The Negotiation Calculus:
Why Parties to Civil Conflict Refuse to Talk

Supplementary File

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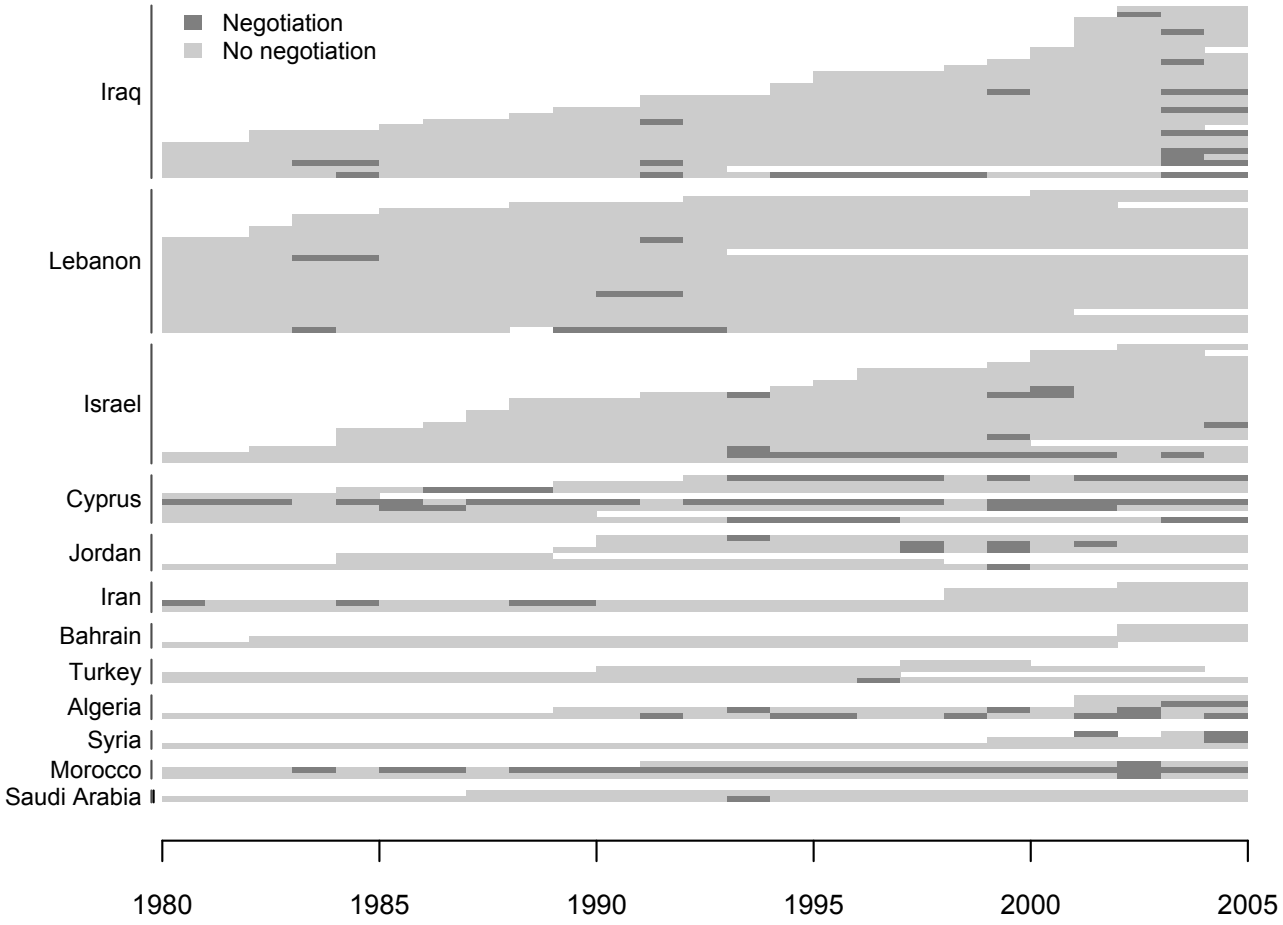
This appendix contains supplementary material from "The Negotiation Calculus: Why Parties to Civil Conflict Refuse to Talk." I first provide more detail on the coding of the dependent variable in my analysis. Next, I describe the robustness checks I conducted as part of the analysis, and discuss a test of a subset of my hypotheses using an alternative dataset with broader geographic scope. Finally, I provide additional details on the out-of-sample predictive power of my variables of interest.

