
“Oil Discoveries, Shifting Power, and Civil Conflict:” A formal and quantitative replication

An INTERNATIONAL STUDIES QUARTERLY ONLINE symposium

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INTRODUCTION

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Oil is associated with all kinds of bad things: Civil war ([Ross 2004, 2006](#)), Human rights violations ([DeMeritt and Young 2013](#)), and poor economic development ([Karl 1997](#)). These studies all examine how oil wealth covaries with these outcomes, but not how the *discovery* of new reserves alters the processes that produce violence or poor economies. A new paper in *International Studies Quarterly* by Curtis Bell and Scott Wolford, “[Oil Discoveries, Shifting Power, and Civil Conflict?](#)” (2015) does just this. Bell and Wolford offer a novel theoretical claim to explain how the discovery of petroleum reserves has nonlinear effects on civil conflict. They show that oil discoveries in *poor* states influence the balance of power and make regime commitments to peace less credible given a prospective shift in state capabilities. The paper also uses a formal model to generate these claims, and then a statistical model to test them.

This symposium will examine the paper from two perspectives. First, [Emily Ritter from the University of California, Merced](#) replicates the formal results from the paper. She clearly explains how Bell and Wolford expand the basic bargaining model of civil war made popular by [Fearon \(2003\)](#) by showing how new resources influence future bargaining.¹ She extends their claims and suggests power for the rebels could be made endogenous to the model leading to claims beyond simple conflict onset.

A clear benefit of formal models is the transparency of assumptions and how they lead to hypotheses. Ritter is able to replicate and extend the results. I am not sure how often this kind of replication occurs, but it is a first for these symposia. Published in the paper or an appendix, proofs of the math are often readily available. But what are the incentives to replicate the model? Clearly the bargaining model as applied to conflict has been replicated and used by a many scholars. The extent to which less famous models have been thoroughly examined, however, is not clear. In the current discussions around research ethics and transparency, this is a useful exercise.

Beyond the formal replication, we asked [Adrian Florea](#), from the University of Glasgow, to replicate the quantitative results. Florea was able to replicate the main results from Bell and Wolford, tried a re-coding of some of the conflict onset cases, and using some different specifications, the results were fairly consistent. To probe and extend, Florea examines a new dependent variable—civil war continuation. Strikingly, the results again are similar to the civil war onset model of Bell and Wolford. This suggests an application of the theory different domains, which Florea encourages Bell and Wolford to pursue.

In the final installment of the symposium, Bell and Wolford respond. They gladly engage in a “modeling dialogue” both statistical as well as formal. They laud Ritter’s extension of the model for explaining potentially conflicting evidence on repression that suggests a clean empirical test. They clarify a point about the mechanism in response to Florea. Finally, they ask questions about the implications of Florea’s replication and suggest the need for future extensions of the theoretical and empirical model.

¹ [Powell \(2004\)](#) extended to revolutions, international conflict, and other areas where an inefficiency mechanism may be at work.

Since [Collier and Hoeffler](#) (2000) and [Fearon and Laitin's](#) (2003) seminal pieces on civil war onset in the early 2000s, many scholars have examined the link between state capacity and the onset and duration of civil war. Bell and Wolford's piece moves beyond this literature in a useful way by thinking about how future expectations of actor capabilities will influence the onset of conflict. If Florea is right, their theory might extend into duration and other areas as well. While international studies often rewards novel theories like Bell and Wolford's, the work Ritter and Florea did is just as important. We hope this symposium is part of building this edifice of solid empirical work that can serve as a foundation for future research.

EXPECTATIONS OF POWER PREDICT CIVIL WAR...AND MORE

Emily Hencken Ritter
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Bell and Wolford (B&W) present an innovative approach to studying the commitment problems that lead to conflict, arguing that oil discoveries provide scholars with an empirical approximation of how *expectations* of a power shift affect the likelihood of war. Since expectations are particularly difficult to operationalize, this development is quite exciting. The theory and the empirical insight forge a path for studying implications of the commitment problem more broadly.

Shifting Resources and Civil War

The simple and insightful theory models the core ideas of bargaining with a commitment problem (see, e.g., [Fearon \(2003\)](#) and [Powell \(2004\)](#)): a government and a rebel group bargain over a pie of a certain size with a common expectation that the state will have an advantage in the next round. B&W characterize the advantage as newly available resources that shift the distribution of power against the rebels, with the rebels' probability of winning decreasing from p in the first period to $p/(1+nr)$ in the second.

