The build-up of coercive capacities: Arms imports and the outbreak of violent intrastate conflicts

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Abstract

Do governments' military build-ups foster the outbreak of intrastate violence? This article investigates the impact of governments' arms imports on the onset of intrastate conflicts. There is scant empirical research on the role of the external acquisition of coercive technologies, and even fewer studies explore the respective causal mechanisms of their consequences. We argue that the existing literature has not adequately considered the potential simultaneity between conflict initiation and arms purchases. In contrast, our study explicitly takes into account that weapon inflows may not only causally induce conflicts but may themselves be caused by conflict anticipation. Following a review of applicable theoretical models to derive our empirical expectations, we offer two innovative approaches to surmount this serious endogeneity problem. First, we employ a simultaneous equations model that allows us to estimate the concurrent effects of both arms imports on conflict onsets and conflict onsets on imports. Second, we are the first to use an instrumental variable approach that uses the import of weapon types not suitable for intrastate conflict as instruments for weapon imports that are relevant for fighting in civil wars. Relying on arms transfer data provided by the Stockholm International Peace Research Institute for the period 1949-2013, we provide estimates for the effect of imports on civil war onset. Our empirical results clearly show that while arms imports are not a genuine cause of intrastate conflicts, they significantly increase the probability of an onset in countries where conditions are notoriously conducive to conflict. In such situations, arms are not an effective deterrent but rather spark conflict escalation.

Keywords

arms trade, civil war, instrumental variable approach, simultaneous equations model

Introduction

Weapons constitute the non-sufficient but necessary input technology for conflict (see Hirshleifer, 2000). The coercive capacity of incumbent governments and their effective control over a state's territory against internal and external challengers relies essentially on the availability of arms. This is an important aspect, which the extensive literature on intrastate conflict onsets (recent reviews include Dixon, 2009; Blattman &

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Miguel, 2010) has largely neglected so far.[1] As only few countries are able to produce modern conventional weapons systems (see Thurner et al., forthcoming), most countries have to import them. This raises serious questions. What is the role of governments' external arms acquisition for intrastate crisis bargaining and escalation? Do they play a causal role in intrastate conflicts?

Looking selectively at historical examples does not provide conclusive answers. There are cases where large arms imports preceded the outbreak of a conflict (e.g. Angola: 1975 and 1998) but also cases where only small or no inflows of arms occurred before a conflict onset (e.g. Liberia: 1989 and 2000). At the same time, there are instances where we observe large arms imports but no civil war (e.g. Libya: 1974–83, United Arab Emirates: 2004–13). Therefore, a fresh look at the consequences of international weapon flows is of practical relevance. The creation of the United Nation's Arms Trade Treaty in 2013 shows that the international community is well aware of the potential risks of an uncontrolled international arms trade. Knowledge of whether the availability of major conventional weapon systems to incumbent governments increases or decreases the risk of intrastate conflict would be therefore of major importance for conflict prevention.

Quantitative empirical research has been almost silent on the impact of arms imports. The (very) few studies that do exist offer no clear theoretical account of how weapon deliveries could affect the initiation of intrastate conflicts, and they arrive at contradicting empirical conclusions. We argue that this is most likely due to the fact that when studying the relationship between conflicts and the acquisition of arms, one is faced with the problem of a potential simultaneity between the emergence of conflict and arms procurement: weapon imports (just as military expenditures) may not only have a causal influence on conflict probability, but perceived and anticipated conflict itself could causally influence governments' inclinations to purchase arms. The resulting endogeneity makes any theoretical as well as statistical analysis challenging. In our view, this problem has not been appropriately dealt with in previous research.

Previous research on arms and intrastate conflicts has also not offered many theoretical rationales for why there should be a causal link between weapon transfers and conflict onset. We accentuate the fundamental insight that scholars of interstate wars have long recognized (see Diehl, 1983): conflicts do not predominantly arise over arms, they arise first and foremost over contested issues. We argue that only the proper control of the established conflict incentives and opportunities allows us to identify whether arms imports have a causal influence on conflict. Bearing this caveat in mind, we explore several relevant approaches. In particular, we look at (i) arguments about how the availability of arms may change policymakers' willingness to use them (e.g. Fordham, 2004); (ii) how arms inflows could be perceived as signals about a government's resolve or its military capabilities in the framework of well-established crisis bargaining models (e.g. Powell, 2006; Walter, 2009a, b), and (iii) how investment in arms may affect different types of state capacities and thus make conflict more or less likely (e.g. Fearon & Laitin, 2003; Besley & Persson, 2011). While arguments about deterrence and signalling might suggest a negative relationship between imports and conflict probability, a number of other mechanisms point in the opposite direction. Under high conflict-risk conditions, governments and opposition groups have strong incentives to initiate violence due to various pre-emptive motives or to solve collective action problems in situations of highly asymmetric military endowments. Furthermore, a lack of state capacity may also make conflict more likely.

In this article, we analyze major conventional weapons (MCW) and their import by governments. This makes sense as MCWs are regularly deployed by the state in civil wars (see Kalyvas & Balcells, 2010). There are two objections that could be raised against this particular focus, however. First, small arms and light weapons (SALW) are also an essential conflict technology in civil wars. Second, looking only at governments neglects the fact that rebel groups may also import arms which could in turn affect intrastate conflicts. With respect to the first point, it would indeed be optimal to simultaneously analyze both MCW and SALW transfers. However, existing data series on SALW transfers are much shorter (starting only in the 1990s) and less consistent than for MCW trades. Furthermore, there is no reason to believe a priori that conflict dynamics induced by both weapon classes are similar. Governments often have a monopoly on MCW before a conflict outbreak. Thus, they are a potentially visible signal of a state's resolve and military capabilities. Hence, it does make sense to analyze the effects of MCW and SALW separately. Regarding the second objection, transfers to rebel groups are generally much more secretive than government purchases and probably only a highly biased subset of these transactions

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[1] Note that there is a more recent literature which relates conflict technologies and external support of rebel groups to conflict intensity and duration, see Balcells & Kalyvas (2014); Sawyer, Gallagher Cunningham & Reed (2015).

appears in our data. As a result, we have much less reliable data on exports to rebels and expect systematic measurement errors to be a huge problem.[2] Moreover, governments are the main recipients of major conventional weapons (MCW) prior to a conflict outbreak. Observable arms flows are therefore predominantly going to governments (although this often changes after a civil war begins).

