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# *Research Article*

## From Lab Experiments to Real Negotiations: An Investigation of International Iron Ore Negotiations

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*Negotiation researchers have conducted a large number of experimental lab studies to identify the factors that affect negotiation outcomes, but it remains unclear whether those results can be generalized to real-world negotiations. To explore this question, we analyzed the dynamic international iron ore annual negotiations that took place from 2005 to 2009. We found evidence that supports two important findings from previous experiments. Specifically, we focused on the impact of negotiators' best alternatives and first offers on negotiation prices using multiple case study analysis. We found that iron ore prices increased more when the gap between the previous year's negotiated price and the price on the alternative spot market, a public market in which commodities are traded for immediate delivery, was larger, which suggested that buyers were sensitive to the strength of this alternative, supporting the literature on the role of alternatives. We also found that the first offer price significantly influenced the final price. Our findings extend two important experimental findings from the negotiation literature to large-scale business negotiations in the real world.*

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## Introduction

Negotiation is a process through which parties with incompatible interests seek to reach agreements (Sebenius 2002). In recent decades, negotiation outcomes such as final agreement price have been widely studied (Bazerman et al. 2000; Thompson 2015). The literature has documented various factors that affect the final outcome of negotiations, such as the best alternative to a negotiated agreement (BATNA) and the first offer (for a review, see Thompson, Wang, and Gunia 2010). Most empirical studies of negotiation are conducted in the lab, using negotiation simulations to identify and analyze participants' behaviors. It is unclear, however, whether the findings are valid for real-world negotiations, which suggests there is a need for more extensive studies on real-life negotiation cases (Barley 1991; Pruitt 2012). In fact, some popular books about negotiation have recommended that successful negotiators rely on their own intuition, rather than scientific research (e.g., Ross 2006). Therefore, bridging results between the laboratory and real-world settings is important for both negotiation researchers and practitioners.

The purpose of this study is to test whether some important findings of lab studies can be extended to real-world negotiations. Specifically, we test the impact of BATNAs and first offers in the context of annual international iron ore negotiations from 2005 to 2009.

These cases were the best data we could obtain to fulfill our research objectives for several reasons. First, the iron ore negotiations involve important trades in the real world made between multiple international buyers (e.g., Chinese, Japanese, and Korean steel firms) and sellers (e.g., Australian and Brazilian mining firms). Trading in bulk commodities such as crude oil, grain, and iron ore plays a critical role in world business. Among these commodities, iron ore was the only one transacted primarily through annual negotiations before 2010 (Wilson 2012). Thus, these real cases offer us a perfect context for studying these two key questions in negotiations.

Second, it is possible to identify alternatives to negotiation in the iron ore market via the "spot market," a public market in which commodities are traded for immediate delivery. Negotiators who failed to reach an agreement on the price increase in the annual negotiation would likely trade on the spot market as an alternative. Comparing the two markets provides insights into the role that alternatives can play.

Third, unlike real-world business negotiations that occur only once, iron ore negotiations take place every year, providing us with a more robust

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sample of cases and the opportunity to examine whether patterns shift over time.

Fourth, the iron ore negotiations involve a single quantitative issue, price change, which makes it easier to compare results and analyze them quantitatively. Most business negotiations involve multiple issues and thus the outcomes are harder to quantify.

Finally, the details of most international business negotiations remain confidential, but iron ore negotiations, on the other hand, receive extensive media coverage and the information is relatively accessible.

This study makes several contributions to the negotiation literature. First, we have extended empirical findings from lab studies to real-world negotiations. Testing the external validity of experimental studies adds significantly to the generalizability of previous results.

In addition, we offer nuanced analysis negotiations in this important market. Iron ore negotiations have received some attention before, but scholars usually use economics theory to explain both sellers' economic benefits (Sukagawa 2010) and buyers' resource security (Wilson 2012). Our study focuses on the interdependent social process between buyers and sellers during certain periods and highlights the important role of negotiation behavior in international trade.

## **Literature Review**

Deal-making negotiations are commonly conceptualized as distributive negotiations in which negotiators are mainly concerned about their own economic outcomes (Thompson et al. 2010). Negotiators in distributive negotiations usually focus on one issue, usually the price; other issues are less important. In the iron ore negotiations, the percentage of price increase based on the last year was the core issue, which is the norm for the industry, and which was also confirmed by news media reports that indicate the processes and outcomes are overwhelmingly focused on price. We, therefore, conceptualize iron ore negotiations in the current study as typical distributive negotiations.

