PAWN STARS: PUTTING THEORIES OF NEGOTIATION TO THE TEST

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Abstract

Theories of negotiations are tested using a unique data set. The History Channel television show *Pawn Stars* portrays negotiations between customers and agents of a pawn shop. This provides a novel data set not typically available to researchers as the tactics of bargaining can be observed, recorded, and analyzed. Many, but not all, of the primary theories of negotiations developed receive empirical support. The use of experts, experience of the negotiators, the gap between the initial offers, and the use of final offers all affect the likelihood of a deal being made as well as the division of the surplus. The party making the opening offer suffers a disadvantage, which stands in contrast to predictions of sequential bargaining and anchoring effects.

Keywords: Asymmetric information, bargaining, experts, final offer, negotiation, Pawn Stars

Introduction

Negotiating is a central activity within any organization. A systematic evaluation of the success of the methods used and the environment within which negotiations are taking place must be developed. To be able to formulate and implement successful strategies, an organization must appreciate the effectiveness of the process involved.

Previous management research focuses on the relationship between the bargaining process and outcomes. Wall (1984) investigates, for example, the impact of mediator proposals on bargaining outcomes. Walsh (1989) evaluates the bargaining process involved with merger and acquisition negotiations. His analysis focuses on how the process is correlated with management turnover. Turnover, for example, is higher following a hostile takeover and with negotiations that involve multiple counteroffers. Michael (2000) is interested in bargaining over franchise agreements by investigating

the following rate of litigation. The components of a negotiated agreement and how they relate to the success of joint venture is analyzed by Luo and Shenker (2002). Roosenboom (2005) investigates bargaining on board structure by analyzing a data set of French IPOs. In short, the previous empirical investigations into bargaining, rather than focus on the process itself, looks at its spillover onto other related outcomes.

Experimental research has been able to generate laboratory results of specific features of the bargaining process. Adler, Brahm and Graham (1992) focus on the key processes affecting face-to-face commercial negotiations comparing results of Chinese and American negotiators. They show, for example, that negotiators who exhibit problem-solving traits earn greater profits and have more satisfied bargaining partners. Experiments assessing the ability of opening offers to take advantage of the anchoring effect are analyzed by Ritov (1996). Zwick and Chen (1999) investigate a preference for fairness in an alternating-offers bargaining game. Galinsky et al (2002) consider the impact of counterfactual thinking, specifically on one's satisfaction when a better deal could have been reached. The back-and-forth nature of extended negotiations is shown to be associated with higher levels of satisfaction than when an opening offer is accepted. Adair and Brett (2005) use data from training sessions to investigate cultural differences in the bargaining process. Magee, Galinsky and Gruenfeld (2007) use priming techniques to induce power in bargaining experiments and analyze the impact. A broad discussion of the extent to which social influence research has affected negotiation is done by Malhotra and Bazerman (2008). Finally, McCannon and Stevens (2014) conduct experiments of alternating-offer bargaining games to assess how personality traits correlate with behavior and outcomes. What is missing is an empirical investigation, using real world rather than experimental data, into the processes used in the negotiation.

Numerous theories have been proposed regarding successful bargaining and the conflict that can arise. Empirical investigations of these theories are limited. The common problem the previous research on bargaining has is that the process, preferences, and (all too often) the outcomes are not directly observable. One would desire data that would allow for hypotheses derived from these theories to be tested. Previous research only has data created from laboratory settings or data from covariates of bargaining.

The television show *Pawn Stars* provides a unique opportunity to remedy this problem and formally test bargaining theories. The reality show airs actual negotiations between agents of a pawn store and customers who bring in interesting items to sell. More than just the outcome of the negotiation is provided. The show depicts the entire transaction with the initial offers, counteroffers, bargaining tactics, and use of third-party experts.

Furthermore, since there have been multiple seasons, a large data set of these transactions is available. Our objective is to provide a rigorous empirical test of many popular theories of negotiation using this unique data set. Being able to identify which theories explain real-world negotiations can aid businesses in the training and evaluation of negotiators.

We find evidence supporting many of the theories put forth in business and economics. A review of these theories is presented in detail in the following section. The theoretical work is organized into two research questions: (1) whether or not a deal is made and (2) how the gains from trade are divided. Theories for lack of success at the bargaining table, including asymmetric information and optimism bias, receive empirical support. For example, the use of experts reduces information asymmetry and is shown to increase the likelihood of a deal being made. Some of the theories for the division of the gains from trade, such as the tactic of using final offers, can also be substantiated.

Not all theories receive empirical support. Specifically, the theory of sequential bargaining (Rubinstein, 1982) argues that the party who makes the initial offer in a negotiation has a strategic advantage in that it is able to extract a disproportionate share of the gains from trade. Also, the psychological theory of anchoring in negotiations (Tversky and Kahneman, 1974) predicts that the party making the initial offer is able to set the expectations of the other party (provide an anchor) with the opening bid. Both theories predict that if a party makes the initial offer, then she should gain more in the negotiation than in those situations where she does not make it. We find the opposite result.

Ours is not the first to use information presented in a television show to test theories in management. Post, van dem Assem, Balthussen, and Thaler (2008) uses the show *Deal or No Deal* to evaluate individual's preferences for risk and to identify which theory of decisionmaking under uncertainty is accurate. Engelberg, Sasseville, and Williams (2012) investigate stock market reaction to recommendations made by Jim Cramer on *Mad Money*.

