

Division of Economics  
A.J. Palumbo School of Business Administration  
Duquesne University  
Pittsburgh, Pennsylvania

USING GAME SHOWS TO TEST GENDER DIFFERENCES IN WAGE NEGOTIATION

Eileen Wang

Submitted to the Economics Faculty  
in partial fulfillment of the requirements for the degree of  
Bachelor of Arts in Economics

December 2012

## Faculty Advisor Signature Page

---

Antony Davies, Ph.D.  
Associate Professor of Economics

Date

*Previous research found that gender differences in negotiation might be one contributing factor in the gender wage gap. This paper used the natural experiment provided by the television game show The Price is Right as an analog for wage negotiation. Data from The Price is Right was collected to examine if men and women bid differently and how the difference might affect the gender wage gap. The results show that women bid higher than men do and suggests that men and women may exhibit different bidding strategies.*

JEL classifications: C93, D44

Key words: negotiation, gender wage gap, bidding, auction, game show, The Price is Right

## Table of Contents

|   |    |
|---|----|
| I. Overview of Past Research.....                 | 5  |
| II. Literature Review.....                        | 7  |
| III. Methodology.....                             | 13 |
| A. Description of The Price is Right.....         | 13 |
| B. Justification of using The Price is Right..... | 14 |
| C. Data Collection and Variables.....             | 16 |
| IV. Results.....                                  | 18 |
| V. Economic Implications.....                     | 22 |
| VI. Suggestion for Future Research.....           | 23 |
| VII. Conclusion.....                              | 24 |
| VIII. References.....                             | 26 |
| Appendix 1: Variation in Coefficients.....        | 28 |

## **I. Overview of Past Research**

According to the U.S. Department of Labor, women's earnings were 81% of men's earnings in 2010. A literature survey conducted for the U.S. Department of Labor found that economic studies attribute most of the gender wage gap to differences in occupational factors, motherhood, and differences in fringe benefits (2009).

Previous research has identified several factors that contribute to the gender wage gap. Researches find that 50 to 60 percent of the gender wage gap is attributed to women's tendency to work in low paying industries (Boraas & Rodgers, 2003; Bowler, 1999; Fields & Wolff, 1995; Groshen, 1991; Johnson & Solon, 1986; Lowen & Sicilian, 2008; Oaxaca, 1973; Solberg & Laughlin, 1995; Weinberg, 2007). Groshen (1991) found that within the same industries the difference in wages between men and women were either small or nonexistent. However, the trend of women moving to higher paying industries has caused the gender wage gap to decrease from a 37.5 percent wage gap in 1979 to a 19.2 percent wage in 2006.

More women are obtaining education in higher paying fields (Blau & Kahn, 2000; Bowler, 1999; DiNatale & Boraas, 2002). Blau and Kahn found that more women are studying math and science while more men are studying health science and education (Blau & Kahn, 2000). Another contributor to the wage gap is cumulative work experience. Wages exhibit diminishing returns to experience (GAO 1995, Blau and Kahn 2006, Borass and Roders 2003). Light and Ureta (1995) and Spivey (2005) found that men lost more when they left the work place and women gain wage back faster than men when they re-enter the work place. Light and Ureta estimated that women's earnings decreased up to 23 percent after leaving work for at least one year while men's earnings decreased up to 25 percent. Also, the earnings of women who took extended leaved increased to the level of those who did not take an extended leave after roughly four years while it took men longer to make up the

difference. Light and Ureta (1995) estimated that work experience accounted for nearly half the gender wage gap between 1968 and 1984.

Budig and England (2001) found that after accounting for motherhood's effect on occupational factors (work experience and job type), the remaining effect of motherhood contributed 3.7 percent to the gender wage gap. However, Dey and Hill's (2007) study of college graduates found that motherhood itself does not reduce a women's wage but leave from work caused by motherhood does. Anderson, Binder, and Krause (2003) estimated motherhood wage penalty was roughly 3 to 5 percent. They found that college degrees are associated with less or even no wage reduction for having children because better-educated workers can request more flexible schedules (2003). They also found that mothers with younger children will lose more money than mothers with older children (2003).

Another cause for the gender wage gap is the amount of fringe benefits companies offer (Solberg and Laughlin 1995, Lowen and Sicilian 2008). The biggest portion of the fringe benefit differences between men and women is healthcare (Gruber 1994, Sheiner 1999, Olson 2002). Differences in healthcare costs are another reason for the gender wage gap. Sheiner found that companies substitute wage with more healthcare by comparing wage and healthcare provided by companies in different cities. Gruber found that the costs of maternity mandate benefits are disproportionately shifted towards women of childbearing age. Olson found that wives with company health insurance earn less than other without. Given these factors, the adjusted gender wage gap is estimated to be between 4.8 percent and 7.1 percent.

Other economists attribute part of the gender wage gap to differences in risk tolerance. Eckel and Grossman (2008) experimented on the degree of risk tolerance between genders and found no significant difference between men and women under the presence of risk. While Eckel and Grossman's experiments may have been inconclusive, many other economists who

used measurements from real life situations found results that were more significant.