Several studies have shown that deal-making outcomes are strongly influenced by the attractiveness of alternatives and the aggressiveness of the first offer. A negotiator's best alternative to a negotiated agreement (BATNA, see Fisher and Ury 1981) is his or her "backup plan" if the current negotiation fails to reach an agreement. This best alternative can be an important source of power for negotiators, often the most important, because it can give them an option for satisfying their interests even if the other parties do not cooperate. A better BATNA gives negotiators more power because it will make them less dependent on the other party (or parties) to meet their needs.

Several studies have shown that negotiators with a better BATNA achieve higher individual gain in various negotiation simulations (e.g., Pinkley, Neale,

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and Bennett 1994; White et al. 1994; Galinsky and Mussweiler 2001; Magee, Galinsky, and Gruenfeld 2007). Other studies have shown that the bargaining price is strongly anchored by the parties' outside options (Aumann and Hart 1992).

Similarly, negotiation researchers have also examined the role of first offers. Every negotiation starts substantially with the first offer. Research has shown that the first offer has an anchoring effect on negotiators and, therefore, affects the subsequent process and hence the outcome (Gunia et al. 2013). The anchoring effect is a particular cognitive bias that leads individuals to rely heavily on the first piece of information offered when making judgments (Tversky and Kahneman 1974). The first offer sets up a cognitive baseline for both parties in subsequent negotiations, making it an important predictor of the final settlement.

Empirical experimental studies have supported this effect in negotiations across different settings (e.g., Galinsky and Mussweiler 2001; Galinsky et al. 2002; Gunia et al. 2013). Some scholars have tried to extend findings of the first offer to the real world. For example, Steve Chi, Raymond Friedman, and Huei-Lin Shih (2013) found that the first offer predicts the final agreement in sales negotiation. Likewise, Manoj Thomas, Daniel Simon, and Vrinda Kadiyali (2010) found that the precision of the first offer strengthens the anchoring effect and affects buyers' payment in real estate transactions.

These findings have greatly extended our understanding of negotiating power in deal-making negotiations, but these studies have been based largely on laboratory experiments. The literature lacks an examination of whether these conclusions can be extended to real-world business negotiations. Our study seeks to test the roles of BATNAs and first offers in real-world iron ore negotiations over several years.

## **Research Methods**

We chose to analyze iron ore negotiations from 2005 to 2009 because the relatively stable price prior to 2005 did not give us enough variance for analyses and the negotiation pricing mechanism terminated in 2009. The buyers we studied were major steel companies in Asia, Europe, and North America, including the German firm ThyssenKrupp, the Japanese firm Nippon, the South Korean firm Posco, and the Chinese firm Baosteel. Among them, Baosteel represented many Chinese steel firms that were collectively the biggest buyer during those years.

The sellers were major mining companies, mainly the "Big Three": the Brazilian firm Companhia Vale do Rio Doce (known as both CVRD and Vale), the Australian firm Rio Tinto Group, and the Anglo-Australian firm BHP Billiton (BHP). Since 1981, the price of iron ore has been determined through negotiated, year-long contracts that fixed the price from April 1 to March 31 of the following year. At the same time, international trade in iron ore was also

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supplemented by the spot market, made up of iron ore exported mainly from India. A negotiated agreement between steel firms (the buyers) and mining firms (the sellers) ensured stability in the supply of materials for steel firms and also provided loans necessary to finance project development by mining firms (Rogers and Robertson 1987).

The annual negotiation is designed to use two interrelated key mechanisms: “champion negotiation” and “price benchmark” (Sukagawa 2010). Champion negotiations are organized in an informal cartel fashion with representative firms from both sides. Negotiation pairs form between all major sellers and all major buyers, and each dyad negotiates separately over the price change (e.g., a 5 percent increase). Price benchmark is a precedent-setting system - when one negotiation dyad reaches an agreement, all the other dyads can decide whether they will complete the negotiation by accepting the price reached in that first agreement. If the first pair to reach an agreement comprises major industry players, the other negotiation dyads are likely to accept the precedent. If no dyad reaches an agreement, all the iron ore will be traded via spot transactions.

We used multiple case analyses in this study (Eisenhardt 1989). We relied mainly on archival data from several authoritative sources, such as the United Nations Comtrade International Trade Statistics Database, the annual reports of major firms, and news media reporting. We used Factiva, a search engine that is widely used in international business research, to identify case-related media coverage, (e.g., Dyck, Volchkova, and Zingales 2008; Bhattacharya et al. 2009; Hope, Thomas, and Vyas 2011). By excluding Internet reader comments and redundancies (e.g., when the same wire service story gets published in multiple different newspapers), we narrowed our data pool of news reports from an original result of 5,700 articles to 596.