We are able to draw on an extensive dataset of 137 countries for the period 1949–2013. Our empirical analysis finds a clear positive effect of MCW imports on the probability of intrastate conflict onset. This effect is particularly large for high-risk countries, that is, for countries in which conflict-inducing conditions, as outlined by the literature, are present. This leads us to conclude that arms imports in these situations do not serve as an effective deterrent by governments but contribute to conflict escalation and thus the outbreak of civil war.

In the following, we will first provide a short overview of the sparse quantitative literature investigating the correlation between weapons imports and intrastate conflict. We then outline our theoretical arguments for deriving our empirical expectations. Before proceeding with our statistical analysis, we discuss how our econometric structural equation and instrumental variable approaches help surmount the endogeneity problem. This is followed by a discussion of our empirical results and a number of robustness tests. The final section offers a brief summary and concluding remarks.

The role of arms imports in the literature

Research on arms transfers and domestic conflicts is scarce. A comprehensive review of empirical findings for about 200 variables by Dixon (2009) mentions arms trade only briefly as belonging to the group of negligible, non-significant factors. The few publications that do investigate the role of arms trade on intrastate war arrive at diverging conclusions. Some studies indicate that arms imports have no effect on the outbreak of internal conflicts. Craft (1999) investigates the link between arms and inter- and intrastate wars at the systemic level between 1945 and 1992. He finds a positive relationship between the total value of transferred MCWs and the number of ongoing conflicts, but no meaningful correlation between arms transfers and the outbreak of conflicts. Durch (2000) investigates interstate and

intrastate wars separately and analyzes the role of arms deliveries for 106 developing states between 1970 and 1995. His results suggest that arms transfers may facilitate the outbreak of external wars but do not affect the risk of internal wars. The most distinct rejection of a link between arms transfers and the outbreak of civil conflict comes from Suzuki (2007). He regresses the outbreak of civil and ethnic conflicts on arms imports in a pooled regression covering 100 states between 1956 to 1998 and finds no statistically significant links.

Other studies, by contrast, suggest that arms contribute to the outbreak of civil conflicts. Based on a pooled regression analysis, Craft & Smaldone (2002) find that arms imports are a significant predictor of civil war incidence in sub-Saharan Africa (1967 to 1997). Blanton (1999) reports a robust link between country-level arms imports and political repression and infers: 'Arms acquisitions appear to contribute to repression by making violent political acts more feasible' (Blanton, 1999: 241). Sislin & Pearson (2001) investigate the role of arms transfers in ethno-political conflicts. Their main finding from three in-depth case studies is that arms acquisition leads to increased violence during conflicts.[3] An additional comparison of 133 ethno-political groups in the 1990s suggests that access to arms may also trigger rebellion and conflict.

The empirical literature thus leaves us with contradictory results, which may suggest that there simply is no systematic link between arms imports and civil wars. However, a definite assessment requires additional theoretical and empirical work. Most papers discuss appeasement vs. instability in general terms but do not disentangle the motivations and signals set by arms transfers (e.g. Craft, 1999; Craft & Smaldone, 2002; Suzuki, 2007). We seek to contribute to the debate with a more detailed discussion of the specific causal implications of governmental arms imports. Our research is further motivated by improvements regarding the documentation of arms transfers over recent years. Some previous publications relied on less reliable data sources and used more restricted sample sizes and observation periods. Finally, a crucial empirical challenge is the problem of endogeneity and reverse causality. Conflicts may be a consequence of arms acquisition, yet arms acquisition may also be the result of the anticipation of conflicts or conflict risks. This problem has not been sufficiently taken into account by previous research. Our study

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[2] Note that the existing external support data by Cunningham & Salehyan (2009) focuse exclusively on conflict events and provide only discrete measures of rebel military capacity.

[3] See also Moore (2012).

therefore proposes the use of both instrumental variables and simultaneous equation modelling.

Exploring theoretical links between intrastate conflict onset and the import of arms

The existing empirical studies offer almost no theoretical rationale for their empirical hypotheses. This should come as no surprise since there are, to our knowledge, no theoretical models that explicitly consider the causal influence of arms imports on the onset of violent intrastate conflicts. To overcome this shortcoming, one can draw on the rationalist approaches developed for the explanation of wars (for overviews see Powell, 1999; Levy & Thompson, 2010; Bueno de Mesquita, 2014). This includes a growing theoretical literature on militarization and armament processes in interstate conflicts (e.g. Kydd, 2000; Baliga & Sjöström, 2004; Meirowitz & Sartori, 2008; Jackson & Morelli, 2009). Its assumptions on the distribution of capabilities and information, commitment problems and the credibility of signals, as well as the costs of deterrence and war, have been discussed as major mechanisms also in the domestic context (for an overview see Lichbach, 2009). However, systematic, context-specific theoretical transfers of insights from interstate war models to domestic conflicts have been rare. The reason is that intrastate conflicts usually involve a state and one or more domestic groups. Classical notions of arms races and strategic mutual armament developed for interstate dynamics do not always apply here. This is all the more the case when considering major conventional weapons. Prior to the outbreak of violence, it is usually the government that is in control of a country's MCW imports. Even if rebel groups prepare for civil war by illegally obtaining weapons, these are in most cases small arms and light weapons, which are technically less demanding and easier to acquire. Rebels often gain access to MCWs only after conflicts start, mostly through external support by third countries or looting (Jackson, 2010).

The following theoretical discussion does not attempt to develop a new model but rather draws on insights from the literature on armament, interstate wars and domestic conflicts. Our basic premise is that conflicts do not arise over arms, they arise over certain issues that seed the sow for possible conflicts (Fearon & Laitin, 2003; Collier & Hoeffler, 2004). If the conditions that create violent conflicts are not present, importing arms should not provoke any violence. In the following, we assume the existence of a central government and one or more opposition groups under conflict-inducing conditions.