The authors innovate beyond the basic bargaining model by assuming that the size of the pie to be divided also increases in the second period. The expanding pie increases the advantage to the rebels of fighting in the first period: not only do they avoid a war they are less likely to win in the future, but they also lock in the division of the larger pie they will receive while they still have the military advantage.

In equilibrium, the rebel group starts a conflict when the costs of war are sufficiently low and their probability of winning in the first period is sufficiently high. B&W interpret the equilibrium condition that rebels reject all offers when $p > \hat{p}$ as suggesting that the relationship between resource shifts and war will not hold if the state is sufficiently powerful to defeat the rebels without the resource shift. This leads to an interesting conditional prediction: When the state is already resource-rich and likely to put down rebellions, discoveries will not affect the likelihood of war. But when the increase in resources occurs for a poor state, the change affects the likelihood of war.

Broader Implications for Conflict Studies

B&W's theory and their argument for using oil discoveries to represent empirical expectations of power shifts opens doors for studying other political phenomena surrounding conflict. Consider, for instance, government repression.

War occurs in B&W's model when the probability that the rebels will win the conflict is sufficiently high. This is an exogenously given parameter in the model; substantively, we can interpret p as representing how powerful the rebels are relative to the government.

Instead of treating p as exogenous, we could think of it as manipulable by one or both actors. If the government expects a group to rebel when the state is sufficiently weak gaining power, it has an incentive to try and prevent the challenge. Repression is one option: tactics of repression seek to undermine challenges to the status quo (see, e.g., [Davenport 2007](#), [Ritter 2014](#), [Sullivan 2015](#), [Ritter and Conrad \[manuscript\]](#)) and are frequently cheaper than outright conflict.

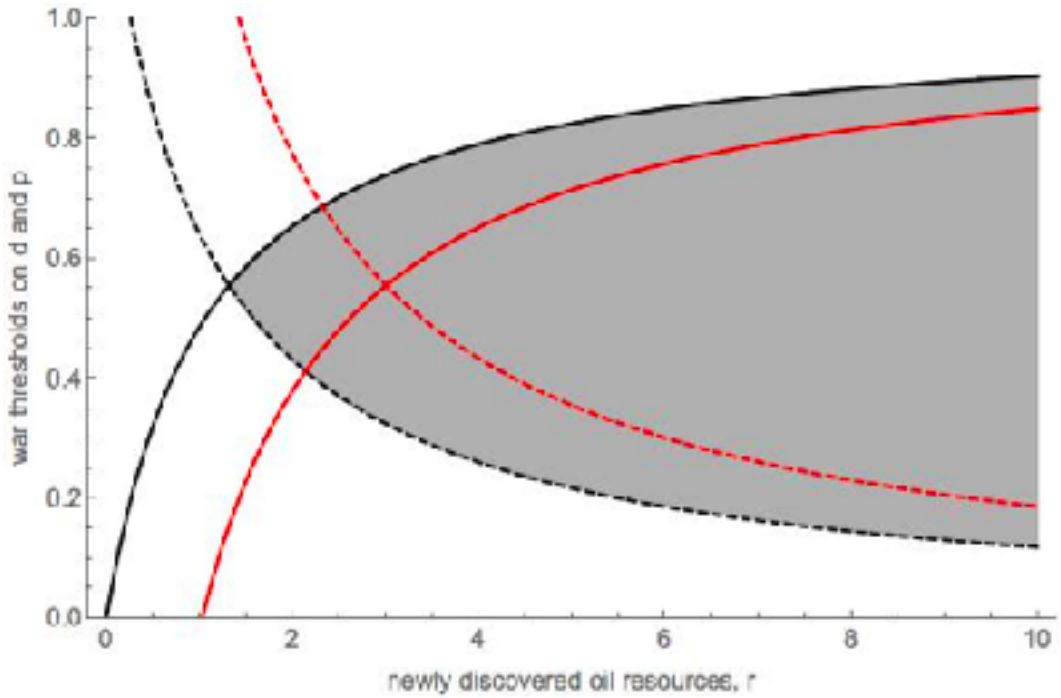
The availability of repressive tactics introduce (at least) one adaptation to the formal model that I assume for this illustration: repression shifts the probability of winning a conflict in the government's favor, whether by reducing the group's resources, undermining its collective action abilities, or creating a context of fear that prevents challenges. I assume that:

- the group's probability of winning the conflict is highest in the absence of repression and before the oil discovery becomes fungible,
- its probability of winning the conflict is lower if they are repressed but is higher than when the discovery is available, and,
- the group's probability of victory is lowest once the discovery is available.