Jianakoplos, Ammon, and Bernasek (2007) found that single women are more risk averse than singly men by measuring the level of risky assets held by men and women. By using data from retirement accounts from the Health and Retirement Study, Neelakantan (2010) concluded that the difference in risk tolerance between men and women account for about 10% of the difference in wealth. Though risk tolerance is measured differently in different studies, the results of these studies suggest that women are more risk averse than men.

## **II. Literature Review**

Babcock, Gelfand, Gettman, and Small (2007) conducted several experiments to observe if framing had an effect on the frequency in which men and women negotiate. In these experiments, Babcock et al. framed the participants by anchoring them with different ideas through the instructions given before the experiment began. They ran five sets of studies, each testing how different frames affect the participants' propensity to negotiate. They told all the participants that they would receive 3 to 10 dollars after playing four three-minute rounds of Boggle. The participants would signal the examiner when finished to receive their monetary reward.

The first study consisted of 35 men and 39 women between the ages of 17 to 40 with a mean age of 23. All the participants were told, "You have now completed four rounds of Boggle and will be compensated between \$3 and \$10. Please indicate to the experimenter that you are finished, so that he or she can score your rounds. Then you will be paid" (2007). The results showed that men initiated negotiation significantly more often than women did.

The second study consisted of 33 men and 34 women between the ages of 18 and 46 with a mean age of 21. Babcock et al. split the participants of this study into two groups. Group 1 was given the same instructions as the participants in the first study. Group 2 was told that, "The exact payment is negotiable" (2007). Babcock et al. found that participants who were told that the payment was negotiable negotiated more often. However, the difference was not significant.

The third study consisted of 62 men and 46 women ages 18 to 34 with mean age of 19. The participants of this group were divided into two groups. Group 1 was framed with negotiating for more money and group 2 was framed with asking for more money. Babcock et al. did this by telling group 1, "We are interested in your thoughts and feelings about negotiating for things for yourself" and group 2, "We are interested in your thoughts and feelings about asking for things for yourself" (2007). Babcock et al. then proceeded to ask the participants questions regarding negotiation. The results of study 3 showed no significant effect due to gender but did show a significant effect due to framing and the interaction between gender and framing. Babcock et al. found that men did not behave differently under negotiating or asking, but women did. Based on the answers to the participants feeling on negotiating and asking for things, Babcock found that women find negotiating to be more intimidating than asking.

The fourth study consisted of 81 men and 72 women between the ages of 18 and 56 with a mean age of 22. Babcock et al. broke this study into three groups. Group 1 was a control group given the same instructions as the participants in study 1. Group 2 was framed with negotiating cue, "You will be compensated between \$3 and \$10. The exact payment is not fixed, and you can ask for more if you want. Many participants negotiate for a higher payment" and group 3 was framed with asking cue, "You will be compensated between \$3 and \$10. The exact payment is not fixed, and you can ask for more if you want. Many participants ask for a higher



payment". Babcock et al. found that those framed with negotiating a negotiating cue negotiated more than the control but there was still a gender gap between the men and the women. Of those who were framed with asking, the women behaved similarly to men.

The fifth study consisted of 70 men and 79 women between the ages 18 and 60 with a mean age of 25. This study tested the effects of framing with power. Babcock et al. separated this study into four groups. Group 1 was told, "Please recall a particular incident in which you had power over another individual or individuals. By power, we mean a situation in which you had control and influence over others. Please describe this situation in which you had power—what happened, how you felt, and so on", and group 2 was told to, "Please describe the way you typically spend your evenings. Begin by writing down a description of your activities, and then figure out how much time you devoted to each activity. Examples of things you might describe include eating dinner, studying for a particular exam, hanging out with certain friends, watching TV, and so on"(2007). They then framed half of group 1 and half of group 2 to asking for more reward and the other half to negotiate for more reward. Babcock et al. found that women framed with power behaved like men when cued to negotiate, but there was no effect on the women cued to ask. The men framed with power did not behave significantly different from those who were not

Babcock et al. concludes that women are more intimidated by negotiation than men are which is why framing the situation rather than asking increases the frequency of negotiation for women. When women are framed with power, they become less intimidated by negotiation, which is why women framed with power did not perceive a difference between being asking for more money and negotiating for more money.

O'Shea and Bush (2002) tested differences in negotiation between men and women by sending out questionnaires to 1995 and 1996 graduates of business, psychology, sociology, and history students at a certain Mid-Atlantic university, asking whether the graduate got a professional job after college and if they are still at that job. The questionnaire also asked about their initial salary offer, if the graduate negotiated on that offer and the size of the final salary. They also asked questions on whether or not the student had any other job offers, and some demographic variables. O'Shea and Bush used a logit model; they only analyzed the people who reported the starting and final salary and whether or not they negotiated. The initial offer was lower for those who did negotiate (though this was not significant). They also found that those who were offered a chance to "present their salary needs" were more likely to negotiate. However, their results for the likelihood of negotiation based on gender were not significant due to a small data sample. They did find that those who held previous jobs were more likely to be presented with the option to present their salary needs and that women had lower initial salary offers than men.