A government can decide to build up military capabilities by importing MCWs. This can either be in response to foreign or domestic threats, but it always has to be balanced against the opportunity costs of not spending limited resources for other ends (Powell, 1993; Besley & Persson, 2011). For intrastate conflicts, only weapons that can be used against internal challengers are relevant. The aim of such a purely domestically-oriented armament process can either be to prepare for a future conflict onset or to deter domestic challengers by signalling the government's resolve and its capabilities to act militarily. The decision to increase military capabilities could be made in anticipation of a certain conflict because the government expects violent challenges by rebels or intends to use force to remove the potential for any future challenges (Powell, 2013). In this case, weapon deliveries are positively associated with the origin of intrastate conflict but are not a causal factor. This point highlights why taking the enodgeneity of arms imports seriously is critical in our empirical analysis. The government is therefore always faced with the strategic decision of whether to buy arms and whether to initiate a violent conflict (for an overview see Kydd, 2015: chapter 7). Domestic groups (potential rebels), on the other hand, can observe arms imports and need to decide whether to initiate a violent challenge to the government. They cannot observe the true resolve of a government to respond militarily to a challenge and they may or may not be able to observe the state's true capabilities. This situation can thus be conceptualized as a repeated strategic game. In each period, the government determines whether to import arms and each side decides whether to initiate a conflict. Since acquiring weapons is costly, the government needs to weigh its benefits (successful deterrence or prevailing in future conflicts) against its opportunity costs (Powell, 1993). Given this simplified set up, we discuss how a government's decision to import MCW affects the probability of conflict onset.

Arms imports and the feasibility of force
This argument was initially proposed by Most & Starr (1989) who distinguish between 'opportunity' and 'willingness'. Having military capabilities creates the opportunity to resolve latent conflicts through the use of force. But having a military option available does not necessarily mean that a government is willing to use it. Only if arms imports affect 'willingness' should we observe a link between arms imports and civil war onsets. Hence, any theoretical account needs to explain why 'willingness' could increase with arms inflows. Analyzing the use of

force in US foreign policy, Fordham (2004: 635) refers to different arguments why higher military capabilities may increase policymakers' 'willingness'. In particular, increases in the expected utility of fighting or the strengthening of hardliners in the government are offered as possible explanations. His empirical analysis of US foreign policy finds that military capabilities indeed increased the frequency with which force was used (Fordham, 2004: 649–652). In a similar vein, Sislin & Pearson (2001: 59) argue that in domestic conflicts, arms increase tension levels and threat perceptions, thus making violence more feasible. In sum, these arguments suggest that arms imports increase the willingness of governments to use force, which makes conflict onset more likely.

Signalling and deterrence

The situation of a government facing one or more potential rebel groups can be linked to an entry deterrence game in economics, where repeated play and private information about one's resolve creates strong incentives for reputation building (Kreps & Wilson, 1982). To deter rebel groups from posing a violent challenge, the government has an incentive to gain a reputation to be resolute and thus willing to meet any challenge to its authority with the use of force. If successful, such a signal should discourage challengers and make conflict less likely. Rebel groups are unable to observe the true resolve of the government and make inferences based on the signals they receive. The procurement of MCW by the government is, of course, such a signal.

There are, however, two important qualifications that cast serious doubts on this hypothesized negative relationship. First, arms inflow may be interpreted as a signal of the unwillingness of the government to compromise. This could accelerate conflict onset if rebels expect their chance of winning to decrease further in the future. Second, even if winning the conflict is unlikely, rebels may still wish to fight. As Walter (2009b: 35) points out, not only are we unable to distinguish resolute and irresolute governments, but also there are different levels of commitment by rebel groups. In particular, there could be groups that are not prepared to back down from their demands even if a violent conflict is very unlikely to be won. While in our view this distinction between resolute and irresolute rebels is not satisfactory to explain a seemingly irrational wish to fight a losing battle, an alternative explanation could lead to the same outcome. Rebel groups may initiate conflict (or low-level skirmishes such as terrorist attacks) to provoke a government reaction and then use this reaction to

recruit support for their cause (see Lichbach, 1998). This would in turn increase their chance of winning a conflict. Attempts to organize and overcome collective action problems could therefore explain why, despite strong signals of resolve by the government, rebels may still choose violent conflict. Thus, onset probability would increase as a peaceful solution is deemed more unlikely with rising arms imports.

So far, we have considered arms imports as signals about a government's resolve. This should not be conflated with signals about military capabilities (Slantchev, 2011: 14). Purchasing weapons could also be an attempt to signal military strength and the potential to increase this strength through imports. This again is aimed to deter challenges and therefore, if successful, should reduce conflict probability (Huth, 1988; Jervis, 1989). Again, the opposite effect is also possible. Observing the ongoing armament of the government may spur rebel groups to initiate conflict as quickly as possible as weapon imports may lead to a shift in the distribution of power. As Powell (2006: 195) has argued, a rapidly shifting distribution of power may lead to conflict because an initially weak state cannot promise other domestic groups that it will not use its increased capabilities in the future to renege on existing peaceful settlements. Furthermore, interstate models of endogenous armament adapted to the intrastate context suggest that rebels may decide to fight when the costs of violent conflict are perceived to be lower relative to the costs resulting from the power shift towards the government. If, on the other hand, the state is strong and there is a large asymmetry in military capabilities, then there could be predatory motives by the state to initiate military action. As the model by Chassang & Padró i Miquel (2010) suggests, in this situation conflict is very likely under complete information or even under incomplete information if the state has a complete monopoly on violence. Finally, the government may consider deterrence as too costly in the long term and thus decide to start a violent conflict in order to eliminate the opposition (Kydd, 2015). In this case, rising arms imports are temporary and a preparation for domestic war. Note that this may also lead to cases where, due to incomplete information, rebels pre-empt the government's decision to fight if they cannot distinguish attempts at deterrence from a government's preparation to strike first.[4]

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[4] As an anonymous referee has correctly pointed out, rebels may also misinterpret arms imports aimed at foreign enemies to be directed at them. This could lead either to a sort of accidental deterrence or to