Introducing this simplistic adaptation to B&W's theory creates a new space for predicted outcomes as a function of the expectation of power shifts.² This figure replicates Figure 1. The solid black line depicts the cutpoint on d below which the group will rebel, and the dashed line is the cutpoint on p above which they will rebel. The gray shaded region is the area in which we should expect to see war.

The solid and dashed *red* lines are the new cutpoints created by the additional option available to the government: to repress and improve the government's odds of victory in the post-discovery, pre-availability of resources period.

² In an attached document created in Mathematica (see Dataverse), I replicate the model and add the repression adaptation to create the figure shown here. Scott Wolford provided the parameter values to replicate Figure 1, in which $\delta=0.95$, $d=0.2$, and $w=1$.



The range in which we see civil war is appreciably reduced once repression becomes an option for the state. Under these conditions, newly discovered resources must represent an even greater shift in power to incentivize rebellion—only a larger shift will lead to war. Furthermore, a set of states that would have been sufficiently weak to invoke rebellion (the shaded area between the two dashed lines) will see oil discoveries lead to repression *instead of war*. Oil discoveries may lead to repression—as oil rents more generally have been found to do (see, e.g., [DeMeritt and Young 2013](#))—but this may also prevent wars that might otherwise occur.

In short, the possibility of empirically analyzing expectations of war allows us to study not only the onset of war due to commitment problems, as Bell and Wolford have, but also other phenomena that may arise in expectation of future power shifts.

COMMENTS ON "OIL DISCOVERIES, SHIFTING POWER, AND CIVIL CONFLICT"

Adrian Florea
University of Glasgow

In this fine study, Bell and Wolford investigate whether the discovery of oil resources increases the risk of civil war onset even before the actual exploration begins. In particular, the authors contend that the effect of petroleum discovery should be mostly visible in weak states where oil exploration can produce substantial changes in the relative power between the government and the rebels. The argument is developed formally and tested with data culled from UCDP and several other sources. The empirical results generally corroborate the main theoretical contention.

Oil discoveries allow the authors to gauge actors' expectations about future power distributions and, thus, to empirically capture current preferences for conflict or cooperation. Bell and Wolford argue that oil discovery functions as an exogenous shock with great potential to shift bargaining power in dynamic ways. Newly discovered petroleum reserves enable governments to militarize, repress domestic challengers, and alter incentives for credible commitment. Anticipated wealth from oil exploration reduces government's motivation to negotiate a peaceful deal and makes it more likely to renege on previous concessions. Conversely, oil discovery might also provide an impetus for agreement with the rebels as the central authorities will be better equipped to accommodate demands for a more equitable distribution of domestic resources. Finally, 'black gold' discovery fundamentally shapes rebels' incentives for war and peace: as Bell and Wolford note, the unearthing of oil deposits predisposes insurgents to initiate conflict in order to forestall adverse shifts in the power distribution.

While wading through the theoretical discussion, the protracted South Sudanese insurgency (1956-2005) readily came to mind.³ One of the reasons for the collapse of the 1972 Addis Ababa agreement - perhaps, the tipping point - was the discovery of petroleum deposits in 1978 around Bentiu, a town located in the Upper Nile region of South Sudan. In blatant violation of the 1972 deal (the agreement had granted the southern regional government authority to legislate on the exploitation of mineral deposits in the South), Khartoum attempted to redraw the boundary with the South and dispatched Northern soldiers to guard the oil fields. The move contributed to the collapse of the Addis Ababa agreement and added fuel to the smouldering SPLM (Sudan People's Liberation Movement) insurgency. Noteworthy, when civil war broke out again in 1983, the Bentiu oil installations were among the first sites attacked by the SPLM. Hence, the South Sudan case appears to validate the logic developed by Bell and Wolford according to which rebels have rational incentives to initiate military action against a government that is expected to accrue additional resources from the exploitation of newly-discovered petroleum reserves.