Theoretical Background

Numerous theories have been developed to understand negotiations. One may divide the research into two categories. First, theory can be used to explain whether or not a negotiation is successful. Does a transaction occur? Second, theory, presuming a transaction arises, addresses the issue of how are the gains from the trade split. How is the pie divided amongst the parties? Rather, what price is paid? Rubin and Brown (1975) define negotiation as a "process whereby two or more parties attempting to settle what each shall give and take, or perform and receive, in a transaction between them." (p. 2)

Thus, the investigation of negotiations can be decomposed into the issue of settlement and the issue of give and take. Adair and Brett (2005) emphasize that negotiations are mixed-motive. Parties cooperatively want to find a mutually-agreeable outcome (i.e., get a deal done) and competitively want to get a good deal for themselves (i.e., gain a big slice of the pie).We first investigate these two lines of inquiry to summarize the relevant theories developed to derive testable hypotheses.

Whether a Deal Gets Done

If a positive surplus, the difference between the willingness to pay of the buyer and the willingness to sell of the producer, exists then standard equilibrium analysis assumes a deal gets made (Lippman and Rumelt, 2003). Of course, the willingness to pay and willingness to sell are difficult in practice to measure. Neither party to a negotiation has the incentive to truthfully reveal this information. If, for example, the buyer is able to convince the seller that he is unwilling to exceed a price *v*, which is less than his true value *v'*, then one might expect the buyer to pay a lower price for the good.

Suppose one is unable to directly observe the true willingness to pay and willingness to sell but, instead, is able to observe the opening offer of both the buyer and seller. If one assumes that true surplus is inversely correlated with the observed gap, then the gap between the announced prices can be used as a proxy for the surplus. If the willingness to pay is less than the willingness to sell (so that a negative surplus arises), then the price initially requested by the seller will more likely far exceed the price initially offered by the buyer. A large gap tends to occur with negative surpluses. Alternatively, if the willingness to pay is closer to the willingness to sell, which increases the surplus, then the gap between the initial offers contracts. The importance of this measurement has been illustrated experimentally by van Poucke and Buelens (2002) and is commonly argued to drive success and failure in the literature on pre-litigation bargaining (see Deck and Farmer (2007) and Marselli, McCannon, and Vannini (2014) for illustration and discussions).

Hypothesis 1: *The likelihood of a deal getting made is higher when the gap between the initial prices proposed decreases.*

Markets, though, occasionally fail to efficiently allocate a resource. Market failures arise when the negotiations are unsuccessful and a deal is not reached even when a mutually beneficial transaction exists. Two broad categories of theories have been developed to explain such failures.

The first is the theory of asymmetric information pioneered by Akerlof (1970). If one side of a transaction is endowed with superior information, then the other party is left with a strategic disadvantage. For

example, assume a seller of an item has solid information that the item is authentic, rare, and would command a high price in resale markets. High high transaction costs prohibit him from utilizing them (Shervani, Frazier and Challagalla, 2007). The poorly-informed buyer may be uncertain whether she is negotiating with someone selling such an item or interacting with a seller who knows that the item is not authentic or simply would not command much demand in secondary markets. Fearful of the latter she would be unwilling to pay a high price for the good. The potential arises for failed negotiations, not because of a negative surplus, but because of the poor information. What is important for the market failure is not just that there exists incomplete information, but that the information is lop-sided. Coff (1999), in a discussion of the division of rents between stakeholders of a firm, highlights the value of information, specifically asymmetric information, to bargaining.

One way to deal with this problem is to collect the lacking information. One of the many examples of information collection is to involve outside, third-party experts. Such an agent has the opportunity to provide two similar but distinct benefits. First, information on the authenticity, rarity, background, and potential secondary market demand can be provided. This reduces uncertainty and, even for highly-valued items, has the potential to expand willingness to pay for risk averse buyers. Second, the information provided reduces the asymmetry of the information. Even with incomplete information, symmetric information mitigates the imperfections in markets. If both sides to a transaction are poorly but symmetrically informed, uniform expectations can arise and mutual *expected* benefits can arise. Ironically, if outside evaluation provides one party to the negotiation even better information than it previously had, the expertise acts to exacerbate the market failures.

Hypothesis 2: *The use of third-party experts increases the likelihood of a successful deal.*

A second theory of market failure has been developed using insights from behavioral economics. Each party to a negotiation must make assessments as to the value of the item. This includes, importantly, the value of the item in resale markets. This opens up the possibility of an optimism bias in one's private information. If parties to a negotiation exhibit optimism bias, then the seller's belief that the item is high-value will be relatively high, while the buyer's similar belief is relatively low. This leads to an expected value calculation that is distorted upwards for the seller and an expected value calculation biased downwards for the buyer. As a consequence, with the biased assessments there may not exist a bargaining zone of prices that are mutually agreeable even when there exists prices that are, in fact, mutually beneficial.

One would expect more experienced traders and organizations with a longer career engaging in bargaining to exhibit less optimism bias. List and Millimet (2008), conducting field studies of preferences for the status quo, find evidence that behavioral biases diminish as experience in market transactions accumulate.

A dominant theory addressed in management theories of bargaining is the idea of anchoring (Tversky and Kahneman, 1974). The opening offer acts as an anchor. This heuristic generates a needed estimate of the value of the good by anchoring on a salient available point. The counteroffering of the bargaining adjusts the value from that anchor. As noted by Northcraft and Neale (1987) and Ritov (1996) the adjustment is typically insufficient. Consequently, the final estimate is overly affected by the anchor. Thus, a deal may fail to be made due to the anchoring effect.

