payoff}_{\text{Round2}}(\text{points}) * 0.04(\$/\text{point}) +$   
Show-up fee (\$10)

**Are there any questions?**

## Instructions for the experiment: Round I

The remainder of the experiment consists of **2 rounds**.

### **Employers and Workers:**

You have been randomly assigned to one of the following roles: **employer** or **worker**. Your role is written in bold at the top of these instructions pages. You will remain in the same role for the duration of the experiment.

### Employers

Employers will start each round with an endowment of 125 points that they may keep or use to “hire” workers, who will perform a task described below. To “hire” workers, employers will submit fixed wage offers. The better the “hired” worker(s) perform(s) the task, the more points the employer will earn.

Note that the task may or may not change between rounds. The description of the task given below applies to this round only. Instructions for the second round task will be provided once the first round task is completed. However, the “hiring” process will remain the same in both rounds.

In each round, employers will see pictures of all workers on the right computer monitor. To see a particular worker’s resume, the employer will click on the text box below the worker’s picture. To return to the worker’s picture, the employer will click on the text box again.

### *Performance Prediction*

Next, employers will be asked to make a prediction for the performance of *each* worker. The prediction will be subject to a prediction penalty. For each item correctly entered by the worker above or below the prediction, we will subtract 0.25 points from the employer’s total payoff. When the number of items entered correctly (Y) is exactly equal to the prediction, the employer will not lose any points. So, the estimate that is the closest to reality will result in the highest earnings. In pilot trials for this task, the average number of items entered correctly was 75 (see task description below for more detail). The prediction penalty for employers will be based on his or her total prediction error for the workers’ performance.

The employer’s estimates will not be revealed to any other subject at any point during the experiment.

### *“Hiring” Workers*

Next, employers will have 3 minutes to make all the wage offers. Employers will make wage offers on the left computer monitor. Note that a given employer may offer equal wages to two or more workers. However, the total value of the offers cannot exceed his or her endowment of 125 points. An offer of zero (0) is equivalent to an unwillingness to hire that worker.

Based on the wage offers, each employer may be matched with one or more worker(s). If more than one employer tries to hire (offers a non-zero wage to) the same worker, the employer with

the highest wage offer will hire that worker. Ties will be resolved by a random draw. There is a possibility that an employer will not be matched to any worker. In that case, his or her earnings for that round will be equal to the endowment of 125 points.

Although the employer with the highest wage offer for a particular worker will “hire” that person, he or she will only have to pay the worker the second highest wage (W) offered to that worker.

Example:

	Employer 1 Offers	Employer 2 Offers	Employer 3 Offers
Worker 1	70 points	40 points	10 points
Worker 2	30 points	30 points	37 points
Worker 3	0 points	0 points	35 points

Outcome of employer-worker matching for employers:

- Employer 1 hires Worker 1 and pays a wage of 40 points, keeping 125 – 40 points.
- Employer 2 does not hire anyone, keeping 125 points.
- Employer 3 hires Workers 2 and 3 and pays them wages of 30 and 0 points, respectively, keeping 125 – 30 points.

Outcome of employer-worker matching for workers:

- Worker 1 is hired by Employer 1 and receives a wage of 40 points.
- Worker 2 is hired by Employer 3 and receives a wage of 30 points.
- Worker 3 is hired by Employer 3 and receives a wage of 0 points.

Upon completion of the task, the employer will earn a payoff based on the performance of the worker(s) he or she hired (if any) and the wage he or she paid to the worker(s), as determined by the above procedure.

Workers

Workers will start each round with an endowment of 25 points.

*Performance Prediction*

Workers will first estimate the number of items they expect to enter correctly in the task. Workers will be asked to make a prediction only for their *own* performance. The prediction will be subject to a prediction penalty. For each item correctly entered by the worker above or below the prediction, we will subtract 0.25 points from the worker’s total payoff. When the number of items entered correctly (Y) is exactly equal to the prediction, the worker will not lose any points. So, the estimate that is the closest to reality will result in the highest earnings. In pilot trials for this task, the average number of items entered correctly was 75 (see task description below for more detail). The prediction penalty for workers will be based on the prediction error for his or her own performance.

The worker's estimates will not be revealed to any other subject at any point during the experiment.