Coding of the dependent variable

The dependent variable for my analysis is a dichotomous variable that takes on the value of one if the government and opposition group engaged in negotiations in a particular year, and zero otherwise. The MAROB dataset codes incidence of negotiation in terms of the success of an opposition group in winning concessions from the government (Wilkenfeld, Asal, and Pate 2008). Using MAROB's ORGSUCCESS variable, I create a dichotomous negotiation variable by recoding the categories "state refuses to negotiate with the organization" and "no negotiation with state sought" to equal zero (no negotiation), and by recoding all other values to equal one (negotiation). My findings are robust, however, to more narrow coding rules for the dependent variable.

About eight percent of dyad-years in the MAROB data feature talks between the parties, but there is significant variation in negotiation behavior both within dyads over time and across dyads. Figure A1 illustrates this variation, showing negotiations by dyad over time within all 12 countries included in the MAROB data. The horizontal lines in the figure represent different opposition groups; dark gray segments indicate talks between the parties, while light gray portions of the lines indicate that no negotiations took place

Figure A1: Negotiations in the MAROB dataset, 1980–2004



between the parties in those years. Lines are left uncolored if a particular organization did not exist in a given year.

As the figure shows, some countries are clearly more willing than others to negotiate. Morocco and Cyprus held talks in more than 30 percent of their dyad-years, for example, while Bahrain conducted no negotiations in these data and Lebanon and Turkey barely more than that—both negotiated in less than two percent of dyad-years. Negotiations have also become more prevalent over time. In the 1980s, about five percent of dyad-years involved talks. That number jumped to nine percent in the 1990s and 11 percent in the 2000s. The most negotiation-heavy year, in fact, was 2004, the last year

included in the dataset. Almost 16 percent of dyads were engaged in negotiations in that year, led by a higher than usual incidence of negotiation in Syria, Cypress, Morocco, and the newly post-Saddam Hussein Iraq.

Robustness tests and additional analyses

The following robustness tests and additional analyses supplement the statistical models described in the body of the article. Table 2 from the article, containing the main results of the quantitative analysis, is reproduced below for reference.

The coefficient on the variable representing reputation costs—the number of opposition groups in a state—is negative and significant; the greater the number of potential claimants in a state, the less likely are the parties to negotiate. If governments are wary of signaling weakness to potential claimants, however, we might expect this relationship to be transitory. Once the government holds several rounds of talks with opposition groups, the government's willingness to negotiate would be revealed, and concerns about reputation would no longer offer a reason to avoid talks. Reputation should have less influence on the decision to negotiate for governments with a history of engaging in talks, than it would for governments that have not been frequent negotiators.

To test this proposition, I repeat the analysis in model 7, adding a variable that represents the cumulative number of negotiation-years for the government. I also interact this cumulative number of negotiation-years with the number of potential claimants. As expected, the coefficient on this interaction term is positive and significant at the $p < 0.1$ level, suggesting that reputational concerns become less of an impediment to talks the more governments involve themselves in negotiations. The second difference of the interaction, calculated at the minimum and maximum for cumulative negotiations and

Table 2: Combined probit models of intrastate negotiation

		Model 6		Model 7	
Hypothesis	Variable	Negotiation		Negotiation	
Reputation	Number of opposition groups	-0.236	***	-0.234	**
		(0.062)		(0.084)	
External Pressure	Military support to rebels	-0.514	*	-0.517	*
		(0.216)		(0.219)	
Internal Pressure	Religious organization	0.025		0.028	
		(0.310)		(0.315)	
Legitimacy	Longevity	0.014	**	0.014	**
		(0.005)		(0.005)	
	Political support to rebels	0.612	**	0.615	**
		(0.196)		(0.195)	
Transaction Costs	Fractionalized leadership	-0.588	^	-0.589	^
		(0.336)		(0.339)	
Costs of Conflict	Rebel violence	0.068		0.068	
		(0.047)		(0.049)	
	Rebel territory	0.984	***	0.985	***
		(0.215)		(0.218)	
Settlement Prospects	Pr(Settlement|Negotiation)			-0.026	
				(0.305)	
	Constant	-0.760	***	-0.761	***
		(0.169)		(0.180)	
	N	1,786		1,786	

Probit coefficients with bootstrapped robust standard errors, clustered by dyad, in parentheses. A cubic polynomial of the number of years since the last dyadic negotiation is included in all models but not shown.