As an example, Kristensen and Gärling (1997; 2000) conduct bargaining experiments. For each fixed reference/reservation price different anchor prices were given. Higher anchors were associated with higher counteroffers made when selling.

Experience may be hypothesized to reduce the distortion caused by anchoring since the agent may be less swayed by the other's assessment. Thus, for both optimism bias and the anchoring effect, one would predict that experience in similar bargaining situations would increase the likelihood of a deal getting done.

> **Hypothesis 3:** *Optimism bias is reduced, anchoring effects are mitigated and, consequently, the likelihood of a successful deal increases as experience of participants increase.*

Division of the Surplus

There are numerous theories regarding how the gains from trade are split between the parties. Absent assumptions on market structures (i.e. numbers of buyers and sellers, information, form of strategic interaction, etc.) there are a range of possible outcomes of a negotiation. Theories, then, attempt to reduce this multiplicity to singular points to be forecasted.

An early and important contribution to this "bargaining problem" was provided by Nash (1950). Using an axiomatic approach he showed that there exists a unique solution to any bargaining problem that satisfies a number of reasonable criteria. He illustrated that the primary factor influencing how much a buyer pays for the good is the outside option of both the buyer and seller if they fail to reach an agreement. Additionally, after each is compensated for their default outcomes, the remaining surplus is equally divided. Market power, in the Nash bargaining environment, is then simply the ability to extract more of the gains from trade because one's outside options are better.

Rather than rely on axiomatic approaches to solve the bargaining problem, a non-cooperative model was pioneered by Rubinstein (1982). He shows, under the assumption that the back-and-forth of the bargaining is costly, not only does a deal get done, but there is *not* an equal division of gains from trade. The party that makes the first offer, because of the preference to reduce the duration of the negotiating process, is able to extract more than half the surplus.

Similarly, while anchoring effects may affect whether a deal gets done, it may also affect the division of the gains from trade. Galinsky and Mussweiler (2001) provide experimental evidence that opening offers serve as an anchor and result in the party making the offer to do relatively better in the negotiated outcome. Hence, the order of the proposals should matter.

Hypothesis 4: *The party making the opening offer gains a greater share of the surplus.*

In an attempt to explain conflict and peace, Schelling (1960) developed ideas on success in bargaining. One point, emphasized throughout his work, is the value of making take-it-or-leave-it offers. If one is able to reach a point in the negotiations where a final offer is made and the other side believes that it is a final offer, then the recipient is left with the choice to either accept the offer, resulting in a successful deal, or to veto the offer, resulting in no trade. So long as the offer does not leave the recipient worse off than declining it, such a tactic ends the negotiations and generates a transaction.

What is especially noteworthy about the take-it-or-leave-it offer is that the one who makes the offer is able to extract a disproportionate share of the gains from trade. If the buyer makes such an offer he can pay relatively little for the good. As an example, if a consumer is negotiating with a true monopolist, one who has no competitors with no readily available substitute goods and no potential challengers from market entry, then the monopolist sets a price equal to the consumer's willingness to pay extracting all surplus.

Hypothesis 5: *Final offers should be associated with both successes in deal-making as well as a disproportionate share of the surplus gained.*

Data

A unique data set is collected and employed to test the validity of these theories. The television shown *Pawn Stars* is aired on the History Channel. The show consists of footage from a pawn store in Las Vegas, Nevada. While there are many employees of the pawn store, the business is run by a family. Ownership is divided between Richard Harrison, who initially created the business, and his son Rick. On the show the founder is simply referred to as "Old Man." Corey Harrison is Rick's son and the third

member of the family. Customers bring in items to the pawn shop to sell, pawn, or trade. The television show records the discussions and negotiations between the three Pawn Stars agents and the customers.

The television show provides a unique glimpse into the workings of real-life negotiations. Researchers in organizational science are typically denied the opportunity to witness the negotiations and are unable to collect empirical data for numerous transactions to formally test theory. The television show *Pawn Stars*, then, provides a unique opportunity to collect a large data set of negotiations in which to test the validity of popular theories.

Data is collected for every item shown on the television show over the first three seasons. Information on the deal-making, characteristics of the negotiation, and characteristics of the items are coded. Hence, a total of eight-seven episodes were coded.

With regards to the deal-making many variables are recorded. First, the initial price announced by each party, *openC* and *openPS* for the customer and Pawn Stars respectively, is collected. If a deal is successfully made the final agreed upon price is noted, *price*. Also, a dummy variable, *deal*, is created to identify whether or not a deal was made. Finally, it is recorded whether or not the final agreement reached is for a pawn or involves a trade, both of which are rare.

It is recorded whether a final offer is made by one of the parties. Language emphasizing that a party is unwilling to change his/her price is used as indication of a final offer. For example, Pawn Stars may state, "this is the best I can do" or "that is the price and not a dime more". If a final offer is made by Pawn Stars, then *finalPS* is equal to one. If a final offer is made by the customer, then *finalC* is equal to one. In no circumstance did a party make what is clearly a final offer demand and then later revise it. There are cases in which Pawn Stars made a final offer, the customer attempted to convince them to pay a higher price, and Pawn Stars refused though.