Table I. Theoretical links between arms imports and intrastate conflict onset

Incentive	Causal mechanism	Reference	Probability of onset
Arms imports and feasibility of force			
Opportunity and willingness	Opportunity increases willingness	Fordham (2004)	+
Signalling and deterrence			
Signalling resolve	Deterrence of challengers	Kreps & Wilson (1982)	–
Signalling resolve	Pre-emptive attack by challengers	Lichbach (1998); Walter (2009)	+
Signalling capability	Deterrence of challengers	Huth (1988); Jervis (1989)	–
Signalling capability	Pre-emptive attack by challengers	Powell (2006)	+
Large asymmetry in capabilities	Predatory motive for government to attack	Chassang & Padró i Miquel (2010)	+
Deterrence too costly	Pre-emptive attack by government	Kydd (2015)	+
Arms imports and state capacities			
Military state capacity	Deterrence of challengers	Fearon & Laitin (2003);	–
Fiscal, legal, redistributive capacity	Trade-off arms imports and capacity building	Besley & Persson (2011)	+

Arms imports and state capacities

Fearon & Laitin (2003) have argued that it is the weakness of governments that strongly influences the probability of civil war. States have different types of capacities to peacefully solve domestic conflicts or deal with challenges militarily (Hendrix, 2010). A very narrow and simple approach would be to equate state capacity with military and police capabilities (Fearon & Laitin, 2003; Kalyvas, 2006). Arms imports increase this type of capacity and should therefore reduce the probability of violent domestic conflict.

The effect of arms imports is less clearcut when considering other dimensions of state capacity. Azam (2001) points to the importance of redistributive capacity. Developing a game-theoretical model, he argues that in African cases it is the ability of states to effectively redistribute resources among different groups and their elites that reduces the probability of violent conflicts. A more prominent dimension of capacity is fiscal or extractive capacity (Tilly, 1985; Levi, 1988; Cheibub, 1998). This describes the ability of countries to efficiently tax their citizens and to extract natural resources. A high capacity is expected to lower the potential for violent conflicts. Empirical analyses have only yielded mixed results, however, failing to establish a clearcut inverse relationship between fiscal capacity and onset probability (Thies, 2010, 2015). Besley & Persson (2011) have developed a formal model in which governments make decisions to invest in future state capacity (fiscal and legal) and in military capabilities. They show that if political institutions are non-inclusive, decisions by

the government to invest in military capabilities result in either one-sided political violence (see also Blanton, 1999) or civil war. Resources spent on the military reduce investment in future state capacity, which lowers wages and thus makes war more likely. Intuitively and in more general terms, resources spent on arms imports lower investment in conflict reducing (redistributive, fiscal and legal) capacity-building. It follows that arms imports should increase the probability of violent intrastate conflict.

Summary of theoretical expectations

Endogenous armament processes and violent intrastate conflict are still not fully understood in the domestic context. Adapting existing theoretical approaches to account for possible arms inflows yields no clearcut predictions. Arguments from crisis bargaining that stress the importance of signalling to deter challengers, as well as theories highlighting the importance of military state capacity, suggest an inverse relationship between arms transfers and onset probability. In contrast, a positive effect of weapon imports on onset probabilities can be deduced from arguments about the feasibility of force, crisis bargaining with highly committed challengers, numerous incentives for both sides to initiate pre-emptive attacks and trade-offs between investing in arms and investing in redistributive, fiscal and legal state capacity. We provide a synopsis of these theoretical arguments in Table I.

In the following sections, we aim to conduct a thorough econometric analysis that adequately deals with the problem of the endogeneity of arms imports. While this is not intended to be a test of all the models and arguments introduced in this section, it will allow us to isolate the aggregate effect of weapon imports.

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intrastate conflict because rebels may initiate violence because they erroneously think that the government is preparing for domestic war.

Data and research design

Data sources and operationalizations

We use an unbalanced panel dataset that covers 137 countries for the years 1949 to 2013. We measure the beginning of an intrastate conflict as a dummy variable (*Onset*) that takes the value 1 if two conditions are met: (i) in a given year t there are at least 25 deaths related to an intrastate (ethnic or civil) conflict, and (ii) there has been no outbreak of the same conflict in $t - 1$ and $t - 2$.[5] Data on intrastate conflicts are from UCDP/PRIO's Armed Conflict Dataset 4-2015,[6] see Gleditsch et al. (2002); Melander, Pettersson & Themnér (2016)).

A particular issue arises with respect to the coding of ongoing intrastate conflicts. The majority of the empirical literature sets ongoing conflict years to zero (McGrath, 2015: 535). As McGrath (2015) shows using Monte Carlo experiments, this can lead to biased estimates and wrong substantive inferences. We decided therefore to set ongoing conflict years to missing.

Data on arms imports are provided by the Stockholm International Peace Research Institute (SIPRI). They cover the trade of major conventional weapons (MCWs), which do not include weapons of mass destruction and small arms and light weapons (SALWs). Arms imports are measured in trend indicator values (TIV) that represent the known, inflation-adjusted production costs of core weapon systems measured in millions of constant-1990 US dollars. Hence, what is supposed to be measured is not the financial value of arms but the volume of military capabilities that is being transferred. MCWs cover a wide range of weapon systems, from armoured vehicles to aircraft and satellites, as well as components such as engines.[7] We exploit the fact that not all of these weapon systems are deployable for intrastate conflicts. For our analysis, we therefore construct different versions of MCW import variables: *Logimports* measures the annual import of arms types which are presumably of high importance in intrastate wars (aircraft, armoured vehicles, artillery and missiles); *Logimports_unrelated* captures the annual import of arms that are unrelated to intrastate conflicts (air-defence systems, anti-submarine weapons, satellites and ships).[8] Note that only arms deals where the TIV of the traded

weapons is at least 0.5 (i.e. US$500,000) are recorded by SIPRI. For all of our import variables we have multiplied this TIV value by 100 and then taken the natural logarithm.