Leibrandt and List (2012) conducted a natural experiment to observe how men and women treat job applications differently. They sent out job applications; some of which stated wages were negotiable and others left the possibility of wage negotiation ambiguous. Leibrandt and List also separated the applications into masculine and gender neutral jobs. They used these two pairs of characteristics in a two by two factorial design model. Leibrandt and List informed the applicants of the job setting in two stages. They first advertised the job position to interested applicants and then they informed them of the job environment. After being informed, the applicants decided if they wish to continue with the job application process. Applicants who

wished to continue were randomly placed in either a group where wage negotiation was stated as possible or left ambiguous.

Leibrandt and List found that men were more likely to apply for both jobs regardless of whether the possibility of negotiation was stated or left ambiguous. They also found that men were markedly more likely than women to negotiate when the option of negotiating was left ambiguous, while women were more likely than men to negotiate if they were specifically told wages were negotiable. Liebrandt and List believed that the gender difference in negotiation was less pronounced when the negotiations were impersonal and not face to face. Leibrandt and List speculated that in the future the wage gap might shrink given the trend towards more impersonal transactions.

Compared to Babcock et al.'s results, Liebrandt and List showed that women would negotiate more frequently if they knew negotiation was allowed. However, Babcock et al. showed that women negotiate as frequently as men do only when they perceived the negotiation process as asking for more money instead of negotiating for more money. The reason for this difference may be because it is more typical for potential employees to negotiate for his or her salary while most people do not have experience with negotiating for a reward during an experimental study. Because of this, women might find wage negotiation less intimidating than reward negotiation as a subject in an experimental study.

Stuhlmacher and Walters (1999) performed a meta-analysis on the difference in negotiation outcomes between men and women. They included both published and unpublished research to avoid possible publication bias. To be included in their meta-analysis, an article had to compare final negotiation outcomes between men and women, measure the outcomes of negotiations, use participants from the United States and Canada who were at least fourteen

years old, and have results that could be used to measure effect size and the direction of gender differences. Stuhlmacher and Walters excluded studies that only used comprise solutions, and matrix games as these games were simultaneous and had limited interaction. In total, Stuhlmacher and Walters looked at twenty-one studies that covered a combined 1,946 men and 1,550 women.

Of the studies they considered, Stuhlmacher and Walters created variables on the year of the study, gender of the first author, ratio of male authors, publication status, negotiator dyad (same or different gender), experiment setting, participant status (students, adults, mixed), number of participants, conflict situation, gender stereotype being tested, negotiator role (buyer, seller, supervisor, etc), number of resolved issues, tradeoff potential, method of communication, incentives offered, confederates use, contingent or noncontingent offers, operationalization of settlement, joint or individual outcome type, presence of constituents, future interaction possibility, number of negotiations each person or group of people perform, strategy of opponent, and negotiator power. The negotiator power was categorized as equal to the other negotiator, low relative to the other negotiator, or high relative to the other negotiator.

Stuhlmacher and Walters computed effect size by comparing the settlement reached by men and women through negotiation. They used the Hedges and Olkin method to find  $g$ , “the difference between men and women on negotiation outcome, divided by the pooled standard deviation” (1999). The  $g$  statistic was used whenever possible. However, Stuhlmacher and Walters also used the  $F$  test, proportions test, and correlation coefficients.

Stuhlmacher and Walters found the effect size was significant at the  $p < 0.01$  level, indicating women receive smaller profits from negotiation than men. Stuhlmacher and Walters removed studies with insignificant results and still found a slightly higher but similar size effect.

They also performed a heterogeneity test and found an insignificant *p-value*, thus concluding that their results were homogeneous. The results of their control variables showed that; higher relative power had a higher size effect than equal power in negotiations, distributive negotiations had a higher size effect than integrative negotiations, face-to-face negotiation has a higher size effect than non-face-to-face negotiations, nonstudent negotiations had a higher size effect than student, negotiations with a constituent present had higher size effect than negotiations with no constituents present, negotiations where future interaction was likely had more size effect than negotiations where future interaction was not expected, negotiations where incentives were not offered had higher size effect than negotiations where incentives were not offered, and smaller size effect with opposite gender opponents than with same gender opponents, but these effects were reversed when field studies were removed. They found no difference in size effect between laboratory studies and field studies. Lastly, publication bias made the size effect larger by 5% but did not change the other findings. Stuhlmacher and Walters cautioned the reader that their analysis consisted of a small sample of studies which might not have fully represented the total population.