Dummy variables controlling for characteristics of the negotiation are also created. The variable *backforth* is equal to one if the negotiation included more than one price announced by each party. If a party stands firm to his/her initial offer or agrees without revision to the other's request, then there is no back-and-forth. Also, *Copen* is a dummy variable which captures the case of the customer making the opening offer. Dummy variables for which of the three Pawn Stars agents are included in the negotiations is created: *OldMan*, *Rick*, and *Corey*. While at least one of these agents is involved in every negotiation, some items involve only one agent while others involve two.

Occasionally, third-party experts are consulted. The Pawn Stars agent involved will from time to time bring in an outsider who is known to be an expert with a particular class of items. For example, a customer may bring in

a rare coin and a professional grader of coin mints may be utilized to provide a proper grading. Other goods may be, for example, extremely rare such as historical memorabilia. American history experts, either museum curators or auction-house managers, are consulted. The dummy variable *expert* equals one if an expert is brought in. When experts are called they provide information to the parties jointly so there is no additional private information. Many outside experts also provide information on expected prices in retail settings or auctions. If any such information is given it is recorded.

Finally, numerous dummy variables are created to control for the type of item that it is. Table 1 provides the complete list of item characteristics. Over three-quarters of the items fall into one of these categories. Along with controlling types of goods, dummy variables are generated to measure whether the consumer acknowledges that he/she bought the item, *purchased*, whether the item is autographed, *signature*, whether the item is associated with a famous individual, *famous*, and whether the item is not in working condition, *notwork*. If an individual specifically purchased a good to, for example, resell it quickly for a profit, then that person's bargaining behavior may be substantially different from someone who found the item or who received it as a gift. Items that are not working require repairs and restoration and may generate different prices than working items.

Table 1 presents the definitions and mean values for the variables in the data set. There are 363 observations. This does not include those items pawned (3.66% of all goods) or where a trade (e.g. barter, consignment) took place (2.33%).

Table 1: Variable Definitions

Dependent Variable		mean
deal	= 1 if an agreement is reached	0.628
Characteristics of the Negotiation		
gap	= difference in initial offers	3741.50
gapPS	= *gap* (as % of Pawn Stars opening offer)	2.028
finalC	= 1 if the customer makes a final offer	0.022
finalPS	= 1 if Pawn Stars makes a final offer	0.226
expert	= 1 if an expert is brought in to assess the item	0.347
Copen	= 1 if the customer makes the initial offer	0.736
backforth	= 1 if a counteroffer and a revised offer are made	0.562
Pawn Stars Agents		
Rick	= 1 if Rick is involved in the negotiations	0.763
OldMan	= 1 if the Old Man is involved in the negotiations	0.256

Corey	= 1 if Corey is involved in the negotiations	0.303
Item Characteristics		
notwork	= 1 if the item is not in working condition	0.132
famous	= 1 if associated with a famous person	0.168
military	= 1 if it is a military item or a weapon	0.187
UShistory	= 1 if the item is associated with an important event in US history	0.083
signature	= 1 if the item is signed	0.061
vehicle	= 1 if the item is a vehicle	0.124
sports	= 1 if the item is related to sports or gaming	0.113
music	= 1 if the item is related to music	0.066
money	= 1 if the item is money or similar	0.052
toy	= 1 if the item is a toy	0.066
art	= 1 if the item is art	0.033
purchased	= 1 if the customer expressly states that the item was previously purchased by the customer	0.471

As one can see, deals are frequently made. The gap between the opening offers is $3741.50, which represents 202.8% of the opening offer by Pawn Stars. There is much variation in these variables. The standard deviation of *gap* and *gapPS* is 27,542 and 5.415, respectively, with median values of 350 and 0.80. While customers only occasionally make final offers, Pawn Stars takes advantage of this bargaining tactic 22.6% of the time. Rick is most commonly involved in the transactions. With each item at least one of the three Pawn Stars agents is involved. Some transactions include only one, while others involve two of them. The fourth individual highlighted in the show, Chumlee, does not engage in any negotiations in the first three seasons and therefore is not included. Finally, the distribution of items is rather widely dispersed across the many categories of goods.

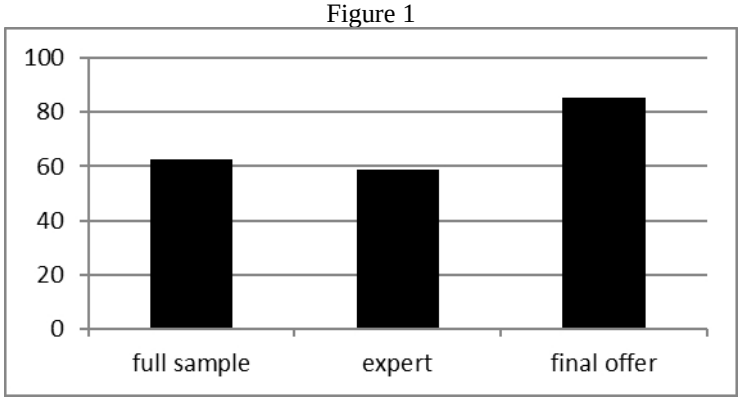
Results

Just as the theory is divided into those pertaining to the likelihood of a success making a deal from those related to the division of the surplus conditional on a deal being made, the results are separated by the same two questions.

Likelihood of Making a Deal

Does the data collected from the television show Pawn Stars exhibit the relationship between successful deal-making and the environmental determinants predicted by theory? Figure 1 illustrates the proportion of negotiations in which a successful deal is reached.