We used the archival data and media reports to draw as complete a picture as possible of the five years’ negotiation processes. To gather and validate the information, we used triangulation, which is the technique that ensures validation of data through cross verification from at least two different sources (Jick 1979). For example, triangulating data between media reports and archival data allowed us to systematically compare and contrast the spot price and negotiated price.

Unlike the stable annually negotiated price, the spot price, which is the purchase price in the spot market, fluctuates on a daily basis, so we used the weighted average spot price of iron ore exports from Australia for the previous year as the indicator of the spot price (Reserve Bank of Australia 2010). Doing so enabled us to examine the mutual influence between the two parallel pricing mechanisms and gain insight into how real-world negotiations unfolded in the dynamic economic environment. We note that our negotiation data about the points are sometimes price ranges rather than specific numbers because sometime negotiators actually offered a price range

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and sometimes media only had access to a price range. In any case, we used strict triangulation methods to improve accuracy.

## **Iron Ore Negotiations 2005–2009**

Before describing five years of negotiation details, we must first answer a key question: why did the iron ore price increase so dramatically after 2005? We suggest that this is primarily because of the participation of buyers from China, which experienced the rapid and state-supported growth of its steel industry. In 2001, China accounted for 18 percent of the world's crude steel production and 19 percent of its iron ore imports; these two numbers dramatically increased to 47 percent and 68 percent, respectively, in 2009 (U.N. Comtrade 2011). Such a dramatic increase is unprecedented in history, and this inevitably reshaped the equilibrium of supply and demand.

When demand from Japanese steel firms significantly increased in earlier decades, the price of iron ore did not change as dramatically. According to Jeffrey Wilson (2012), this is because Japanese steel firms apparently coordinated with the iron ore firms through more effective joint ventures and integrated supply and demand, but Chinese firms did not have such strong relationships with those suppliers. Japan has fewer steel firms, so such coordination among buyers would be simpler to accomplish than in the larger and more fragmented Chinese market. For example, in May 2009, when major Chinese negotiator China Iron and Steel Association (CISA) threatened a boycott against the Big Three mining companies, thirty-eight small and medium Chinese steel firms accepted an offer by Vale (Zhao and Li 2008). The dramatic fluctuations in iron ore prices during the period of our study gave us a unique opportunity to examine the industry through the lens of negotiation.

### **2005 Negotiation**

The 2005 iron ore negotiation began at the end of 2004, starting with the first offer of a 50 percent price increase from the previous year's contracted price raised by the seller, BHP, and the counteroffer of a 20 percent increase raised by the buyer, Nippon (*Financial Express* 2005). On January 21, 2005, the seller Vale announced that it had received an offer with a higher price increase: 90 percent. A month later, Nippon and Vale finally reached agreement on a 71.5 percent increase (Smale 2005). The next day, Rio Tinto indicated that it had reached an agreement with Japan's firms following this benchmark, and Posco then followed this agreement as well (Rio Tinto 2005).

In contrast, the representative of the biggest buyer, Baosteel, expressed objections, but did not receive any informative responses from the Big Three sellers. In April, BHP announced another offer, at a price increase of 103 percent to 104 percent (BHP Billiton 2005). On April 13, after months of negotiation, Baosteel and BHP finally reached an agreement strictly following the previously agreed price benchmark of a 71.5 percent increase, and BHP shelved the idea of changing the calculation of Free On Board (FOB), which meant the sellers were

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no longer responsible for shipping cost (BHP Billiton 2005). The weighted average spot price in 2004 was \$61.17 per ton (U.N. Comtrade 2011).

This benchmark price was unprecedentedly high, so the biggest buyers, the Chinese steel firms, reacted accordingly. Some Chinese news coverage questioned the legitimacy of Japan as a representative of Asian buyers – because it was Nippon’s deal with Vale that had set the benchmark – considering Japan’s declining share of regional imports and what they argued was an inefficient negotiated agreement (Yang 2006). The Chinese government issued an iron and steel industry development policy, which regulated certain criteria such as production scale to determine the eligibility of iron ore importers. The number of eligible steel firms declined from 523 to 118 according to this policy (Jiang 2006), and noneligible firms had to obtain ore through the secondary markets. The Chinese government claimed that this policy would contain the exceedingly exuberant demand from domestic firms, but it was also interpreted as a cartelization of Chinese steel firms for the purpose of influencing future annual negotiations (Wilson 2012).