### *Getting "Hired" by an Employer*

Then, workers will wait until they are matched to an employer (if any). Each worker will then engage in a data entry task described below. Upon completion of the task, workers will be informed of the fixed wage (W) paid by their employer (if any). Workers will also get a summary of their earnings in the data entry task. All wages and additional payoffs based on performance will be paid at the end of the experiment.

### **Tasks:**

#### Employers

Employers do not have any further tasks beyond offering the workers' wages and predicting worker performance, as described above. During the task completion phase, the employers are free to read or engage in other quiet activities. Do not use the lab computer until instructed again by us.

#### Workers

The workers will have 6 minutes to enter as much data as possible correctly. At the end of the 6-minute period, the experimenters will determine the number of correctly entered items (Y). Workers will be paid 1 point per correctly entered item.

### **Sample Data Entry Task**

Read the following carefully to understand the nature of the workers' task.

Below is a sample of the kind of data workers will be asked to enter from a paper copy into electronic format. The worker's task will be to enter the data exactly as it appears. The titles of the rows and columns have been pre-filled in an Excel spreadsheet into which the worker will enter the data.

For example, enter "104" into the cell corresponding to the row "Belgorodskaya Oblast" and the year "2000" in the "Real Income (percent of previous year)" column. Note that workers may see some "... " or blank entries. These entries correspond to missing values in the data. They will not count toward the number of correct items.

## 4. Population Living Standard

### 4.1 Changes in Income

	Real income (percent of previous year)					Real wages (percent of previous year)					Real pensions (percent of previous year)				
	1995	1996	1997	1999	2000	1995	1996	1997	1999	2000	1995	1996	1997	1999	2000
<b>Russian Federation</b>	<b>84</b>	<b>101</b>	<b>106</b>	<b>87</b>	<b>111</b>	<b>72</b>	<b>106</b>	<b>105</b>	<b>78</b>	<b>121</b>	<b>87</b>	<b>108</b>	<b>103</b>	<b>95</b>	<b>131</b>
<b>Central Federal Region</b>															
Belgorodskaya Oblast	84	103	92	83	104	72	103	98	80	117	89	104	101	92	131
Bryanskaya Oblast	76	102	97	82	107	68	97	102	78	116	77	108	101	94	134
Vladimirskaya Oblast	77	102	108	89	100	77	105	108	82	122	83	112	104	95	140
Voronezhskaya Oblast	90	87	122	82	97	71	103	104	80	117	85	105	100	96	130
Ivanovskaya Oblast	89	99	103	75	106	76	102	97	73	117	83	107	104	93	143
Kaluzhskaya Oblast	82	87	99	82	102	70	104	108	80	126	76	111	106	98	135
Kostromskaya Oblast	85	89	100	92	104	77	105	101	83	111	81	110	104	96	134
Kurskaya Oblast	78	98	111	86	98	70	101	103	76	111	81	109	105	90	132
Lipezkaya Oblast	84	108	95	90	112	76	106	101	78	122	80	111	98	89	131
Moskovskaya Oblast	74	102	114	89	108	75	106	114	85	120	97	112	108	95	134
Orlovskaya Oblast	76	105	99	85	103	69	109	108	87	122	85	108	110	93	136
Ryazanskaya Oblast	76	95	105	85	103	72	93	102	79	118	73	112	103	93	137
Smolenskaya Oblast	83	101	102	91	106	66	101	108	79	116	83	113	101	89	133
Tambovskaya Oblast	77	94	106	94	106	69	97	102	79	112	82	109	100	90	132
Tverskaya Oblast	79	95	99	90	103	81	104	101	80	116	75	110	103	92	135
Tulskaya Oblast	82	94	112	88	105	80	106	102	83	121	88	103	102	92	133
Yaroslavskaya Oblast	81	91	99	90	111	73	108	104	83	125	86	105	103	97	137
Moscow City	77	106	107	82	109	53	108	112	75	110	81	108	103	87	132
<b>Northwest Federal Region</b>															

Below is a reproduction of the spreadsheet corresponding to the sample data above. It will appear larger on the worker's screen and may not have the same borders as shown here.