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, ^ $p < 0.10$

potential claimants, also reaches significance at the $p < 0.1$ level (Berry, DeMeritt, and Esarey 2010).[1] These results provide additional support for the finding that a

[1] The statistical significance of the coefficient on an interaction term in a probit model is known to be a imperfect indicator of the significance of the true relationship between two variables (Ai and Norton 2003; Brambor, Clark, and Golder 2006; Braumoeller 2004). The "second difference" allows for a test of the statistical significance of an interaction in terms of a particular quantity of interest under particular assumptions for other variables

government's concern about its reputation is an important driver of negotiation behavior.

Another possibility is that the presence of a number of potential claimants means something different in a democracy than it does in an autocracy. Democratic states are likely to provide more opportunities for opposition groups to participate in government short of engaging in violent conflict. For this reason, democratic states may be less concerned about the reputational costs of engaging in negotiations with opposition groups. Additional analysis, however, suggest that reputational effects matter to both democracies and non-democracies. An interaction between state regime type, using data from the POLITY IV project (Marshall, Jaggers, and Gurr 2010), and the number of potential claimants does not reach statistical significance. Regime type itself seems not to be an important driver of negotiation behavior; a regime type variable added to the model is not significant, and does not alter the results for other variables.

Two measures of the cost of legitimizing the opposition—the longevity of the opposition group and whether or not it receives political support from foreign states or international organizations—are strongly associated with the decision to negotiate. Groups with longer tenure and that enjoy outside political support are more likely to be involved in negotiations. There is some risk that the longevity finding could be influenced by the presence of a few organizations of long standing. The longest-tenured group in the

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in the model. The min-max second difference used here is defined as [Pr(Y|X=*max*(X), Z=*max*(Z)) – Pr(Y|X=*min*(X), Z=*max*(Z))] – [Pr(Y|X=*max*(X), Z=*min*(Z) – Pr(Y|X=*min*(X), Z=*min*(Z)]. This is simply the difference between two first differences. The first of the two first differences is the effect on the predicted probability of negotiation of a change in the number of potential claimants from its maximum to its minimum value, with the cumulative negotiation-years variable set at its maximum and all other variables set to their mean. The second of the first differences is the effect on the predicted probability of negotiation of a change in the number of potential claimants from its maximum to its minimum value, with the cumulative negotiation-years variable set at its minimum and all other variables at their mean (Berry, DeMeritt, and Esarey 2010).

MAROB data is al-Ahbash of Lebanon, founded in 1930, but the median longevity in the dataset is only 18 years. To better understand the sensitivity of my results to potential outliers, I repeated the analysis but dropped from the dataset all dyad-years that involved organizations formed more than ten years earlier. The coefficient on the longevity of the opposition group remained negative and significant using this subset of the data.[2] Even within a cohort of relatively new organizations, states appear more likely to negotiate with more established groups, consistent with the legitimacy hypothesis.

One potentially important dynamic not captured in the main analyses is the effect of spatial diffusion on the decision of parties to negotiate. It may be that peace talks are, in a sense, contagious. The decision of one government in the region to negotiate with its opposition groups may lead to parallel efforts in other states. Similarly, the success of a particular opposition group in securing negotiations in one state may affect the willingness of another government to hold talks with the same group. If the events in other states are correlated with costs of negotiation—such as outside support for opposition groups—ignoring regional trends may bias my results. I therefore construct two new variables: a count of the number of negotiations outside a particular state in a given year, and a count of the number of negotiations conducted by a particular organization with other governments in a given year. These variables do not reach statistical significance when added to the model, and their presence in the model does not affect the results for other

[2] Longevity is also significantly associated with negotiation when the sample is restricted to longer-lived organizations (greater than ten years).

variables.[3] Regional patterns in negotiation do not appear to be a significant driver of negotiation behavior, and are not a source of bias in my results.

External validity and mediation

While the MAROB dataset has several important benefits, as discussed in the article, it is limited in its geographic scope to 12 states in the Middle East and North Africa. My findings, however, are likely to apply more broadly. While a full empirical test of my theory beyond the Middle East/North Africa region is not possible with available data, robustness checks using global civil war data finds strong support for the reputation, external support, and legitimacy hypotheses.