### ***2006 Negotiation***

The 2006 negotiations started in November 2005 with the sellers’ first offer of a 10 percent to 20 percent price increase. Buyers’ negotiation representatives expressed their objections to this increase because they expected a decrease, in view of the decline in worldwide steel firms’ performance in 2005. This price gap persisted through three rounds of negotiations (Jiang 2006).

One noteworthy feature of the 2006 negotiation was that the Chinese government got more involved, although indirectly, in the negotiation. The Chinese government began to control the import price of iron ores, disallowing some transactions that exceed the regulated price limit. On March 15, which was United Nations World Consumers Rights Day, two Chinese national ministries issued a joint declaration indicating that they were paying close attention to the iron ore negotiation and that they would take certain actions if they deemed the price unacceptable (Mo 2006). In addition, the Chinese government announced its eleventh Five-Year Plan (which sets national economic policies) for years 2006 to 2010 in which a key component was to regulate the energy industry (Pan 2006).

The Australian government was displeased by the Chinese government’s actions. Officials in the Australian Department of Foreign Affairs and Trade expressed concern about the impact of government involvement from both buyer and seller sides. In March 2006, a Brazilian newspaper reported that Vale would propose a 24 percent increase, and Vale’s official website reprinted the article mentioning this number. The fourth round ended with yet another impasse (CVRD 2006a).

In the fifth round of negotiation, Vale and ThyssenKrupp announced that they had reached an agreement on a 19 percent price increase. In the following weeks, Vale announced an agreement with multiple steel firms following this

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price benchmark, including Riva from Italy, JFE from Japan, Posco from South Korea, Arcelor Mittal from India, and China Steel from Taiwan (CVRD 2006b). On May 24, Vale delivered an ultimatum to Baosteel indicating that if China did not accept this offer, all the iron ore planned for sale to China would be sold to other buyers at the spot price. A month later, Baosteel accepted the benchmark 19 percent price increase (CVRD 2006c). The weighted average spot price in 2005 was \$66.62 per ton (Reserve Bank of Australia 2010).

### ***2007 Negotiation***

The annual negotiation in 2007 was remarkably short compared to the lengthy five rounds of negotiation that took place in 2006. On December 11, 2006, the first round of negotiation officially began. Representatives of buyers in Japan and Korea rejected the first proposal of a 5 percent to 10 percent price increase by the sellers, and both parties agreed to launch a second round of negotiations in January 2007 (Japan Metal Bulletin 2006). Nevertheless, on December 21, Baosteel and Vale announced agreement on a 9.5 percent price increase based on the last year (CVRD 2006d). In the following months, major steel and mining firms accepted this offer one after the other, which ended the annual negotiation. The weighted average spot price for this year was \$63.75 per ton (Reserve Bank of Australia 2010).

### ***2008 Negotiation***

To start, Vale asked for a 70 percent price increase in late November 2007. In February 2008, Nippon and Posco announced an agreement with Vale, calling for a two-tiered price increase of 65 percent in the price of one southern iron ore but a 71 percent increase for another northern iron ore (CVRD 2008). Baosteel followed by agreeing to these prices with Vale.

Sellers BHP and Rio Tinto refused to follow the benchmark set by Vale but proposed a price increase of 85 percent to 95 percent for Baosteel. Baosteel argued that this action, setting two different benchmark prices, violated the industrial tradition because historically an agreement indicated only one uniform number, regardless of the type of iron ore (Reuters 2008). Before the negotiation deadline was reached, Baosteel finally agreed on two-tiered 80 percent and 96.5 percent price increases based on the last year. Nippon and Pohang then followed by accepting these more expensive prices, which applied only to Asian buyers. Last but not least, Vale further asked for a 20 percent price increase based on the previously negotiated agreement with all Asian buyers, but the new offer was not accepted. Again, the buyers and sellers had the alternative of the spot market, at the weighted average price of \$87.82 per ton in the previous year (Reserve Bank of Australia 2010).