### **III. Methodology**

#### *A. Description of The Price is Right*

I will observe the natural experiment that occurs in the game show *The Price is Right* as an analogue for the wage negotiation process. In the game show *The Price is Right*, four contestants are randomly called from the audience to partake in a bidding game. The host shows the players a prize then gives a short description of the prize. The players then bid on the retail value of the prize in order from right to left (from the players perspective). Each player knows

the bid of the previous player(s). The player who bids closest to the actual retail price of the prize without bidding over wins the prize and an opportunity to play another pricing game. If a player bids exactly on the retail price, he/she wins an additional \$500 in addition to the prize. After each round of bidding, another player is randomly called from the audience to repeat another round of the bidding game. If all four players overbid on the price of the prize, the bidding process starts over again with the players bidding in the same order on the same prize. After the first round, the new player will always be the first player to bid on the new prize. In each episode, there are six rounds of this bidding game. I will use the data I collect from the game show to observe if men and women bid differently.

#### *B. Justification of using The Price is Right*

I justify using The Price is Right for several reasons. The prizes of this show provide a much larger incentive than most research experiments can offer. This show also captures the uncertainty the players have about the reservation prize. Most importantly, The Price is Right has similar incentives in utility maximization and opportunity cost reduction.

A potential employee's goal is to maximize his/her salary. To do so, he/she strives to negotiate as close to the employer's reservation price as he/she can. If the potential employee demands a price that exceeds the employer's reservation price, the employer will not hire him/her, and so the opportunity cost of demanding too high a price is the wage.

If the employee demands a price that is lower than the employer's reservation price, the employer will hire him/her and the potential employee's opportunity cost is the difference between the demanded salary and the maximum salary the employer would have paid. The probability of obtaining a job is the potential employee's salary demand subtracted from the

employer's reservation price all over the total reservation price. The probability of obtaining the job is shown in the following equation:

$$\text{probability of obtaining job} = \frac{(\text{reservation price} - \text{salary demand})}{\text{reservation price}} \quad (1)$$

The contestants in The Price is Right also try to bid as close as they can to the reservation price, the retail value of the bid, without bidding over the preset limit. The opportunity cost of overbidding is the prize. This is shown as:

$$\text{opportunity cost} = \text{value of prize} \quad (2)$$

The opportunity cost from underbidding is:

$$e(\text{opportunity cost}) = \quad (3)$$

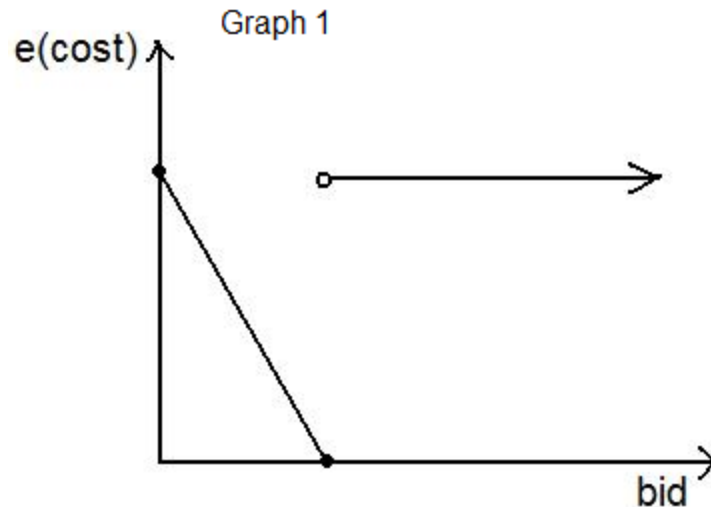
$$\text{value of winning}(\text{probability of winning}) + \text{value of losing}(\text{probability of losing})$$

This can be simplified to:

$$e(\text{opportunity cost}) = \text{value of prize} - \text{bid} \quad (4)$$

Similar to wage negotiation, the opportunity cost of bidding under is the difference between the value of the prize and the bid the player placed. However, unlike The Price is Right, overbidding does not mean the potential employee automatically loses the job. The potential employees only lose the job when the results of the bidding are above the reservation value. In The Price is Right, the players automatically lose if they overbid. Hence I removed all the overbids in The Price is Right data to make my analysis a better representation of actual wage negotiation.

Wage negotiation and The Price is Right is unique in that the cost of over bidding is not symmetric to the utility of under bidding. The following graph illustrates that, the higher the bid is, the lower the expected cost, until the bid exceeds the maximum value.



I used bid divided by value of item as the dependent variable. This allows me to assess how close the bids are to retail value. With this, I can compare how women bid differently than men.

In *The Price is Right*, some players choose extremely low bids, usually one dollar, if they suspect that other players have or will bid over the retail value. If a player who is not the last person to bid in a certain round bids one dollar, the player who bids after will sometimes bid two dollars to maximize his/her chances of winning if he/she also believes the other players bid over the retail price. These extreme bids follow a different strategy than bidding as close to the retail price as possible without going over. Therefore, I have removed all the extreme low bids that are \$10 or under.