Table	Region name	Real income 1995	Real income 1996	Real income 1997	Real income 1999	Real income 2000	Real wages 1995	Real wages 1996	Real wages 1997	Real wages 1999	Real wages 2000	Real pensions 1995	Real pensions 1996	Real pensions 1997	Real pensions 1999	Real pensions 2000
4.1	Russian Federation															
4.1	Central Federal Region															
4.1	Belgorodskaya Oblast															
4.1	Bryanskaya Oblast															
4.1	Vladimirskaya Oblast															
4.1	Voronezhskaya Oblast															
4.1	Ivanovskaya Oblast															
4.1	Kaluzhskaya Oblast															
4.1	Kostromskaya Oblast															
4.1	Kurskaya Oblast															
4.1	Lipezkaya Oblast															
4.1	Moskovskaya Oblast															
4.1	Orlovskaya Oblast															
4.1	Ryazanskaya Oblast															
4.1	Smolenskaya Oblast															
4.1	Tambovskaya Oblast															
4.1	Tverskaya Oblast															
4.1	Tulskaya Oblast															
4.1	Yaroslavskaya Oblast															
4.1	Moscow City															

The blank spreadsheets should already be open on workers' right screens. Please do not enter anything into the spreadsheets until instructed to do so. Do not manipulate the spreadsheets in any way.

Recall that workers will have 6 minutes to enter as much data as possible. We do not expect workers to be able to enter all the data, so there may be several un-entered data sheets left after time is up. Once the time is up, workers should stop entering data and wait for one of the experimenters, who will save and close the spreadsheets. Workers should not try to save or close the spreadsheets themselves – this may result in improper processing and miscalculation of correctly entered items.

We will then check the entries for accuracy. In order to receive points for entering the data correctly, the entry in each cell must be exact and must correspond to the appropriate row and column. For example, if a worker enters “107” instead of “104” into the cell corresponding to the row “Belgorodskaya Oblast” and the year “2000” in the “Real Income (percent of previous year)” column, he or she will receive 0 points for that entry.

### **Within-Round Payoffs:**

#### **Notation Legend**

125: initial employer endowment

25: initial worker endowment

Y: number of items entered correctly by worker

W: wage paid to worker (second highest wage offered to worker)

Prediction Penalty (for employers): 0.25 times the total error in predicting the performance of workers

Prediction Penalty (for workers): 0.25 times the error in predicting own performance

The payoffs for each round will be calculated as follows:

#### **Employer who hired no workers:**

$$\text{EmployerPayoff}_{\text{Round}T} = 125 - \text{Prediction Penalty}$$

#### **Employer who hired one worker:**

$$\text{EmployerPayoff}_{\text{Round}T} = 125 + (1/3)*Y - W - \text{Prediction Penalty}$$

#### **Employer who hired two or more workers:**

$$\text{EmployerPayoff}_{\text{Round}T} = 125 + (1/3)*Y(1) - W(1) + (1/3)*Y(2) - W(2) + \dots - \text{Prediction Penalty}$$

$(1/3)*Y(1) - W(1)$  are the net earnings from the first “hired” worker,  $(1/3)*Y(2) - W(2)$  are the net earnings from the second “hired” worker, and “...” represents the net earnings from the rest (if any) “hired” workers.

#### **Workers:**

$$\text{WorkerPayoff}_{\text{Round}T} = 25 + (2/3)*Y + W - \text{Prediction Penalty}$$

**Example:** Employer hires one worker. The second-highest wage offered to the worker is  $W = 40$ . Number of correct items ( $Y$ ) in round  $T = 45$ ; Worker’s prediction of  $Y$  is 40; Employer’s

total prediction error is 6. The employer's payoff in round T is \_\_\_\_\_. The worker's payoff in round T is \_\_\_\_\_.

**Rounds:**

There will be 2 rounds consisting of wage offers made by employers to hire workers, performance predictions by the employer and worker, and subsequent task completion by the worker.

After the first round, each employer will receive the following information:

- Number of correct items Y entered by each worker, even if the employer did not hire him or her.
- Own payoff for the round

Each worker will receive the following information:

- Total number of items he or she entered
- Number of correct items Y out of the verified items
- Own payoff for the round

The final payoff for the experiment will be calculated as follows:

**Final payoff (\$)** =  $\text{Payoff}_{\text{Round1}}(\text{points}) * 0.04(\$/\text{point}) + \text{Payoff}_{\text{Round2}}(\text{points}) * 0.04(\$/\text{point}) +$   
Show-up fee (\$10)

**Are there any questions?**

**RESUME-BUILDING QUESTIONNAIRE**

[Note that all questionnaires will be computerized.]