The drawback of looking at annual figures is that while SIPRI reports TIV values for the date of delivery, the time of ordering weapons might already constitute a signal to rebel groups. To smooth the temporal differences between order and delivery dates, we created two variables, *Logimports_avg*5 and *Logimports_avg*10, which are 5-year and 10-year backward moving averages of arms imports.

Conflict onsets and arms imports: Addressing the endogeneity problem

Analyzing the impact of arms deliveries on the onset of intrastate conflicts, we are confronted with a problem of co-determination: arms imports may not only affect conflict but could themselves be caused by its outbreak or the anticipation of such an event in the immediate future. This is all the more apparent if we conceptualize conflict onset as a latent, continuous variable. Other than a binary conflict indicator might suggest, onset is the consequence of a development in which tensions rise until a certain threshold is reached. In our case, this threshold is marked by a certain number of conflict-related deaths. As a result, a positive correlation between arms imports and onset could either indicate a causal effect of weapon deliveries on conflict onset or be a consequence of the looming outbreak which raises the demand for weapons. The few empirical studies that do exist on arms imports and intrastate conflict have, in our view, not paid sufficient attention to this problem.

We therefore apply a twofold strategy: on the one hand, we propose an instrument for civil war-related weapons. On the other hand, we employ a simultaneous equation model (SEM) as developed by Amemiya (1978), Heckman (1978) and Maddala (1983). The instrumental variable framework proceeds in two steps: first, we predict weapon imports with an instrumental variable that is related to the import decision (first-stage relevance), but not to civil war onset (the exclusion restriction). Second, we use the exogenous variation induced by the instrument to assess the endogenous variation[9] between imports and civil war (second stage). We propose to use variation in non-civil war-related

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[5] Note there are instances where there is more than one intrastate conflict in a country in a given year.

[6] See: http://ucdp.uu.se/downloads/

[7] See http://www.sipri.org/databases/armstransfers/background/coverage for more details.

[8] 'Engines', 'Sensors' and the category 'Other' were not included in either variable.

[9] An approach taking endogeneity into account is warranted: a Wald test of exogeneity (see Wooldridge, 2002: 472–475) does not reject the null of no correlation between the reduced form residuals and the dependent variable for several models.

weapons as a suitable instrument for civil war-related weapons. With rare exceptions (e.g. the naval warfare in the Sri Lankan civil war), these weapons are plausibly targeted at external defence and interstate wars. We argue that the purchase of these weapon types is due to regional arms races, security concerns and external threats, but also because of corruption, military greed and prestige (e.g. Ball, 1993). At the same time, in order to sustain a balanced military portfolio, governments tend to purchase other major conventional weapons that are deployable in a civil war. This latter part of our argument is testable: the correlation between both types is strong. We report the first stage regression results in Online appendix Table A.3: an increase in *Logimports_unrelated* leads to a substantial and significant increase in the related imports variable (*Logimports*), with and without inclusion of a broad range of control variables. The correlation is, as expected, even stronger with 5-year or even 10-year moving averages. The instrument is thus clearly relevant and passes weak-instruments tests. The exogeneity of the instrument, on the other hand, can only be assessed theoretically. We deem it highly plausible, however, that in anticipation of a civil war, rational military and political leaders would replenish and expand stocks of civil war-related weapons and not specifically purchase the types included in *Logimports_unrelated*. As a test of this assumption, we show that *Logimports_unrelated* is not correlated with civil war onset when controlling for (SEM-instrumented) *Logimports* (compare online appendix Section A.2.2).

The IV-probit setup then takes the following form:

$$Y_1 = \alpha_1 + \beta_1 R_1 + \gamma'_1 \mathbf{Z}_{on} + \epsilon_1 \qquad (1)$$

$$Y_2^* = \alpha_2 + \beta_2 \hat{Y}_1 + \gamma'_2 \mathbf{Z}_{on} + \epsilon_2, \qquad (2)$$

where Y_1 measures arms imports and is instrumented by civil war-unrelated arms imports R. Equation 1 controls also for variables later used in the second stage probit ($\mathbf{Z}'_{on}$). The second stage, Equation 2, then draws on predicted arms imports ($\hat{Y}_1$) as independent variable to explain binary conflict onset Y_2^*. To our knowledge, we are the first in proposing this instrument and therefore go beyond the existing empirical literature when addressing the endogeneity problem in this way.

Since one can never fully prove that an instrument works, we therefore, as a second strategy, apply a simultaneous equations model (SEM). A number of studies have utilized this approach to deal with simultaneity in studying, for instance, the reciprocal relationships between trade and interstate disputes (Keshk, Pollins &

Reuveny, 2004), democracy and war (Reuveny & Li, 2003), state capacity and intrastate conflict onset (Thies, 2010), and fiscal capacity and state failure (Thies, 2015).

The SEM takes the following general form:

$$Y_1 = \beta_1 Y_2^* + \gamma'_1 \mathbf{Z}_{im} + u_1 \qquad (3)$$

$$Y_2^* = \beta_2 Y_1 + \gamma'_2 \mathbf{Z}_{on} + u_2, \qquad (4)$$

where Y_1 measures arms imports and Y_2^* is our binary conflict onset variable. The vectors $\mathbf{Z}_{im}$ and $\mathbf{Z}_{on}$ capture the set of variables for the second stage import and onset equations. In the first stage, both equations are estimated using the *full* set of variables ($\mathbf{Z}_{im}$ and $\mathbf{Z}_{on}$). The fitted values of the two dependent variables are then plugged into the second stage to replace the endogenous regressors using the specific sets of independent variables. The continuous dependent variable equation is then estimated by OLS and the binary dependent variable equation is a probit model. This allows us to simultaneously estimate the effect of weapon deliveries on conflict onsets and the effect of onsets on arms imports.