### *C. Data Collection and Variables*

I have recorded the gender of the players, as this is the main factor I want to test. The gender was set as a dummy variable with females being 0 and male 1. I also recorded the order in which the players bid because players who bid later have the advantage of knowing the previous bids. I recorded the number of chances the players expect to have left to bid. This



means each player in round one would expect to have six chances left to bid while each player in round three would expect to have four chances left to bid. The chances left to bid range from one to six because there are six rounds per show. Lastly, I recorded each player's bid and the retail value of the prize. I have collected data on 182 episodes; 2,066 bids from seventy-three episodes found on youtube.com and 2,944 bids from 109 episode recaps found on www.golden-road.net. After removing all the bids under \$10 and one 2 million dollar bid that was too large to be displayed on each player's screen, the data set was reduced to 4,494 bids, 2,763 females and 1,731 males. I then removed the overbids and my dataset was further reduced to 2,986 bids, 1,849 females and 1,137 males.

I used the data I had collected as dependent variables for the bid to value ratio. I also generated three new variables that may contribute to the dependent variable. The first variable I generated is the standard deviation of the previous bids. The second is the bid placed by the previous bidder. These two variables may provide the bidder information on the value of the prize. The last is the number of rounds a player will have played after said player finish the round that is currently being played. This measured the level of experience the player had. I also generated multiple interaction variables to test for possible gender effect of each variable. By using the previous bid and standard deviation of the previous bids, I had to remove the first bid in each round because there is no value for standard deviation or previous bid for the first bidder. After removing the first bids, my data set was reduced to 2165 bids, 1340 females and 825 male. I used an *OLS* regression to test these variables' effects on the bid to value ratio. A list of the variables are shown in Table 1.

**Table 1.**

|                    |  |
|--------------------|--|
| Bid/Value          | The contestant's bid divided by the value of the good on which the contestant is bidding |
| Gender             | Gender of the player (male = 1, female = 0)  |
| Value              | The retail value of the prize the contestant bids on.                                    |
| Bid Order          | $N$ if the contestant is the $N^{th}$ bidder.  |
| Bids Left          | A contestant's expected rounds left to bid.  |
| Standard Deviation | The standard deviation of the previous bids.   |
| Previous Bid       | Bid placed by previous player.   |
| Experience         | The number of round(s) a contestant will have played after the current round.            |

#### IV. Results

Based on previous research, I hypothesized that women will bid lower compared to men. To test this, I took the ratio of each player's bid to value of the prize he/she bid on as my dependent variable. A bid to value ratio is a more accurate measure on how a player bids than just the difference between the value of the prize and the bid on the value because the price of each prize is different. A higher bid to value ratio mean the bidder is bidding closer to the reservation price while a lower bid to value ratio means the bidder is bidding further from the reservation price.

The first regression I preformed included gender, bid order, value of the prize, bids left, standard deviation, previous bid, and experience. The gender coefficient is negatively significant at the 10% level. Contrary to my hypothesis, this indicates that women may bid higher than men do. The bid order coefficient of 0.0141 is significantly positive at the 1% level, which suggests players bid 1.41 percentage point higher per each move down the bidding line. The value of the prize coefficient of -0.0001 is significantly negative at the 1% level. This suggests that players

bid more conservatively as the value of the prize increase. The coefficient of standard deviation is significantly negative at the 5% level. However, the variable only affects the bid to value ratio by 0.00128 percentage point. The previous bid coefficient of 0.0001 is significantly positive at the 1% level, which suggests that players bid 0.01 percentage point higher than the previous bid. Lastly, the experience coefficient of -0.0218 is significantly negative at the 1% level, which suggests that experienced players bid more conservatively. The results are shown in Table 2.

**Table 2.** OSL on 2165 bids

| Variables  | Coefficient | Standard Error | P-Value |
|--|-------------|----------------|---------|
| Constant   | 0.8766      | 0.019          | 0.000   |
| Gender (male=1, female=0)  | -0.0147     | 0.008          | 0.059   |
| Bid Order  | 0.0141      | 0.003          | 0.000   |
| Value of Prize   | -0.0001     | 0.000          | 0.000   |
| Bids Left  | -0.0098     | 0.002          | 0.000   |
| Standard Deviation   | -0.0000     | 0.000          | 0.046   |
| Previous Bid   | 0.0001      | 0.000          | 0.000   |
| Experience   | -0.0218     | 0.002          | 0.000   |
| Adjusted R <sup>2</sup> =0.2974 P-Value<0.001*** P-Value<0.01** P-Value<0.1* |             |                |         |

The model shows no indication of heteroscedasticity, multicollinearity, or specification error. However, the omitted variable test did significantly reject the null hypothesis that there was no omitted variable bias. I performed another regression on the same variables in Table 2 but also added gender interaction variables. The results are shown in Table 3.