The MAROB data is also a relatively poor test bed for questions about the effect of mediation in driving negotiation behavior. The dataset includes opposition groups that do not employ violence, and so are unlikely to draw the attention of external mediators. Mediation data also is not readily available for the set of cases included in the MAROB dataset. While the MAROB dataset does consider mediation as one of many aspects of political support from foreign governments and transnational groups, mediation is not coded as a separate category.

I therefore conduct additional analyses using UCDP/Prio's dyad-year armed conflict dataset (Uppsala Conflict Data Program 2014), combined with the Non-State Actor (NSA) Dataset from Cunningham, Gleditsch, and Salehyan (2013). These data are global in scope and include conflict dyads from 1975 through 2011. It is important to note, however, that the UCDP/Prio data represents a fundamentally different sample of

[3] Lagged versions of these variables also do not affect the results for other factors in the model. A variable counting the number of negotiations conducted by a government outside a particular dyad in a given year is statistically significant; states are more likely to negotiate with one group when they are also negotiating with another. Adding this variable to the model, however, does not affect results for the variables of interest.

cases than the MAROB dataset used in the main analysis; the former includes only civil wars, while the latter includes some nonviolent opposition groups.

The dependent variable in this analysis is UCDP/Prio's measure of whether a dyad engaged in negotiations in a given year. I chose independent variables to match, as closely as possible, the independent variables used in the main analysis. To test the reputation hypothesis, I again use the count of the number of opposition groups drawn from the broader Minorities at Risk dataset (Minorities at Risk Project 2009). To test the external pressure hypothesis, I use the NSA dataset's coding of military support to rebels by foreign governments or non-state actors, corresponding to the MAROB measure of external military support used in the main analysis. I create a dichotomous variable that is set to one if the rebel group in the dyad received explicit military or troop support from a foreign government, or received minor or major military support from a transnational non-state actor.

Two variables allow for a test of the legitimacy hypotheses. To measure the longevity of the opposition group, I calculate the number of years since the earlier of the first expression of incompatibility or the first battle death in the dyad from the UCDP/Prio data. To measure the level of outside political support, I use the NSA data to create a dichotomous variable set to one when the rebels receive non-military support from either transnational non-state actors or foreign governments in a given year. To control for the cost of conflict, I use two variables: a dichotomous measure set to one when rebel fighting capacity relative to the government is moderate or high, according to the NSA data, and a dichotomous variable set to one when the NSA data judges the rebel group has a high level of control over territory. Finally, I use a measure of whether external mediation was offered to the dyad, from the Civil War Mediation dataset (DeRouen, Bercovitch, and Pospieszna 2011).

For these models, I use penalized likelihood probit regression to allow for estimation in the presence of separation in the data for some subsamples (Heinze and Schemper 2002; Zorn 2005). The models includes a cubic polynomial of the time since

Table A1: Analysis of intrastate negotiation using UCDP/Prio data

		Model A1	Model A2	Model A3
	Variable	Negotiation	Negotiation	Negotiation (no mediation)
Reputation	Number of opposition groups	-0.025 *	0.011	0.009
		(0.013)	(0.013)	(0.014)
External Pressure	Military support to rebels	-0.249 **	-0.307 ***	-0.309 ***
		(0.078)	(0.083)	(0.091)
Legitimacy	Longevity	0.020 ***	0.021 ***	0.020 ***
		(0.003)	(0.003)	(0.004)
	Non-military support to rebels	0.168 *	0.174 *	0.231 *
		(0.083)	(0.088)	(0.100)
Mediation	Offer to mediate		1.561 ***	2.206 ***
			(0.095)	(0.228)
Costs of Conflict	Rebal fighting capacity	0.763 ***	0.668 ***	0.741 ***
		(0.085)	(0.091)	(0.102)
	Rebel control of territory	0.720 ***	-0.002	-0.098
		(0.188)	(0.213)	(0.322)
	Constant	-0.727 ***	-1.165 ***	-1.241 **
		(0.083)	(0.092)	(0.100)
	N	2,151	2,151	1,917

Penalized likelihood probit regression coefficients with standard errors in parentheses. A cubic polynomial of the number of years since the last dyadic negotiation is included but not shown.