While technically relying on a similar exclusion restriction compared to an instrumental variable approach, both the import and the export equation are predominantly theoretically justified. For the import equation, we use insights from Smith & Tasiran (2005), who estimate demand functions for arms imports, as well as results from Pamp & Thurner (2017) who analyze the relationship between arms and military expenditures. The second-stage import equation is thus as follows:

$$\begin{aligned} Ln(import) = \beta_0 &+ \beta_1 \widehat{onset} \\ &+ \gamma'_1 \begin{pmatrix} Logimports\_unrelated \\ Logmilex \\ Logexport \\ Loggdppc \\ Capacity \\ Region\_dummies \end{pmatrix} + \epsilon_{1,t} \end{aligned}$$

$$(5)$$

Similar to the instrumental variable approach, we use the import of unrelated weapons. This complements the use of log military expenditures (*Logmilex*), which are measured in millions of 2010 constant US dollars. One may suspect that arms imports and military spending are part of an accounting identity, but results by Pamp & Thurner (2017) clearly show that this is not the case. We also include the log of arms exports (*Logexport*). The

rationale for doing so is that the international arms trade is in large part an intra-industry trade (Thies & Peterson, 2015). In addition, we control for GDP per capita, which should be positively related to arms imports due to likely income effects of weapon demand (*Loggdppc*). As different levels of state capacity might influence not only onset directly but also the feasibility of arms imports, we include the Relative Political Capacity index (*Capacity*) created by Kugler & Tammen (2010). Finally, we introduce five regional dummies (*West, Eastern europe, Latin america, Subsaharan africa, Asia*) with the reference category being the region of Northern Africa and the Middle East. This is motivated by the fact that some countries repeatedly have faced security-dilemma-type situations which have led to arms races with other countries (Richardson & Rashevsky, 1960).

Turning next to the second-stage onset equation, the choice of covariates largely follows the seminal contribution by Fearon & Laitin (2003). We improved on some of their variables, especially with respect to measuring ethnic heterogeneity. Furthermore, we expanded their specification by taking the insights of some of the more recent studies into account:

$$Onset = \beta_0 + \beta_2 Ln(\widehat{import})$$
$$+ \gamma_2 \begin{pmatrix} Onset\_last5y \\ Loggdppc, \text{Log}pop, Redistr \\ Mid, Noncontiguous \\ Capacity \\ anoc, Instability \\ Excl\_pop \\ Logmountain \\ t, t^2, t^3 \end{pmatrix} + \epsilon_{2,t}$$

(6)

We created a dummy variable (*Onset_last5y*), which is 1 if there was an onset during the period $t - 1$ to $t - 5$. We also added the log of GDP per capita (*Loggdppc*) and the log of population size (*Logpop*). In addition, we created an indicator (*Redistr*) which captures the amount of income redistribution by the state. It is obtained by calculating the difference between the Gini coefficients of market and disposable incomes. The underlying intuition is that more redistribution should reduce the incentives for challenging the government and thus reduce conflict (see Buhaug, Cederman & Gleditsch, 2014).

To control for interstate conflict, we included a variable (*Mid*) which measures whether a country is involved in a military interstate dispute and, if so, its intensity (Marshall, 2016). As proposed by Fearon & Laitin (2003), we included a dummy (*Noncontiguous*) indicating whether a country is a non-contiguous state. Moreover, we also expect the state capacity of the government to influence the probability of conflict onsets.

The literature has assigned an important role to the type and stability of the political regime in a country (e.g. Fearon & Laitin, 2003; Vreeland, 2008; Sunde & Cervellati, 2013). First, *Instability* is a variable that captures whether there was a change in the Polity IV index (Marshall, Gurr & Jaggers, 2016) of 3 or higher in the previous three years. Second, *Anoc* is a dummy which indicates whether a country is an anocracy. Previous research has found countries with these regimes to be particularly prone to intrastate conflict. Furthermore, the share of population that is excluded from political power and participation (*Excl_pop*), be it for ethnic, religious or other reasons, and the amount of mountainous terrain (*Logmountain*) in a country are expected to increase the probability of an intrastate conflict (e.g. Fearon & Laitin, 2003).

Finally, to deal with possible temporal dependence (Beck, Katz & Tucker, 1998), we included linear, quadratic and cubic polynomials of time (t, t^2, t^3) in our onset equation, as proposed by Carter & Signorino (2010). An overview of all our variables and data sources can be found in Table C.1 in the Online appendix, where we also offer a more extensive discussion on variable selections, operationalizations and methodological issues. We tested extensively if our results depend on the inclusion of any one of these variables in the import or onset equations.

Discussion of the empirical results

In the following, we present our results on the relation between weapons imports and intrastate conflict. Table II reports second-stage results from an instrumental variable probit regression. The main independent variables are arms imports measured as logs of yearly inflows (Models 1 and 2), 5-year moving averages (Models 3 and 4) and 10-year moving averages (Models 5 and 6). The results clearly show that (instrumented) imports have a strong and statistically significant influence on the probability of an onset. The effect is stronger when controlling for the conflict-inducing factors. Effects are more precisely measured when drawing on 5-year or 10-year moving averages, which is plausible as spikes in annual imports are evened out. Assuming the validity of the instrument, the results give a strong empirical support for the hypothesis that arms imports have a positive causal influence on the onset probability of civil war. This effect clearly goes beyond any effect that (latent) intratstate conflicts

Table II. Instrumental variable probit regression: Weapon imports and onsets

	(1) onset	(2) onset	(3) onset	(4) onset	(5) onset	(6) onset
Logimports	0.054**	0.090*				
	(0.012)	(0.043)				
Logimports_avg5			0.048**	0.083*		
			(0.0098)	(0.034)		
Logimports_avg10					0.046**	0.078*
					(0.0094)	(0.032)
Onset_last5y		0.63**		0.63**		0.63**
		(0.095)		(0.094)		(0.094)
Loggdppc		−0.19*		−0.18**		−0.17**
		(0.077)		(0.066)		(0.063)
Logpop		0.040		0.045		0.052
		(0.063)		(0.054)		(0.050)
Redistr		−0.042**		−0.044**		−0.044**
		(0.012)		(0.012)		(0.012)
Mid		0.15**		0.15**		0.15**
		(0.050)		(0.049)		(0.049)
Anoc		0.26**		0.26**		0.25**
		(0.082)		(0.082)		(0.082)
Logmountain		0.0038		0.0034		0.0033
		(0.029)		(0.029)		(0.029)
Noncontiguous		−0.20		−0.18		−0.17
		(0.18)		(0.17)		(0.17)
Instability		0.35**		0.34**		0.33**
		(0.093)		(0.093)		(0.093)
Capacity		−0.100		−0.092		−0.091
		(0.098)		(0.097)		(0.097)
Excl_pop		0.32*		0.32*		0.34*
		(0.15)		(0.15)		(0.15)
N	7,219	4,645	7,070	4,645	7,070	4,645
Pseudo-R^2	0.022	0.29	0.0011	0.14	0.000092	0.12