### ***2009 Negotiation***

In August 2008, the spot price for iron ore began to plummet as a result of the global financial crisis, and it rapidly fell below the agreed negotiation price. The negotiated volume of purchases became a burden for many steel firms



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such as Baosteel (Wilson 2012). Because the spot price became unexpectedly low, some steel firms violated the contract and refused to import the iron ore as specified earlier. In response to multiple breaches of contract, the Big Three sellers jointly proposed a new index pricing regime to replace the annually negotiated agreement (Steel Index 2008). Baosteel rejected this proposal and insisted on the negotiation mechanism, with a proposal of “at least a 45 percent decrease” in price (Allen 2008). All these offers and counteroffers were discussed in the background; the weighted average spot price in 2008 was \$133 per ton (Reserve Bank of Australia 2010).

In May 2009, Nippon and Rio Tinto reached agreement at price decreases of 33 percent and 44 percent for two categories of iron ore, respectively (Creamer 2009). The Chinese steel companies and iron ore producers failed to reach agreement. A striking political scandal complicated negotiations: on July 5, four members of Rio Tinto’s negotiation team were arrested and charged with bribing Chinese steel firms to obtain inside information on negotiations (Wilson 2012). This scandal escalated the conflict between China, the largest buyer as a country, and all sellers. Following this disruption, the annual negotiation pricing mechanism began to be modified and ceased to function.

Figure One shows how iron ore prices fluctuated from 2001 to 2009. Table One lists the key attributes of each negotiation from 2005 to 2009

## **Findings and Analysis**

### ***Spot Price as BATNA***

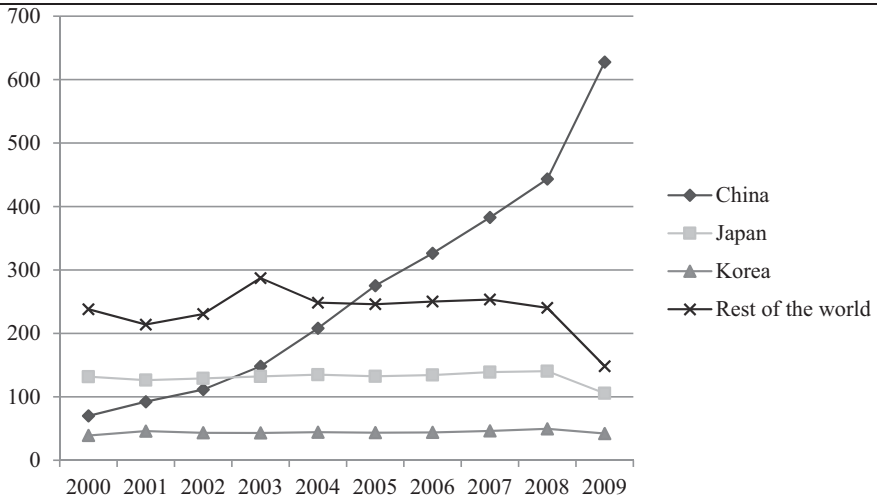
In each year’s negotiation, if no agreement was reached within a dyad, the sellers and buyers had to consider their alternatives. The sellers had the option of coming to agreement with other steel firms (see Figure One). If no dyad reached an agreement, the sellers could then sell to steel firms at the spot market price, which was usually higher than the negotiated price (Reserve Bank of Australia 2010; see Figure Two). At the same time, the sellers also were motivated to reduce uncertainty because uncertainty typically exacts its own costs (Sukagawa 2010).

We can infer from the historical data that those years witnessed a strong demand for iron ore from all over the world; mining firms recruited more employees and purchased more machines to meet the increased demand during those years (Reserve Bank of Australia 2010). In other words, losing one buyer was unlikely to cause significant damage because overall demand was so robust. In sum, while not without consequence, for sellers impasse would have been far from fatal.

Buyers also had alternatives. They could reduce their steel production volumes, purchase on the domestic market, or buy on the spot market. Among these choices, buying on the spot market is the only feasible one, so the spot market price serves as their BATNA.

Table One							
Iron Ore Negotiation Attributes							
Year	First-Offer Party	First Offer	Starting Point	First Pair of Agreement	Date of Agreement	Price of Agreement	
2005	BHP	50 percent increase	end of 2004	Nippon and Vale	2-28-2005	71.5 percent increase	
2006	Mining firms	10 percent-20 percent increase	11-14-2005	ThyssenKrupp and Vale	5-16-2006	19 percent increase	
2007	Mining firms	5-10 percent increase	12-11-2006	Baosteel and Vale	12-21-2006	9.5 percent increase	
2008	Mining firms	70 percent increase	late Nov. 2007	Posco and Vale	2-22-2008	65 percent and 71 percent increase	
2009	Baosteel	45 percent decrease	end of 2008	Nippon and Rio Tinto	5-26-2009	33 percent and 44.5 percent decrease	