**Table 3.** OSL With Interaction Variables

| Variables  | Coefficient | Standard Error | P-Value |
|--|-------------|----------------|---------|
| Constant   | 0.899       | 0.038          | 0.000   |
| Gender (male=1, female=0)  | -0.081      | 0.003          | 0.030   |
| Bid Order  | 0.009       | 0.000          | 0.013   |
| Value of Prize   | -0.000      | 0.003          | 0.000   |
| Bids Left  | -0.007      | 0.000          | 0.014   |
| Standard Deviation   | -0.000      | 0.000          | 0.021   |
| Previous Bid   | 0.000       | 0.003          | 0.000   |
| Experience   | -0.021      | 0.006          | 0.000   |
| Gender x Bid Order   | 0.016       | 0.000          | 0.007   |
| Gender x Value of Prize  | 0.000       | 0.005          | 0.206   |
| Gender x Bids Left   | -0.007      | 0.000          | 0.142   |
| Gender x Standard Deviation  | 0.000       | 0.000          | 0.128   |
| Gender x Previous Bid  | 0.000       | 0.004          | 0.298   |
| Gender x Experience  | -0.003      | 0.023          | 0.526   |
| Adjusted R <sup>2</sup> =0.3008 P-Value<0.001*** P-Value<0.01** P-Value<0.1* |             |                |         |

With the interaction variables, the results show a significant coefficient of -0.0814 for the gender variable at the 5% level, which means that women significantly bid higher than men by 8.14 percentage points. The gender interaction variables did not cause any of the previous variables to become insignificant and improved the significance of the gender dummy. The only significant gender interaction variable was bid order at the 5% level. The 0.0156 coefficient on Gender x Bid Order indicated that for every turn down the bidding line, men bid 1.56 percentage points higher than women did. These results did not show signs of heteroscedasticity, multicollinearity, or miss specification error. However, it did show significant signs of omitted variable bias again.

I theorize that the increased value of the prize does not have a linear effect on the value to bid ratio. The players' bid to value ratio may become lower as the value increase, meaning the players bid more conservatively for bigger prizes. Therefore, I generated the variable value<sup>2</sup> to try to capture this effect. After performing multiple regressions with difference variations of the

independent variables, the one with the most significance in the independent variables uses the variables gender, bid order, value, bids left, standard deviation, previous bid, experience, value<sup>2</sup> gender interaction with bid order, gender interaction with value, and gender interaction with standard deviation. The results are shown in Table 4.

**Table 4**

| Variables                   | Coefficient | Standard Error | P-Value |
|-----------------------------|-------------|----------------|---------|
| Constant                    | 0.970       | 0.025          | 0.000   |
| Gender (male=1, female=0)   | -0.113      | 0.029          | 0.000   |
| Bid Order                   | 0.006       | 0.003          | 0.063   |
| Value of Prize              | -0.000      | 0.000          | 0.000   |
| Bids Left                   | -0.009      | 0.002          | 0.000   |
| Standard Deviation          | -0.000      | 0.000          | 0.002   |
| Previous Bid                | 0.000       | 0.000          | 0.000   |
| Experience                  | -0.022      | 0.002          | 0.000   |
| Value <sup>2</sup>          | 0.000       | 0.000          | 0.005   |
| Gender x Bid Order          | 0.016       | 0.006          | 0.066   |
| Gender x Value of Prize     | 0.000       | 0.000          | 0.022   |
| Gender x Standard Deviation | 0.000       | 0.000          | 0.000   |

The results of Table 4 suggest that women significantly bid 11.25% percentage point higher than men did. The 0.0064 coefficient on bid order suggests that for every turn down the line of bidding, players bid 0.64 percentage points higher. The significant negative coefficient for value still suggests that players bid more conservatively as the value of the prize increase. The significant -0.0094 coefficient on bids left suggest players bid 0.94 percentage points lower for each bid that player may have left. The significantly negative coefficient on standard deviation suggests that players will bid more conservatively the higher the variance of the previous bids are. The significant 0.001 coefficient on the previous bid suggest that players bid 0.1 percentage point higher than the previous bidder did. The significant -0.022 coefficient on experience suggests that players bid 2.2 percentage points lower per extra round they bid. The

significant 0.0162 coefficient on gender interaction with bid order suggests that men bid 1.62 percentage points higher than women did for every turn down the lining line. The significantly positive coefficient on gender interaction between value of the prize and standard deviation suggest that men bid higher than women did when the variance of the previous bids becomes higher and men bid higher than women did when the value of the prize becomes higher.

This regression shows no signs of heteroscedasticity and multicollinearity, but does show signs of omitted variable bias and specification error. I graphed the residuals of some regression results to the bid to value ratio. The graphs show an upward trend in the residual to the bid to value ratio. This suggests that there may be other factors influencing how player bid. However, the limited amount of observable information was utilized as best as possible.

A commonality across the different variation of regression was that the signs on the coefficients were always consistent even though it was not always significant. Furthermore, the values of the coefficients were all surprisingly similar. One interaction variable that was consistently significant was gender and bid order. The coefficient value for this variable ranged from 0.0155 to 0.0163. Though the gender dummy was not consistently significant under the 5% level, the value was consistently negative, indicating that women bid higher than men do. The gender coefficient ranged from -0.0751 to -0.1125 when gender interaction variable(s) were used. A chart of all the coefficient variation in the variables used is shown in Appendix 1.