Figure 1



Inconclusive evidence exists between the use of experts and successful deal-making as the proportion of cases involving an expert which result in an agreement is similar to the proportion of cases in the full sample. Thus, further investigation is needed to support Hypothesis 2. When Pawn Stars issues a final offer a deal frequently arises. In such cases an agreement is reached in 85.4% of the negotiations and the correlation coefficient between *deal* and *finalPS* is 0.25 (p-value < 0.001). This is evidence in support of Hypothesis 5. Also, the average gap between the initial offers is only $1933.73 when a deal is reached, or rather, a value of 1.745 for *gapPS*. Since these are less than the mean values presented in Table 1, support for Hypothesis 1 exists as well. Formal econometric evidence, though, is needed to verify that these relationships have statistical significance and are not driven by omitted variables.

A logit analysis is conducted to identify whether the determinants predicted by the theories show statistical significance. Table 2 presents the results.

Table 2: Likelihood of Making a Deal (dep. var. = *deal*)

I			II		
gapPS	-0.097 **	(0.042)		-0.089 **	(0.042)
finalC	-1.247 *	(0.723)	-1.320 *	(0.798)	
finalPS	1.229 ***	(0.464)		1.243 ***	(0.463)
expert	-0.281	(0.314)		-0.292	(0.276)
Copen	0.738 **	(0.323)		0.675 **	(0.310)
backforth	2.119 ***	(0.317	)	2.079 ***	(0.289)
OldMan 0.711 **	(0.361)		0.576 *	(0.318)	
Corey	0.397	(0.329)	0.189	(0.299)	
purchased	-0.046	(0.282)			
notwork 0.711 *	(0.423)				
famous	-0.490	(0.416)			
signature	-0.400	(0.592)			
UShistory	0.244	(0.497)			
military 0.091	(0.413)				

vehicle	-0.865 * (0.463)		
sport	-0.540	(0.507)	
toy	0.260	(0.722)	
music	0.390	(0.658)	
art	0.055	(0.743)	
money	0.330	(0.513)	
season FEs?	YES		NO
McFadden R^2	0.281		0.254
AIC	390.4		375.4
% correct	78.8%		79.3%

Coefficients of the logit analysis are reported with $N = 363$.
* $p < 0.1$ ** $p < 0.05$ *** $p < 0.01$
QML standard errors are reported in parentheses and a constant is included in each specification.

Column I presents the results from the full model. An *F*-test of the joint null hypothesis that the season fixed effects have no effect fails to be rejected at the 10% level (*F*-stat = 0.38). An *F*-test for the joint null hypothesis that the item characteristics have no effect also fails to be rejected at the 10% level (*F*-stat = 1.07). Similarly, an *F*-test for the joint null hypothesis that the Pawn Stars actors have no effect fails to be rejected at the 10% level (*F*-stat = 2.19). Consequently, the logit regression is re-specified excluding the season fixed effects and the item characteristics. Since the theory predicts the experience of the Pawn Stars is important, the coefficient on *OldMan* is significant, and the joint null hypothesis can be rejected at the 12% level of significance, the Pawn Stars dummy variables are included in Column II. Column III presents the results of the full model when, rather than considering the gap between the opening offers relative to the size of the offers, the absolute magnitude of the gap is considered.

The results presented in Table 3 conform to the predictions of the theories. The gap between the offered and asked prices made by the two parties has a negative and statistically significant effect on the likelihood of a deal getting done. Hence, the farther away the two sides are at the start of the negotiation the more probable it is that there is indeed no positive surplus to be divided. The marginal effect is estimated to be a drop in the likelihood of a deal being by 3.1 percentage points for an increase in the gap by $1000. This is evidence in support of Hypothesis 1.

When Pawn Stars makes final offers to the customer it has a large and statistically significant increase in the likelihood of a deal getting made (Hypothesis 5). This corresponds favorably to the argument made by Schelling (1960). At the mean the marginal impact on the likelihood of making a deal is an increase of 0.227, which using the mean value of *deal* from Table 1 is an increase of 36.2%. Interestingly, when a customer makes

a final offer there is evidence that it decreases the chance of a successful deal. This is in contradiction to Schelling's theory and signals that the experienced, professional agents are unwilling to be coerced into a disadvantageous deal. This can be explained, for example, by the repeated game engaged in by the employees of Pawn Stars. While the interaction with any one customer is a one-time affair, numerous negotiations are undertaken by each of the Pawn Stars employees. An informal policy of not yielding to customer final offers could lead to improved firm profitability as the lost transactions are made-up for by lower prices paid by adopting the strategy.

With regards to the theory of optimism bias leading to market failures, it was hypothesized that the Old Man with the most experience would exhibit the least amount of optimism bias. This is confirmed in the Table 2. The marginal effect of including the Old Man in the negotiations is an increase in the likelihood of a successful deal of 0.143 relative to including Rick. Again using the mean value of *deal*, this is a 22.7% increase in the likelihood of making a deal. It was also predicted that the coefficient for Corey would be negative since he has the least amount of experience. The results in Table 2 illustrate that there is no statistically significant difference between the chance of Corey making a deal and Rick making a deal. Hence, the impact of the experience is the Old Man being more successful than both Rick and Corey. This result conforms to the belief that experienced negotiators are able to successfully navigate the process, as outlined by Fisher and Udry (1981), and provides support for Hypothesis 3.