Bell and Wolford are to be commended for starting a serious conversation on the role of mineral resource discoveries and civil warfare. Being tasked by the ISQ online editor to perform a replication of this well-crafted study, I undertook the following steps. First, I re-ran the original models on the original data and the results were consistent with

³ The authors use the case of Sudan to illustrate the delayed realization of oil discoveries.

those reported in the article. Second, I re-ran the original models after cross-checking authors' coding for civil wars onsets with the UCDP data. Apart from minor inconsistencies (a handful of civil war onsets were not coded or were improperly coded),⁴ I also excluded three cases of civil war onsets - US 2001, US 2004, Romania 1989 - which conform neither with the UCDP conceptualization of internal conflict nor with the conventional definition of civil warfare as armed combat between two or more political organizations subject to a common authority at the outset of hostilities. In the US case we are dealing with terrorist attacks while in the case of Romania we are observing a revolution - two phenomena which involve violence but which are conceptually distinct from civil warfare. UCDP codings are carefully vetted but, in some (thankfully, rare) instances, remain prone to unit homogeneity concerns - a serious issue that I discuss at length elsewhere. Nevertheless, my expectation was that the exclusion of these three cases as well as the recoding of the handful of inconsistencies would not significantly alter the main findings. Indeed, when re-run on the adjusted data, the models produced substantively similar results.

Third, and more importantly, I replicated the basic models in Bell and Wolford using a different dependent variable: civil war presence (continuation), with data taken from the UCDP. The logic of bargaining failure in the context of anticipated changes in relative capabilities should extend to actors' incentives for credible commitment in the midst of warfare. Powell, for instance, notes that a key function of persistent fighting is to forestall adverse shifts in the power distribution. Oil discovery creates expectations about favorable changes in the relative power balance, and reduces actors' desirability to strike a deal. Essentially, oil discovery during conflict shifts antagonists' discount rates, and increases the likelihood of civil war continuation since neither the government nor the rebels have an incentive to strike a bargain with the anticipated change in the balance of military capabilities. Table A presents the main models proposed by Bell and Wolford with the new dependent variable (a dichotomous indicator for whether civil conflict is ongoing). The result under Model 3 suggests that, as conjectured above, the discovery of oil reserves is a robust predictor of civil war continuation in weak states. This is a finding that reinforces the argument developed by the authors: the unearthing of petroleum deposits changes the balance of power, and makes leaders of weak states less inclined to prefer peace to the continuation of conflict. Obviously, more systematic analysis is needed to unpack the relationship between discovery of oil reserves and internal war duration. As a further step, I envision an analysis of conflict duration with the government-rebel group dyad as the unit of analysis and with the inclusion of other covariates that have been found to alter actors' incentives for credible commitment, such as rebel movement fragmentation. I hope that Bell and Wolford will successfully embark on this project as well.

⁴ Suriname 1987 ; Spain 1980 ; Spain 1985 ; Azerbaijan 1992 ; Niger 1996 ; Togo 1991 ; Uganda 1979 ; Thailand 2003 ; Laos 1989.

RESPONSE BY CURTIS BELL AND SCOTT WOLFORD

Curtis Bell and Scott Wolford
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Emily Ritter and Adrian Florea have conducted a pair of rigorous, thoughtful replications of our article [“Oil Discoveries, Shifting Power, and Civil Conflict,”](#) focusing respectively on reproducing our theoretical and empirical models. They’ve contributed to what we hope will be a productive “modeling dialogue” ([Myerson 1992](#)) about the link between oil resources—both proved and exploited—and civil conflict. In this response, we focus on summarizing what we can learn from their proposed extensions, though we also clarify a point of confusion in the interpretation of the theory, which we use to discuss where the contributors’ efforts can take the modeling dialogue in the future.