## **V. Economic Implications**

If bid order is treated as an analog for the back and forth process of negotiation, it can be interpreted that men increase their bids more than women do when negotiating. Given that the gender dummy shows women bid higher than men, my results may suggest men and women

have different bidding strategies. Women starting with higher bids while men use negotiation to increase their bid. However, men's bids do not exceed women's bids even after making up the difference through negotiation. This could mean that men like to negotiate or that men need the negotiation process to increase their bids. In the labor market this may suggest that men prefer to negotiate more so than women. Previous research shows that men are more inclined to initiate negotiation (Babcock et al. 2003, Leibbrandt and List 2012).

A possible explanation for why women bid higher than men can draw from Stuhlmacher and Walters (1999). Stuhlmacher and Walters found that women ask for less when negotiating if it can be expected that they will have future interaction with the negotiator. They suggest that women value the relation established with their negotiators more than men do.

Therefore one possible reason as to why women bid higher than men on The Price is Right is because the negotiations in The Price is Right does not include a negotiator in which women can establish many relationships with. These interpretations suggest that to equalize salary differences cause by negotiation, women could negotiate in a setting with no negotiator.

Another implication that can be interpreted since women bid higher than men is that perhaps the gender wage gap is underestimated. If my results suggest women do bid higher than men do, all other things equal, women's salaries should be higher than men's salaries. Therefore, women's ability to negotiate possibility mitigates the gender wage gap. If this interpretation is correct, then there would be a smaller gender wage gap in jobs that require negotiation, such as white collar jobs, then jobs where there are no negotiations, such as blue collar jobs.

## **VI. Suggestion for Future Research**

To test interpretation that women are better at wage negotiation, future research can observe the gender wage gap between white collar and blue collar jobs. A more accurate

observation would look at white collar and blue collar jobs in the same salary range, i.e. around \$30,000 to \$35,000. If the wage gap in the white collar jobs is smaller than the wage gap in the blue collar jobs, then this assumption holds true.

If my results indicate that men like or need the negotiation process more so than women, then other natural experiments can be observe to look for this affect. For example, on auction websites with options to buy or bid (such as ebay), men would bid more frequently while women would use the "Buy It Now" option more frequently. The showcase auctions on The Price is Right can be another natural experiment used to test this assumption. In the showcase auction, one prize is shown to both these players. The player who won the most money before this game gets to choose who bids first on the prize shown. After the first person bids, another prize is shown to both players and the player who did not bid yet bids on the second prize. This represents a one shot bidding game where negotiations do not take place. If women reach their highest bid value early on and men do not, the women's bids on the showcase prizes should be higher than the men's bids on the showcase items.

An alternative to observing natural experiments would be conducting an original experiment with the same setting as The Price is Right and collect more data on the contestants to mitigate omitted variable bias. For example, the contestants' age, race, socioeconomic status, education, and marital status may all be significant factors in bidding behavior. If the direction of the coefficients in this new experiment is the same as direction of the coefficients from my study, then my results remain valid. Separating the data by gender is another method that can be use. Then an analysis of the two genders can be performed separately to observe if certain factors affect men and women differently. However, more research experiments conducted lack the benefit of the high monetary incentive offered by The Price is Right.



## **VII. Conclusion**

I hypothesized that men would bid higher than women would, but instead found the opposite. However, after each progression in bid order, men increased their bid to value ratio more so than women did. This can be interpreted as a difference in negotiation strategy between men and women. Women start with high bids but do not increase as much as men do after each round of negotiation. Men start low but make up the difference by negotiating higher.

In real wage negotiations, men end up with more than women do. However, my results seem to show the opposite. This might indicate that The Price is Right is missing some aspects of real negotiation. Babcock et al. found that the process of negotiation intimidated women. The Price is Right is not an actual negotiation in which the women must negotiate with another person. However, this does not mean there are no other intimidating factors on The Price is Right. Leibbrandt and List found that women ask for less when negotiating because women place greater value on the relationship they build between themselves and the negotiator. Since this game does not have an opposition in which the players are negotiating against, women may be less intimidated or not affected by the prospects of building a relationship. The Price is Right may also provide a skewed sample. Individuals who would take part in a game show may be more overzealous than the true population. However, if this does present a bias, it should affect both men and women.