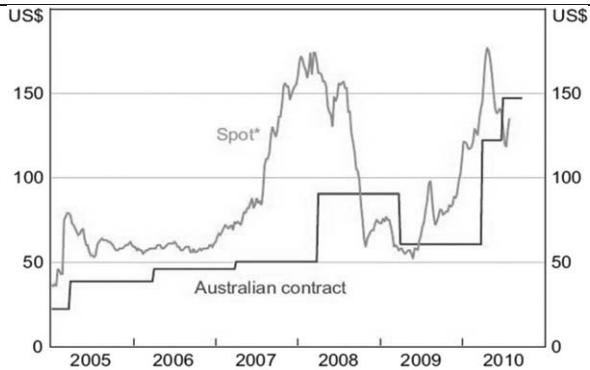
**Figure One**  
**Worldwide Iron Ore Imports by Major Buyers from 2000 to 2009**



Note: Million tons per annum.

It is extremely difficult for steel firms to adjust their production volume in the short run. For Baosteel, who faced rapidly increasing demand for steel, reducing steel production would be economically unwise and socially undesirable because it would have entailed laying off workers. The market

**Figure Two**  
**Agreement Price and Spot Market Price of Iron Ore from 2005 to 2009**



Note: In the years 2008 and 2009, the agreements consist of two prices, so we use the mean of the two numbers.

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**Figure Three**  
**Scatterplot of the Association between Price Gap and Negotiation Outcome**

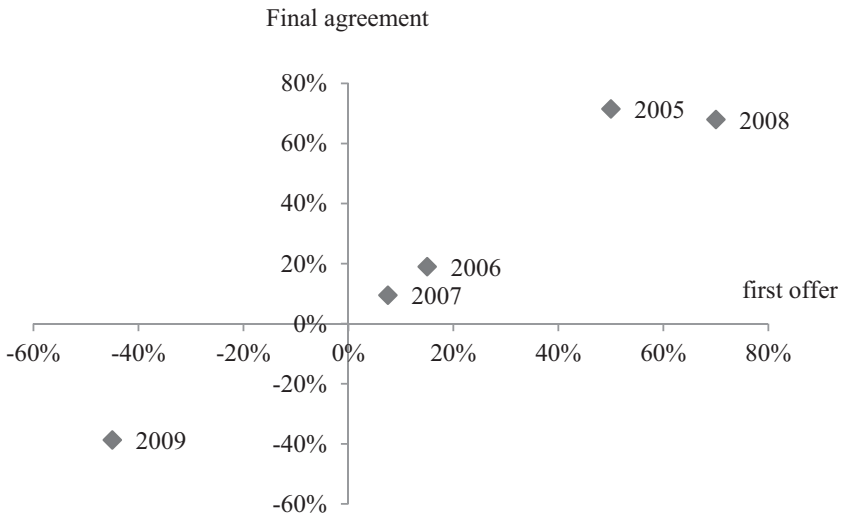
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**Figure Four**  
**Scatterplot of the Association between the First Offer and Negotiation Outcome**

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strength of the major iron ore sellers is long established – no other mining companies can compete with their rich supplies because of their geological advantages (Labson, Gooday, and Manson 1995).

Using the spot market was the primary alternative available to both buyers and sellers if they failed to reach an agreement. Thus, the spot price of iron ore reflects the quality of buyers' and sellers' BATNAs. We used a scatterplot (see Figure Three) to visually demonstrate our proposition that high spot prices will motivate buyers to accept a high price increase in negotiations. The *x*-axis represents the price ratio between the spot market and the negotiated agreement. A higher ratio indicates a larger gap between the spot price and the negotiated price, with the agreed price shown as the baseline.

Because the issue negotiated was the increase in the price rather than the absolute price, we estimated the previous year's agreed price based on data from the Reserve Bank of Australia (2010). We used the following formula:

$$\text{Price gap} = \frac{\text{spot price} - \text{agreed price}}{\text{agreed price}}$$

In the formula, spot price refers to the yearly average spot prices and agreed price refers to the price negotiated in the previous year that is in effect in the current year. In Figure Three, the *y*-axis represents the increase in the final agreed price, which indicates the negotiation outcome. In the years 2008 and 2009, the agreements consisted of two prices, so we use the mean of the two numbers. The figure suggests that if no agreement were reached, the best alternative for both buyers and sellers would be to purchase and sell the iron ore on the international spot market. The wider the price gap, that is, the gap between last year's agreed price and this year's spot price, the greater the pressure buyers were likely to experience to accept this year's offered price, which would lead to a higher price as the outcome of negotiation. In sum, we conclude that buyers were more vulnerable to the consequences of nonagreement and hence were more motivated to reach an agreement, even with a seemingly high price increase. We propose that in four out of the five years, buyers were in a relatively weaker condition than the sellers.