PLEASE ANSWER THE FOLLOWING QUESTIONS! YOUR ANSWERS WILL BE USED TO BUILD YOUR RESUME

Note that the answers may be viewed by some other participants.

Please, answer each question as truthfully as possible! The outcomes of the experiment and your earning may depend on your responses. After you answer the questions, please, wait for the second part of the experiment to begin.

1. From the options listed below, please, indicate your current student status at your college or university:

- Undergraduate
- Graduate
- Other

2. Which of the following areas of study best represents your major or concentration at your college or university? (If you are a double-major and your majors span more than one of the three areas below, please, choose the area that you consider to be your primary focus.)

- Natural Sciences (including engineering and math)
- Social Sciences
- Humanities
- Undeclared

3. Indicate the range that your overall undergraduate GPA falls into (on a 4.0 scale), even if you are no longer an undergraduate. Choose N/A if you wish not to disclose your GPA. (If your college or university uses a different GPA system, please, convert to the 4.0 scale to the best of your ability.)

- 0-2.0
- 2.0-2.5
- 2.5-3.0
- 3.0-3.5
- 3.5-4.0
- N/A

4. The following three questions ask you to assess your proficiency in several areas. Please, be as objective in your assessment as possible.

Typing skills:

- Basic
- Good
- Excellent

Analytical skills:

- Basic
- Good
- Excellent

Communications skills:

- Basic
- Good
- Excellent

**POST-EXPERIMENT QUESTIONNAIRE**

Please fill out this brief questionnaire. Again, we ask you to answer all questions as truthfully as possible. Your answers will help us tremendously! Feel free to leave any of the answers blank if you prefer not to answer.

1. Gender:  Male  Female
2. Age: \_\_\_\_\_
3. Marital status:
  - Now married
  - Widowed
  - Divorced
  - Separated
  - Never married
 Are you of Hispanic origin or descent, such as Mexican, Puerto Rican, Cuban, or other Spanish background?  Yes  No
4. Which of the following best describe(s) your race (check all that apply)?
  - American Indian or Alaska Native
  - Asian
  - Black or African American
  - Native Hawaiian or Other Pacific Islander
  - White
  - Other (please specify) \_\_\_\_\_
5. Country of birth: \_\_\_\_\_
6. Are you currently a student?  Yes  No
  - 1) If yes, what is your student status?  Graduate  Undergraduate
  - 2) If yes, what is (are) your field(s) of study? \_\_\_\_\_
7. What is (was) your undergraduate GPA, on a 4.0 scale? \_\_\_\_\_
8. What is your family's total household income?
  - Under \$20,000
  - \$20,000 to \$45,000
  - \$45,000 to \$65,000
  - \$65,000 to \$90,000
  - \$90,000 to \$125,000
  - \$125,000 to \$200,000

More questions on the next page!

\$200,000 or more

9. Please describe any significant work or internship experiences (paid or unpaid) that you held in the past or currently hold. Indicate the top skill that was most important for the success in that job.

1) Job Title: \_\_\_\_\_

Job Description: \_\_\_\_\_

Analytical/Quantitative       Verbal/Communication       Typing  
 Creative       Working with other people       Other (specify) \_\_\_\_\_

2) Job Title: \_\_\_\_\_

Job Description: \_\_\_\_\_

Analytical/Quantitative       Verbal/Communication       Typing  
 Creative       Working with other people       Other (specify) \_\_\_\_\_

3) Job Title: \_\_\_\_\_

Job Description: \_\_\_\_\_

Analytical/Quantitative       Verbal/Communication       Typing  
 Creative       Working with other people       Other (specify) \_\_\_\_\_

10. If you were in the role of EMPLOYER in this experiment, please indicate with which worker(s) (if any) you have a personal relationship (friend, classmate, co-worker, etc).

None       Worker 1       Worker 2       Worker 3       Worker 4

**THANK YOU VERY MUCH FOR YOUR PARTICIPATION IN THIS STUDY!**