## VIII. References

- Anderson D. J., M. Binder, and K. Krause (2003) The Motherhood Wage Penalty Revisited: Experience, Heterogeneity, Work Effort, and Work-Schedule Flexibility, *Industrial and Labor Relations Review*, 56(2): 273-294.
- Babcock L., and S. Laschever (2003) *Women Don't Ask, Negotiation and the Gender Divide*, Princeton Univ Pr, Print.
- Blau, F.D., M.A. Ferber, and A.E. Winkler (2007) *The Economics of Women, Men, and Work*. (5th ed.) Upper Saddle River, NJ: Pearson Education, Inc.
- Boraas, S. and W.M. III. Rodgers (2003) How Does Gender Play a Role in the Earnings Gap? An Update, *Monthly Labor Review*, 9-15.
- Bowler, M. (1999) Women's Earnings: An Overview, *Monthly Labor Review*, 13-21.
- Budig, M. J. and P. England (2001) The Wage Penalty for Motherhood, *American Sociological Review*, 66(2):204-225.
- CONSAD Research Corp. (2009) "An Analysis of Reasons for the Disparity in Wages between Men and Women," A Report Prepared for the U.S. Department of Labor.  
<http://www.consad.com/content/reports/Gender%20Wage%20Gap%20Final%20Report.pdf>
- Dey, J.G. and C. Hill (2007) *Behind the Pay Gap*, Washington, DC: American Association of University Women Educational Foundation.
- DiNatale, M. and S. Boraas (2002) The Labor Force Experience of Women From "Generation X", *Monthly Labor Review*, 3-15.
- Eckel, C. and P. Grossman (2008) Men, Women and Risk Aversion: Experimental Evidence, *Handbook of experimental economics results*, 1: 1061-1073.
- Fields, J. and E. Wolff (1995) Interindustry Wage Differentials and the Gender Wage Gap, *Industrial and Labor Relations Review*, 49(1): 105-120.
- Groshen, E. (1991) The Structure of the Female/Male Wage Differential: Is it Who You Are, What You Do, or Where You Work?, *Journal of Human Resources*, 26(3): 457-472.
- Gruber, J. (1994) The Incidence of Mandated Maternity Benefits, *American Economic Review*, 84(3): 622-641.
- Jianakoplos, N. and A. Bernasek (2007) Are Women More Risk Averse?, *Economic Inquiry*, 36(4): 620-630.

- Johnson, G. and G. Solon (1986) Estimates of the Direct Effects of Comparable Worth Policy, *American Economic Review*, 76:1117-1125.
- Leibbrandt, A. and J. List (2012) Do Women Avoid Salary Negotiations? Evidence From a Large Scale Natural Field Experiment, *NBER Working Paper Series*
- Light, A. and M. Ureta (1995) Early-Career Work Experience and Gender Wage Differentials, *Journal of Labor Economics*, 13(1): 121-154.
- Lowen, A. and P. Sicilian (2008) “Family-Friendly” Fringe Benefits and the Gender Wage Gap, *Journal of Labor Research*, 30(2): 101-119.
- Neelakantan, U. (2010) Estimation and impact of gender differences in risk tolerance, *Economic Inquiry*, 48(1): 228-233.
- Oaxaca, R. (1973) Male-Female Wage Differentials in Urban Labor Markets, *International Economic Review*, 14(3): 693-708.
- Olson, C. (2002) Do workers accept lower wages in exchange for health benefits?, *Journal of Labor Economics*, 20(2): 91-114.
- O'Shea, P. and D. Bush (2002) Negotiation For Starting Salary: Antecedents and Outcomes Among Recent College Graduates, *Journal of Business and Psychology*, 16(3): 365-382
- Sheiner, L. (1999) Health Care Costs, Wages, and Aging, *Washington, DC: Federal Reserve Board of Governors*.
- Small, D. A., Gelfand, M., Babcock L., and H. Gettman (2007) Who Goes to the Bargaining Table? The Influence of Gender and Framing on the Initiation of Negotiation, *Journal of personality and social psychology*, 93(4): 600.
- Solberg, E. and T. Laughlin (1995) The Gender Pay Gap, Fringe Benefits, and Occupational Crowding, *Industrial and Labor Relations Review*, 48(4): 692-708.
- Spivey, C. (2005) Time Off at What Price? The Effects of Career Interruptions on Earnings, *Industrial and Labor Relations Review*, 59(1): 119-140.
- Stuhlmazher, A. and A. Walters (1999) Gender Differences in Negotiation Outcome: A Meta-Analysis, *Personnel Psychology*, 52(3): 653-677
- Weinberg, D. (2007) Earnings by Gender: Evidence from Census 2000, *Monthly Labor Review*: 25-34.

## Appendix 1

The following chart show the variation in coefficients from multiple regression models that included gender interaction variable(s).

| Variation in Coefficients   | Maximum  | Minimum  |
|-----------------------------|----------|----------|
| Gender                      | -0.07505 | -0.11249 |
| Bid Order                   | 0.008561 | 0.006373 |
| Value                       | -0.00023 | -0.00157 |
| Value <sup>2</sup>          | 1.79E-08 | 1.90E-08 |
| Bids Left                   | -0.00681 | -0.0094  |
| Stand Deviation             | -1.9E-05 | -2.4E-05 |
| Previous Bid                | 0.000171 | 9.61E-05 |
| Experience                  | -0.02077 | -0.02199 |
| Gender x Bid Order          | 0.016253 | 0.015514 |
| Gender x Value              | 2.22E-05 | 1.88E-06 |
| Gender x Bids Left          | -0.00608 | -0.00679 |
| Gender x Standard Deviation | 2.82E-05 | 2.05E-05 |
| Gender x Previous Bid       | 2.09E-05 | 1.77E-05 |
| Gender x Experience         | -0.00281 | -0.00295 |