Thus, our first conclusion is that, in the iron ore negotiations, the best alternative affects the price outcome such that the higher the spot price compared with the previous year's agreed price, the larger the increase in the current year's contract price will be.

### ***First Offer: Anchoring Effect***

Two mechanisms help us explain the anchoring effect, which is the influence of the first offer on the final outcome, in iron ore negotiations (Gunia et al. 2013). The first mechanism is *insufficient adjustment*, which describes how people's thinking becomes stuck or fixated close to an anchor. The first offer establishes an official baseline for subsequent bargaining, in particular when

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the market lacks a normative price. Indeed, the market for iron ore was highly uncertain during the focal years. The price was relatively stable before 2005, but then supply and demand began to change dramatically. When the environment is uncertain, negotiators are more likely to look for a reference point (Jacowitz and Kahneman 1995); hence the first piece of information on the table is more likely to become the baseline for negotiators' subsequent bargaining.

The second mechanism is *selective accessibility*, which means that the anchor initially seems reasonable so people tend to generate more knowledge to confirm this anchor. For example, a high first offer makes buyers focus more on the great value of iron ore while a low first offer makes them focus more on its availability. This mechanism is particularly important in the negotiations we studied. In the real world, negotiators assume that the other party comes to the table with sufficient data and arguments to make to support its positions. Unlike artificial experimental manipulations, in the iron ore negotiations, negotiators based their offers on real-world market information and expected their counterparts to justify their offers. This perception strengthened the anchoring effect because of the assumption of the offer's authenticity.

More specifically, one important difference between these real negotiations and lab simulations is the role the media played in the iron ore negotiations. News media showed great interest in following and reporting the iron ore negotiations, and negotiators had to respond to information released by the media as well. In other words, negotiators not only had to prepare to justify and substantiate their own offers with the press, but also needed to prepare to argue their counterparts' proposed offers. For example, in 2005 a Brazilian newspaper reported that Vale would offer a 24 percent increase even before the company officially announced it. It is then reasonable to infer that buyers studied this number prior to the negotiation. They may have simply prepared data and reports to provide evidence to argue against this offer, but in the process they were exposed to, and additionally influenced by, this anchor price.

According to the anchoring effect theory, a reasonable conclusion is that the focal year's first offer was affected by the last year's negotiation outcome (i.e., on the percentage of price change). Our study of the industry, however, indicates that this is unlikely. Making the first offer entails analyzing current supply-and-demand analysis in a dynamic market, which makes the last year's outcome less relevant. The market changes quickly, which is why suppliers and purchasers must renegotiate annually. The difference between 2005's outcome (71.5 percent) and 2006's first offer (10–20 percent), as well as the difference between 2007's outcome (9.5 percent) and 2008's first offer (70 percent), show that it is unlikely that the precedent exerts much control. We thus suggest that the effect of the first offer is limited to the focal year's negotiation processes and outcomes.

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We visually demonstrate the pattern of the first offer and the agreement price with a scatterplot in Figure Four. The  $x$ -axis indicates the first offer, regardless of whether it was made by buyers or sellers; the  $y$ -axis indicates the final negotiated agreement. In the years 2006 and 2007 the first offers were price ranges, so we use the mean of these ranges as the indicator. The figure shows that the price of the first offer and that of the final agreement are highly correlated. Thus, our second major conclusion is that, in iron ore negotiations, the first offer has an anchoring effect and affects the outcome.

## Scholarly and Practical Contributions

The laboratory experiments that dominate the negotiation literature have high levels of internal validity, but their external validity is seldom certain. This study extends the external validity of two of the most important findings in the negotiation literature and adds important practical insights. Specifically, it supports the real-world validity of experimental findings about the roles of BATNAs and first offers. The literature has long documented that BATNAs act as one of the strongest sources of negotiating power, but the empirical support is overwhelmingly from experimental studies. Likewise, the role of the anchoring effect of the first offer in negotiations has also been robustly supported in the literature regardless of the type of simulation or participants' demographic or cultural characteristics (Gunia et al. 2013).