Instrumental variable probit regression (two-step procedure), *Logimports (Logimports avg5)* instrumented by *Logimports (Logimports avg5)* of civil war-unrelated major conventional weapons. Standard errors in parentheses. Constant and coefficients for t, t^2 and t^3 not shown.
$†p < 0.10$; $*p < 0.05$; $**p < 0.01$.

may have on decisions to import weapons. Note that most control variables show the expected signs. However, *Logpop*, *Logmountain*, *NonContiguous* and *capacity* are not statistically significant. Interestingly, the share of the excluded population (*Excl_pop*) has a strong, positive effect that is highly significant. This corroborates similar findings by Wimmer, Cederman & Min (2009), Cederman, Wimmer & Min (2010) and Wimmer (2013).

Drawing on the simultaneous equation approach, a similar picture emerges from our second stage results for conflict onset (Table III). Arms imports have a substantially and statistically very similar influence as in Models 2 and 4 of Table II. Our control variables mostly show the expected signs, while *Logmountain*, *Noncontigouus*, and *Capacity* remain statistically insignificant. Although comparisons to the results obtained by Craft & Smaldone (2002) and Suzuki (2007) are difficult to make due

to very different samples, variable selections and empirical approaches, we find, in general, our findings more in line with the former.

Note that these results are average effects of a nonlinear model. As Hanmer & Kalkan (2012) have shown, calculating marginal effects on the basis of average variable values creates a weak connection with the underlying hypotheses. We therefore create meaningful cases to make causal inferences. As laid out in our theoretical approach above, we expect imports to matter most when a country is in a situation where conditions for a domestic conflict are present, thus raising the probability of an onset. To examine this possibility, we calculate marginal effects for a high-risk scenario and a low-risk scenario. We define as high-risk, countries with an anocratic regime, a recent conflict onset, at least one bordering country, a change in the Polity IV index of 3 or higher

Table III. Second stage results of SEM: Onsets

	(1) onset	(2) onset	(3) onset
Logimports	0.075*		
	(0.030)		
Logimports_avg5		0.072*	
		(0.029)	
Logimports_avg10			0.064*
			(0.028)
Onset_last5y	0.66**	0.66**	0.66**
	(0.10)	(0.10)	(0.10)
Loggdppc	−0.20**	−0.20**	−0.18**
	(0.066)	(0.064)	(0.062)
Logpop	0.11*	0.11*	0.12**
	(0.049)	(0.049)	(0.048)
Redistr	−0.042**	−0.043**	−0.043**
	(0.013)	(0.013)	(0.013)
Mid	0.22**	0.22**	0.22**
	(0.059)	(0.059)	(0.059)
Anoc	0.21*	0.20*	0.19*
	(0.092)	(0.091)	(0.091)
Logmountain	0.029	0.029	0.029
	(0.033)	(0.033)	(0.033)
Noncontiguous	−0.15	−0.14	−0.12
	(0.19)	(0.19)	(0.19)
Instability	0.31**	0.29**	0.28**
	(0.10)	(0.10)	(0.10)
Capacity	0.035	0.019	0.014
	(0.11)	(0.11)	(0.11)
Excl_pop	0.34*	0.34†	0.35*
	(0.17)	(0.17)	(0.17)
N	3,998	3,998	3,998
Pseudo-R^2	0.18	0.18	0.18

Simultaneous equations model according to Equations 5 and 6. Standard errors in parentheses. Constant and coefficients for t, t^2 and t^3 not shown.
†$p < 0.10$; *$p < 0.05$; **$p < 0.01$.

in the previous three years, an interstate conflict value of 4 and values for mountainous terrain and share of excluded population that put a country in the 90th percentile of the sample and a low amount of income redistribution, state capacity and GDP per capita (10th percentile of the sample). The reverse of these values defines low-risk.[10] For further illustrative purposes, we also include the case of Angola, a country that has experienced a number of civil war onsets between 1975 and 2002. Looking at the mean values for 1973–2013, Angola resembles the high-risk case for most independent variables.

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[10] The low-risk values correspond, for example, to Denmark 1991–2013.

Table IV. Marginal effects of arms imports on conflict onset in different scenarios.

	Logimports	Logimports avg5	Logimports avg10
High-risk	0.02279	0.0222	0.02194
	(0.00963)	(0.0094)	(0.00991)
Low-risk	0.00031	0.00030	0.00030
	(0.00016)	(0.00016)	(0.00016)
Angola	0.01343	0.01265	0.01227
	(0.00595)	(0.00557)	(0.00576)

Marginal effects with standard errors in parentheses. High-risk scenario: $Onset\_last5y = 1$, $Anoc = 1$, $Instability = 1$, $Noncontiguous = 0$, $Logmountain = 3.985273$, $Exclpop = 0.458$, $Redistr = 0.9306297$, $Capacity = 0.478$, $Loggdppc = 11.33362$, $Mid = 4$, all other variables = mean. Low-risk scenario: $Onset\_last5y = 0$, $Anoc = 0$, $Instability = 0$, $Noncontiguous = 1$, $Logmountain = 0$, $Exclpop = 0$, $Redistr = 16.62126$, $Capacity = 1.495$, $Loggdppc = 14.60336$, $Mid = 0$, all other variables = mean. Angola: $Onset\_Last5y = 0.5$, $Anoc = 0.5897$, $Instability = 0.111$, $Noncontiguous = 1$, $Logmountain = 2.370244$, $Exclpop = 0.62$, $Redistr = 2.805$, $Capacity = 1.782$, $Loggdppc = 12.60593$, $Mid = 0$, all other variables = mean.