Most of the item characteristics are insignificant and, as stated, are jointly insignificant. The exceptions are items that do not work properly and vehicles. The former are more likely to have a deal get done and the latter are less likely. Pawn Stars has a number of restoration specialists available where a repeated business relationship exists. The customer is unlikely to have access to such services at low transaction costs. Thus, deals get done. Similarly, a significant amount of uncertainty likely exists for the purchasing of vehicles and the negative coefficient can be explained by risk aversion.[5] With regards to the season fixed effects the likelihood of a successful negotiation is invariant to the season, which supports the contention that the behavior of Pawn Stars and the customers does not vary with the duration of the program. Also, as one would expect, *backforth* is positive and statistically significant. If a deal is going to fail, then it is more likely that one will not see offers followed by counteroffers. If parties are willing to go back and forth on the price, then it is quite likely a deal can be made.

The variable *Copen* is positive and statistically significant in each specification. While no theory presented anticipates its effect, this is

[5] A casual observer of the show would note the Pawn Stars hesitation when buying vehicles.

evidence that the amateur sellers are more likely to agree to a deal if they are actively announcing prices.

An unexpected result arises regarding the effect of an expert on the likelihood of a deal being made (Hypothesis 2). As previously discussed, with asymmetric information market failure can arise even when efficient transactions exist. By bringing in a superiorly-informed third party, improved and level information arises. This should increase the likelihood of a deal being made. The management studies of the structure of the negotiations all indicate that expert involvement encourages success as they can separate the issue from the person and provide objective criteria (Fisher and Udry, 1981). The results in Table 3 show that the effect is statistically insignificant and, in fact, the estimated coefficients are negative.

An important issue regarding the use of experts is that their involvement is not random, but rather an endogenous choice made by the Pawn Stars. This is an especially poignant observation when one notes that endogeneity of the consultation of the expert is most likely highly correlated with the likelihood of a deal getting made. Pawn Stars are highly-informed traders with years of experience. If they are confronted with a good that they are uncertain about, risk aversion will likely drive them towards rejecting a deal. It is these very uncertain deals where the value of the expert is greatest. Hence, it seems reasonable that experts are brought in when items come into the pawn shop that would, absent the expert, be rejected. Thus, there are opposing forces influencing the sign of the coefficient: experts may increase the likelihood of a deal but they are only called in for situations in which a deal is unlikely. The endogeneity of *expert* may be causing the counterintuitive, insignificant result.

A common way to econometrically deal with the endogeneity problem is to use instrumental variables. The idea is to find variables that are correlated with the use of experts, but are not correlated with the likelihood of a deal getting done. In the first stage to the estimation, these instruments can be regressed on the endogenous variable so that its fitted value can be estimated. This removes the noise associated with the endogenous choice from the variable. In the second stage of the estimation, the "cleaned" value of the variable can be used as an independent variable. Using the instrumental variables in this procedure is known as two-stage least squares.

We use a few item characteristics as instrumental variables since the knowledge of the Pawn Stars and, hence, the value of third-party experts is stronger for some categories of goods than others. One variable is *vehicle*. Cars, trucks, and motorcycles, for examples, are typically professionally restored before Pawn Stars resells them. Outside auto body shops are used and frequently the magnitude of the repairs requires expert assessment. Similarly, sporting items and art pieces will frequently require experts to

assess the authenticity and value of rather rare objects. Finally, monetary items often need outside assessment. This is especially true given the grading system used to determine the quality of a rare coin. Thus, the four variables *vehicle*, *sport*, *art*, and *money* are expected to be highly correlated with *expert*.

A proper instrument is correlated with the endogenous explanatory variable, but uncorrelated with the dependent variable. All four are uncorrelated with *deal*. The statistical significance of the correlations between *expert* and the instruments *art* and *money* are poor. Hence, Table 3 presents the two-stage least squares results using all four proposed instruments along with only the two that are correlated with the use of experts.

-Table 3: Effect of Experts on Deal-Making (dep. var. = *deal*)

	All 4 Instruments		**Only *vehicle* & *sports***	
gapPS	-0.012 **	(0.006)	-0.096 **	(0.043)
finalC	-0.323	(0.245)	-0.321 *	(0.177)
finalPS	0.209 ***	(0.063)	0.207 ***	(0.070)
expert	0.534 *	(0.299)	0.514 *	(0.303)
Copen	0.206 ***	(0.079)	0.204 ***	(0.075)
backforth	0.344 ***	(0.068)	0.346 ***	(0.067)
Rick	-0.223 **	(0.094)	-0.219 **	(0.094)
adj R^2	0.126		0.132	
F	17.05 ***		16.10 ***	

Coefficients of the two-stage least squares analysis are reported with $N = 363$.
* $p < 0.1$ ** $p < 0.05$ *** $p < 0.01$
Heteroskedastic-robust standard errors are reported in parentheses and a constant is included in each specification

Similar results arise if *art* is added to the original two instruments and if *money* is added to the original two instruments. Correcting for endogeneity, the coefficient on *expert* both turns positive and becomes statistically significant. Thus, the use of an expert does increase the likelihood of a deal being made and support for Hypothesis 2 arises. This is also evidence that experts are consulted only when Pawn Stars are uncertain about the good and ex ante unlikely to purchase it.

While not presented, the results of Table 2 continue to hold using probit analysis. Also, all standard errors reported are robust to heteroskedasticity issues. This allows for more accurate hypothesis testing.

Division of the Surplus

To address the theories of the division of the surplus, the data set is restricted to only the subsample of items in which a trade occurred. As

provided in Table 1, 62.8% of the negotiations resulted in a deal. This corresponds to a sample with $N = 227$.