We quantitatively summarized multiple years' negotiations and found that the more expensive the spot price was relative to the the previous years' negotiated price, the greater would be the increase in the negotiated price that year. Apparently, the higher the spot price, the less attractive it is to buyers as an alternative to the benchmark negotiated price - it offers less relative advantage.

Our paper adds to the previous studies that have used field data to validate and supplement experimental findings. For example, Douglas Johnson and Dean Pruitt (1972) used field data to examine mediation effectiveness. Michaela Draganska, Daniel Klapper, and Sofia Villas-Boas (2010) found that, in the German coffee market, negotiating power was itself a function of exogenous alternatives. Two empirical studies on real transactions in real estate sales found that more precise first offers (e.g., \$351,467) anchored the final price more strongly (Janiszewski and Uy 2008) and were seen by potential buyers as cheaper than round number prices (e.g., \$350,000) even when the latter was actually lower (Thomas et al. 2010). Aimin Yan and Barbara Gray (1994) examined the power structures of four Chinese-U.S. joint ventures based on each side's BATNA and stake in the venture.

When we conduct negotiation experiments, "we usually know how the data is recorded and generated; we know the hypotheses tested and the causal inferences made; we know that when more data is needed, further experiments may be undertaken to improve data quality; what we do not

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know is how we can overcome the sense of artificiality that inevitably characterizes these studies” (Bercovitch 2004: 416). Negotiation experiments provide us with valuable insights, but evidence from real negotiations allows us to better understand the social complexity (Barry and Fulmer 2004).

Real-world validation also gives practitioners greater faith in academic research findings and advice. Our research indicates that important experimental findings about BATNAs and first offers can be generalized to natural settings, so managers and practitioners should not underestimate their importance. Practitioners who disregard such factors are more likely to make strategic errors. For example, some iron buyers assumed the price changes were driven by seller monopolization, a conspiracy among their competitors, or simply a lack of solidarity among buyers (Moore 2008). But the iron ore price fluctuated considerably after the formal negotiation framework ended: it reached its peak at more than \$180 per ton in February 2011 and its bottom at less than \$40 per ton in December 2015 (Mundi Index 2017).

At the two time points of the extremely high and extremely low prices, the players in the industry remained essentially the same; the major sellers were the same big three mining companies, and the major buyers were the same steel companies. The price changes clearly were not driven by seller monopolization, price fixing, or a lack of solidarity among buyers. Instead, buyers’ and sellers’ best alternatives seem to play the key role in the international business transactions.

## **Limitations and Future Directions**

This study inevitably has some limitations. First, the small number of cases could limit the validity of our findings. It is much harder to identify and examine a sufficient number of cases in the real world than in a laboratory. Although our research supports generalizing lab findings to real-world negotiations, it is unclear whether our findings can be generalized to other negotiation contexts.

We focused only on the BATNAs and the first offers in our study but other factors could have affected negotiation outcomes. For example, the 2007 negotiation was briefer than the other four years, and it is possible that duration played a role in the results but we did not look at that. In some cases, dyadic negotiation became multiparty negotiation and we also did not consider how that affected outcomes, nor did we consider cultural differences between the different parties, which is worth examining.

Another possible concern is that the two factors we focused on may not have been independent of each other. The first offer is a more proximal indicator of how negotiation unfolds while BATNA is a more distal indicator. That is, negotiators may take BATNA into consideration when they plan for the first offer. We obviously cannot rule out this possibility, because in the real-world negotiators’ perceptions of their own or their counterparts’ back-



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up plans can affect their first move in the negotiation. In addition, negotiators also need to carefully study the industrial environment before they express their first offers. Indeed, the literature has documented linkages between BATNAs and first offers (e.g., Galinsky and Mussweiler 2001; Magee et al. 2007). Thus, the nonindependence of the two factors, which is supported by previous findings, actually reflects how actual negotiations unfold in the real world.

Researchers who seek to pay more attention to real negotiation cases could expand their negotiation case data to include transaction logs and e-mail correspondence about deal making, as well as the type of publicly available reports that we used. These sources might enable us to identify a larger number of comparative negotiation cases.

Examining real negotiation events allows researchers to take a close look at how negotiators behave in naturalistic settings. The international iron ore negotiations provided us with an ideal natural setting for validating experimental findings about the role of two important factors (BATNA and first offers) on negotiation behavior.

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