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, ^ $p < 0.10$

the last dyadic negotiation to address temporal dependence in the data (Carter and Signorino 2010).

Results using this alternative dataset are shown in table A1. Model A1 suggests that the findings in the main analysis apply beyond the geographic limitations of the MAROB dataset. The coefficient on the count of the number of opposition groups in the state is negative and significant; negotiation is less likely when states have a greater number of potential claimants. External pressure—in terms of military support to rebels—is also significantly associated with a reluctance to negotiate. The longevity of the dyad as well as non-military support to rebels, proxies for rebel legitimacy, are associated with an increased likelihood of negotiations. Each of these findings is consistent with the

hypotheses advanced in the article. Taken together, these results should give us more confidence in the external validity of the analysis.

Model A2 considers how external offers to mediate affect negotiation behavior. The coefficient on mediation is positive and significant; when an external mediator is available, negotiations are much more likely. This result persists in model A3, which excludes all cases where mediation actually took place. That the mediation offer variable remains positive and significant suggests that mediation offers encourage negotiation even when the mediation itself is rejected.

Of course, there may be a selection effect in play; the factors that make mediation more likely may also make conditions more favorable for bilateral talks. To identify the independent effect of mediation offers on negotiation, I use a bivariate probit procedure that treats mediation as an endogenous regressor. To model mediation itself, I add variables that represent the importance of the state in the international system, including the state's GDP and composite capabilities score (Gleditsch 2002; Singer 1988); variables representing previous conflict and negotiation behavior in the dyad; and a dummy variable representing extraterritorial conflict. The result is the same—mediation offers are strongly associated with negotiation even after accounting for many of the factors that lead to mediation offers in the first place.

The predictive power of negotiation costs and benefits

One way to understand the substantive importance of my findings is through out-of-sample prediction—how much do the costs and benefits of negotiation contribute to our ability to predict negotiation behavior? Out-of-sample prediction prevents statistical models from teaching to the test, exposing model over-fitting and looking beyond statistical significance to identify variables that have real predictive power. Strong out-of-sample prediction should give us more confidence that the model has successfully captured some underlying relationship in the data (Beck, King, and Zeng 2000; Ward, Greenhill, and Bakke 2010).