For each successful trade the agreed upon price is recorded and denoted *price*. Since the primary question is how the gains from trade is divided the variable *surplus* is created. It is defined as the proportion of *gap* that is paid by Pawn Stars, or rather, *surplus* = (*price* – *openPS*) / *gap*. Hence, an increase in the variable *surplus* corresponds with Pawn Stars paying relatively more for the good and the customer receiving a price closer to his/her initial asking amount. Table 4 presents the descriptive statistics for the subsample.

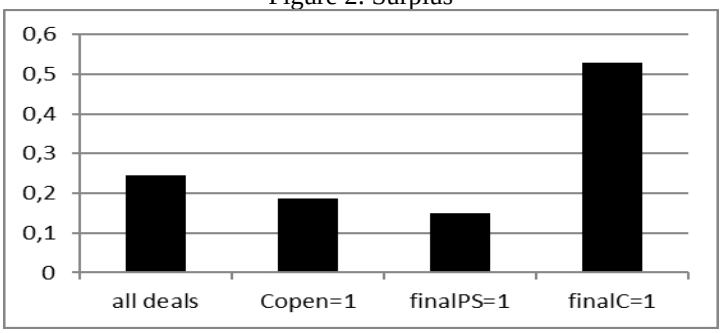
Table 4: Descriptive Statistics – Deals

variable	**mean**	**variable**	**mean**
price	2578.8	*purchased*	0.489
% *openC*	0.652	*authentic*	0.405
% *openPS*	1.233	*notwork*	0.154
surplus	0.246	*famous*	0.137
openC	4139.1	*military*	0.189
openPS	2201.1	*UShistory*	0.079
finalC	0.018	*signature*	0.048
finalPS	0.308	*vehicle*	0.132
expert	0.326	*sports*	0.115
Copen	0.846	*music*	0.075
backforth	0.753	*money*	0.066
Rick	0.722	*toy*	0.088
OldMan	0.278	*art*	0.031
Corey	0.326		

Hence, the average price paid for a good by Pawn Stars is $2578.80, which represents about 65% of the customers opening request and 123% of Pawn Stars initial offer. As expected, given the previous econometric results, the proportion of items in which Pawn Stars makes a final offer increase and those where the customer makes a final offer decrease. Similarly, the fraction of items in which an expert is consulted decreases due to the selection bias of when they are called in for consultation.

As before, the sample can be analyzed for evidence favoring the testable hypotheses. Figure 2 presents the average surplus paid.

Figure 2: Surplus



The proportion of the initial gap in the offers paid by Pawn Stars is less when the customer makes the opening offer. This is in opposition to Hypothesis 4. Alternatively, Pawn Stars pays a smaller fraction of the surplus when it makes a final offer, but a greater proportion when the customer makes the final offer (15.0% and 52.9% respectively). This is consistent with Hypothesis 5. Again, formal econometric tests are needed to investigate these descriptive means.

To formally put the theories presented to the test the characteristics of the negotiation and the items are used as explanatory variables to predict the proportion of the surplus paid by Pawn Stars. Table 5 presents the results with heteroskedastic-robust standard errors reported.

Table 5: Division of the Surplus (dep. var. = *surplus*)

	I		**II**	
finalC	0.224 **	(0.104)	0.193 *	(0.103)
finalPS	-0.127 ***	(0.036)	-0.112 ***	(0.031)
expert	-0.040	(0.040)	-0.035	(0.033)
Copen	-0.413 ***	(0.075)	-0.400 ***	(0.070)
backforth	0.072 *	(0.041)	0.071 *	(0.037)
OldMan	-0.046	(0.038)		
Corey	0.001	(0.039)		
controls:				
items?	YES		NO	
seasons?	YES		NO	
adj R^2	0.288		0.296	
F	4.97 ***		14.13 ***	
AIC	12.31		-5.14	

Coefficients of the OLS analysis are reported with $N = 227$.
* p < 0.1 ** p < 0.05 *** p < 0.01
Heteroskedastic-robust standard errors are reported in parentheses and a constant is included in each specification.

Column I presents the results including controls for the Pawn Stars agents, item characteristics, and season fixed effects. An *F*-test of the joint null hypothesis that the season fixed effects are insignificant fails to be rejected (*F*-stat = 0.45). Similarly, the joint null hypothesis that the item characteristics have no effect along with the Pawn Star agents have jointly no effect can both fail to be rejected at the 10% level (*F*-stats of 0.92 and 0.80 respectively). Hence, Column II presents the estimation excluding them. Their exclusion increases the adjusted R^2 and the *F* (for overall significance) and decreases the AIC, which supports their omission.

The results conform to the predictions of the theories presented. As expected (Hypothesis 5), the final offers contribute substantially to the determination of the price. If the consumer makes a take-it-or-leave-it offer, then the proportion of the surplus paid by Pawn Stars increases. Using the mean value of *surplus* from Table 4 this corresponds to an increase in the proportion of the surplus paid by 78.5% to 91.0%. Similarly, if Pawn Stars makes a final offer the amount they pay decreases. Again, using the mean value of *surplus* this corresponds to a decrease in the proportion paid by 45.5% to 51.6%.

While the tactic of encouraging the customer to make the opening price encourages deal-making, it also has the effect of decreasing the amount Pawn Stars pays for the good. This feature of bargaining proves to be quite successful for the organization. This result stands in contrast to the first-mover advantage (Hypothesis 4) of Rubinstein (1982) and the anchoring effect illustrated experimentally by Galinsky and Mussweiler (2001).