First, Ritter proposes an extension of the theoretical model. She shows that giving the government the option to repress after discovery but before rebels can attack narrows the conditions under which civil war occurs, requiring a larger prospective shift in power to overcome the rebels’ present disincentives to fight—which now include the exogenous costs of war and the endogenous effects of repression. This occurs even as the reasons behind the outbreak of civil war and the model’s empirical implications remain the same. This is notable in two ways. First, the possibility of preemptive repression points to an additional empirical factor that can attenuate the relationship between oil discovery and civil war: pre-existing coercive capacity at the time of discovery, which allows the state to disrupt preventive civil wars before they start. Second, as she notes, it can help explain otherwise puzzling instances of repression—particularly those that might appear to occur “out of nowhere” or outside the *Law of Coercive Responsiveness* ([Davenport 2007](#))—because they are preventive rather than reactive (see, *inter alia*, [Danneman and Ritter 2014](#), [Ritter 2014](#)). Further, an empirical model based on this insight, we suspect, would find a curvilinear relationship between oil discovery and repression; repression will spike in response to moderately sized oil discoveries but decline (to be replaced by the outbreak of civil war) as discoveries grow so large that repression cannot keep the lid on rebellion.

The incentive to repress in this extended model also sheds light on government incentives in the baseline model—to take steps to avoid war in the present so that gains from oil reserves can be realized. In that sense, Florea’s remark that “anticipated wealth...reduces government’s motivation to negotiate a peaceful deal” is a misreading of what is an admittedly subtle mechanism. Anticipated wealth actually makes governments *very* willing to negotiate and make concessions today; it renders them patient, because they will be strong enough to renege on those concessions later, once new oil wealth is realized as increased military power. It is not the government but potential rebels that lose the incentive to negotiate in the shadow of anticipated oil wealth. This process perhaps tempts the government to repress, but *not* to draw itself into an all-or-nothing civil war before it grows strong. The government’s willingness to make concessions but inability to commit to them in the long run is precisely what renders the rebels unwilling to accept even the most generous concessions.⁵

⁵ See [Powell \(2004\)](#) for a characterization of this mechanism in several contexts through a general inefficiency condition.

Next, Florea conducts a thorough empirical replication, reproducing the core published result on our original sample and one carefully adjusted for some quirky codings of civil conflict in the UCDP data. In each case, newly proved oil reserves are associated with an increased probability of civil conflict in the poorest states, or those for whom the future shift in relative power will be greatest. The bulk of his contribution, though, focuses on a test that uses not civil conflict *onset* but civil conflict *presence* as the outcome variable, on the logic that the shift in power takes time to realize and therefore may incentivize conflict as the shift looms on the horizon ([Powell 2012](#)). Rather than drop years of ongoing civil war, he keeps them in the data, where a positive outcome indicates that a civil conflict either begins or does not stop. In Model 3, which selects on those states with per capita GDP of less than \$12k/year, an increase in proved reserves is associated with the presence of fighting in the following year. This is an intriguing pattern, though—as Florea notes—it remains more suggestive than dispositive.

By our reading, there are two questions underlying his basic insight. First, do oil discoveries during civil wars tend to lengthen them? This is perhaps closest in spirit to Florea’s empirical model, though it might call for an interaction with a lagged dependent variable. Another option is to observe wars over time and record the instances of new oil discoveries during the fighting.⁶ Second, do civil wars that begin as the result of oil discovery last longer, or perhaps end differently, than other civil wars? This requires a different empirical model that samples on wars themselves, perhaps coding the size of new proved reserves in states on the eve of the civil war’s outbreak. This new model might help illuminate when and how the fighting stops: once the oil wealth is realized or the ability to exploit is eliminated, once the rebels are defeated, or once the rebels capture it (or the state apparatus to control it).

We are not yet convinced, however, of the need to sample on government-rebel group dyads, unless our theory can be extended to model—and find—dependencies across observations of multiple rebel groups fighting the government at the same time. Our hunch is that a looming adverse shift in power makes *any* rebel group eager to fight, which suggests that country-year might be the appropriate unit of analysis. If victory will allow the winner of the war, government or rebel group, however, to exploit the vanquished, it might be associated with a proliferation of rebel groups fighting to secure their own survival. Such a theoretical model, as well as empirical models to assess these relationships between war duration and the number of rebel groups, awaits further exploration.

In sum, Ritter and Florea have each made significant contributions to what we hope turns out to be a fruitful research agenda, extending our theoretical and empirical models to explain both state repression and the duration of civil conflict. Replication is valuable as a policing mechanism, to encourage careful work and to allow for the correction of mistakes—in both theory and empirics—but replication can also lead to new, creative, and unanticipated insights, which both contributors have done in this case.

⁶ It is also possible that oil discovery is unlikely during civil war, which would push observed effects—even if true—towards zero.

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