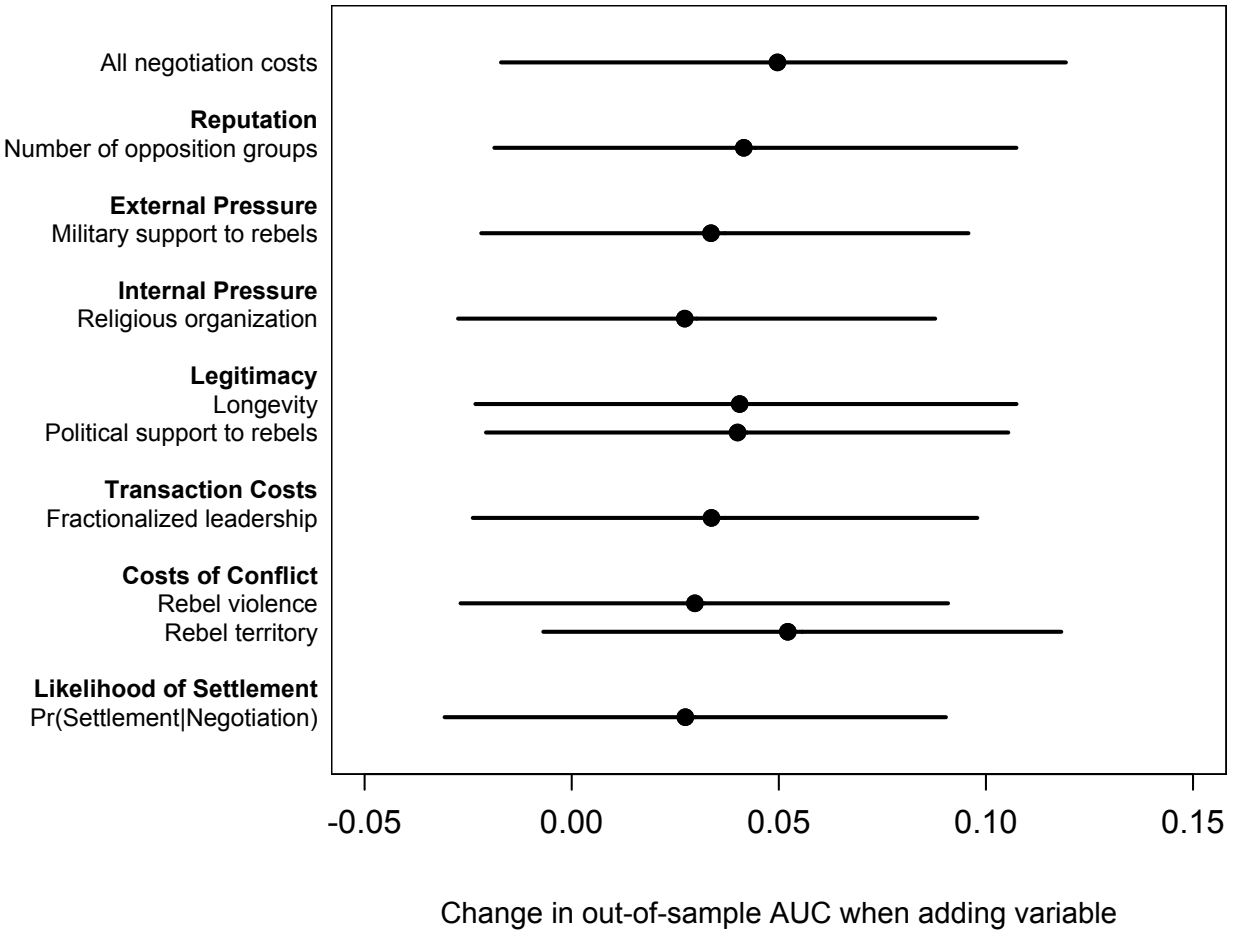
I measure predictive power using the area under the ROC curve (AUC).[4] ROC curves plot the true-positive rate (here, the number of negotiation events correctly predicted divided by the number of actual negotiations) against the false-positive rate (the number of negotiation events incorrectly predicted divided by the number of observations with no negotiation). Models that correctly predict all cases will have an AUC of 1, while models that are no better than a coin-flip will have an AUC of 0.5. To evaluate the predictive power of negotiation costs and benefits, I employ a 3-fold cross-validation procedure. The data are randomly divided into three equal parts, two of which are used to train the model and one of which is reserved for out-of-sample testing.[5] This process is repeated three times so that each third of the dataset serves once as the test data. To be sure that my findings do not depend on the initial random division of the data, I execute the entire 3-fold validation procedure 10 times, using different random subsamples in each attempt, and average the results.

The full model of negotiation behavior, model 7, yields an out-of-sample AUC of 0.84. This performance compares favorably to a naïve model incorporating only a lagged dependent variable—the equivalent for our purposes of predicting tomorrow's stock performance based on today's closing price—which has a predictive power of about 0.52, scarcely better than chance. A more sophisticated baseline model, incorporating a cubic polynomial of years since the last negotiation as its only independent variables, does

[4] For an overview of ROC plots and the evaluation of predictions, see Swets (1988).

[5] Splitting the dataset into 2 or 4 pieces gives similar results. Because negotiation is an unusual event, creating too many subsamples risks yielding a validation dataset with no incidence of negotiation. To avoid problems of quasi-separation in the data due to smaller sample sizes, I use a penalized likelihood regression procedure to fit the model (Firth 1993; Heinze and Schemper 2002; Zorn 2005). This approach has the added benefit of robustness to finite sample and rare-events bias (King and Zeng 2001).

Figure A2: Out-of-sample prediction of negotiation behavior



better, with an AUC of about 0.73. Still, the full model provides a significant improvement in predictive power.

Figure A2 illustrates the predictive power of each of the factors in the model. The black circles show the increase in AUC achieved by adding a particular variable or variables to the otherwise fully specified model. Black lines depict 95 percent bootstrapped confidence intervals. The first row in figure 3, for example, shows that the six variables representing the negotiation cost hypotheses together add about five percentage points to the predictive power of the model. Individual variables contribute from three to five percentage points. No one variable ultimately is responsible for the

model's strong predictive power—in fact, the different factors in the model each have a similar effect on its overall performance.

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