The back-and-forth nature of the negotiations favors the customer. While customer satisfaction may be higher, the value of a back-and-forth does not substitute for monetary gain and, in fact, seems to complement it.

Also, which of the Pawn Stars agents is involved in the transaction does not seem to matter for the division of the surplus. We previously argued that the agent controls captured potential optimism bias leading to market failures. While the evidence suggests that the lack of bias corresponds to the Old Man paying a smaller proportion of the surplus and the presence of optimism corresponds to Corey paying a larger proportion (relative to Rick), these effects are statistically insignificant.

The statistical significance of expert is again lacking. While, as stated, it suffers from endogeneity problems, neither the theory of market failure due to asymmetric information nor the negotiation tactics that emphasized its importance predict its effect on the price paid. The practical guides stress how expertise can facilitate success, but are mute on the impact on price. While experts help to alleviate the concerns and improve the chances of a deal being made, the uncertainty seems to lead to a decrease in the price paid (but insignificantly so) by the Pawn Stars.

Occasionally, experts provide an assessment of the anticipated market price. Frequently, for example, experts work in the retailing of such goods or manage auction houses. In such situations along with providing information on the identity and authenticity of an item, information on value is given.

As a final investigation, then, the data set is further subdivided to consider only those items in which a deal was successfully agreed upon, an expert was consulted, *and* the expert provided an anticipated retail/auction price. We consider this subsample to identify whether a final offer made by Pawn Stars and consumer opening in the negotiation affects the outcome in these special cases.

With these restrictions only sixty observations survive. Since the item characteristics, season fixed effects, and Pawn Stars control variables have been shown to not (jointly) affect the division of the surplus they are not considered in the specifications. Also, since the data set is small, only the effect of a final offer being made by Pawn Stars, *finalPS*, along with characteristics of the negotiation, *Copen* and *backforth*, are included. Along with *surplus* two other dependent variables are considered. The variable *value* is the price agreed upon relative to the provided expert's valuation, *value = price* / *valuation*. Also, *price* is used as the dependent variable with *valuation* used as an additional control variable. Typically, the expert gives both an upper bound and a lower bound to the range of anticipated prices. We choose to calculate *value* using the lower provided price since it typically is the one used as the reference point for the negotiations. We choose to use the upper bound as *valuation* since it provides the maximum level at which the item can be priced at in a secondary market. The results do not change substantially if either of these uses is reversed. Table 6 presents the results.

Table 6: Bargaining with Expert Evaluations

	surplus	*value*	*price*
finalPS	-0.116 ** (0.051)	-0.072 * (0.041)	-1207.4 * (712.1)
Copen	-0.238 * (0.126)	0.066 (0.067)	861.27 (736.5)
backforth	0.107 (0.076)	0.001 (0.051)	-12225 * (646.9)
valuation			0.625 *** (0.061)
adj R^2	0.168	0.185	0.896
F	5.62 ***	4.34 ***	27.60 ***
AIC	-16.32	-14.85	1117.2

Coefficients of the OLS analysis are reported with $N = 60$.
* p < 0.1 ** p < 0.05 *** p < 0.01
Heteroskedastic-robust standard errors are reported in parentheses and a constant is included in each specification.

The results coincide with the previous findings. Take-it-or-leave-it offers by Pawn Stars reduce how much they pay. Specifically, they reduce the portion of the surplus given, the fraction of the expert's valuation paid, and the absolute price. The reduction in the price paid of $1207.40 (third column) represents 26% of the average price agreed upon when an expert provides a valuation. This is in contrast to a reduction in price by 17% at the mean for the deals made (calculated replicating the specification used in the third column of Table 2, but using the data set of all successful deals). Hence, using final offers significantly improves Pawn Stars' well-being when experts are consulted mitigating the asymmetric information.

Conclusion

The television show Pawn Stars provides a unique glimpse into the bargaining process. Empirically investigating these negotiations allows us to put theories in economics and organizational science to the test. This is an opportunity few researchers have had. Important theories such as market failure due to asymmetric information, the value of take-it-or-leave-it offers, distortions caused by optimism bias, and the role of information and experience in deal-making find empirical support in the results. The theory of first-mover advantage in sequential bargaining environments and frictions generated by anchoring lacks such support. This is consistent with the experimental evidence presented by Cotter and Henley (2008).

While the data provides a rare insight making the empirical tests possible, it is far from ideal data. The data do not have variation in the bargaining skill and knowledge of the buyers to assess how general the results are. The potential for selection bias caused by the producers/editors of the television show is cause for one to hesitate. It is comforting, though, that the season fixed effects are repeatedly shown to be insignificant. This is evidence that as the show gained viewers and popularity no systematic biases arise. Also, the potential for distorted behavior due to the presence of the cameras cannot be overlooked. However, even given the data limitations, the depth and quality of the data that is available provides important insights into the functioning of negotiations.

Future work should search for ways to identify how to measure and evaluate important concepts such as anchoring, fairness considerations, and bargaining tactics. The present analysis is limited to only those variables that can be measured. Similarly, Weiss (1993) argues that the three key facets to negotiations are relationships, behaviors, and conditions. While a serious attempt to measure differing behaviors is done here, the data does not allow for a study of differing relationships or conditions. This, then, is left for future investigation.

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