As column 1 in Table IV shows, arms imports increase onset probability in the high-risk scenario and the Angolan case. The effect is extremely small in the low-risk case. In quantitative terms, assuming the sample average for arms imports and transforming log-values back into TIVs, we find that an increase in arms imports by 2.7 million TIV raises the onset probability by 2.3 percentage points under the high-risk scenario, whereas the marginal effects for Angola are about 1.3 percentage points. To put this into perspective, the sample mean for arms imports is 195.45 million TIV, which is somewhat lower than civil war-torn Angola's average of 267.81 million TIVs. Note that arms imports can change quite strongly over time – upward or downward movements by several hundred million TIVs are not rare. In 1987, for instance, imports to Angola increased by almost 500 million TIVs. When comparing a situation with no imports to the case with the sample maximum of imports, we find that for the high-risk case the predicted probability of conflict onset increases from 59% to 80% (see Figure 1). In the low-risk case, on the other hand, the marginal effects are much smaller. A change from zero to maximum imports increases onset probability from 0.09% to 0.6%. This finding emphasizes the fact that arms imports to countries in which conditions for civil conflict are not present have almost no impact on onset probability. In other words, arms imports in and of themselves do not cause intrastate conflicts. Note that the marginal effects of the 5- and 10-year backward averages of arms imports are almost identical.

With respect to the second stage estimations for the import equation, we provide the results and a more detailed discussion in Online appendix Table A.1. At this point, a
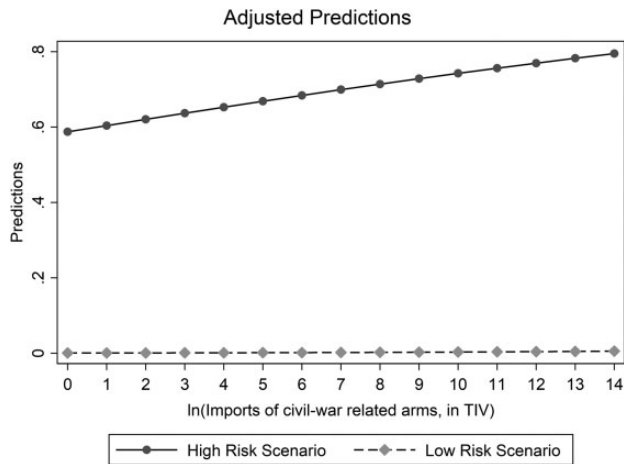
Adjusted Predictions

Figure 1. Predicted probabilities for yearly arms imports in high-risk and low-risk scenarios

The x-axis shows the instrumented values of yearly arms imports (in logs).

brief summary shall suffice given that our focus is on conflict onsets. What the estimations for the import equation clearly show is that anticipation effects are sizable. Conflict onset in year *t* significantly increases the amount of weapons imports, thus underlining the simultaneity of imports and conflicts. Ignoring this endogeneity would therefore lead to highly biased inferences.

We are now in a position to relate our empirical findings to our theoretical expectations. The results show that there is indeed a positive, causal effect of arms imports on the probability of violent conflict onsets. Given our estimation strategies, we can rule out that this is simply due to a conflict anticipation effect. In line with our theoretical thinking, weapon inflows strongly influence conflict probability in a high-risk scenario, that is, in a situation where other conditions make conflict more likely. In the low-risk case, however, all the marginal effects remained extremely small. These results suggest that arms inflows to countries where conflict-inducing conditions are present have an escalating effect and do not discourage potential challengers. In these situations effective deterrence does not seem to be taking place. Rather, conflict initiation becomes more likely. Whether this is due to pre-emptive motives by the government or rebel groups is beyond the scope of our analysis, however.

Robustness and validity of the instruments

We tested the robustness of our models in a number of ways. We applied alternative estimators (two-stage least squares), checked results for different assumptions on standard errors, employed alternative definitions for the main dependent variable (Log*imports*), and for the conflict onset variable. Overall, we can confirm all of our conclusions. The robustness tests are summarized in more detail in the Online appendix, which also reports tests on the exogeneity assumption of the IV- and SEM-model. First of all, we tested whether *Logimports_unrelated* has an independent influence on civil war onset in a SEM model that excludes *Logimports_unrelated* in the Z_{im} vector. While all other coefficients, and notably our arms imports coefficient, change only marginally, unrelated weapons show neither a substantive nor a statistical relation with conflict onset (see Table A.4). Secondly, for the SEM, we allowed variables only contained in $Z_{im/on}$ and most susceptible to potential endogeneity concerns to influence both the import and the onset equation. Again, our conclusions hold, which makes us confident that both approaches provide internally valid results for the effect of arms imports on conflict onset.

Summary and conclusions

This article systematically analyzed the relationship between the import of major conventional weapons and the onset of intrastate conflict. We focused on weapon transfers to governments as primary recipients of MCWs. Our point of departure was the conceptual and econometric challenge that governments may import arms in anticipating a future conflict outbreak, which would mean that a positive relationship between arms and civil war onset does not imply causation. This inherent endogeneity is the key problem when empirically exploring the relationship between weapons and conflicts. Previous studies have not appropriately dealt with this issue.

Based on theoretical ideas developed initially in the interstate war literature, we first explored several theoretical mechanisms relating imports to conflicts. We argued that the availability of arms may increase governments, willingness to use them in order to resolve a conflict by violent means. We showed that some crisis bargaining models suggest that arms imports could function as a deterrent against potential challengers. However, we maintained that imports could also lead to escalation and thus conflict due to predatory incentives by governments or pre-emptive motives by rebels. Hence, arms inflows affect the actors' decision to fight because they change the underlying distribution of military capabilities and exacerbate commitment problems. Finally, past arms imports may have reduced investment in state capacities, thus reducing states' abilities to resolve conflicts peacefully. We therefore expected that when controlling properly for the inherent endogeneity, we

would still find a positive effect on intrastate conflict onsets.

Testing our theoretical expectations, we found that increases in imports do indeed increase the probability of an intrastate conflict. This suggests that they fuel tensions in a latent conflict and make its outbreak more probable. This effect is quite substantial, but only in high-risk cases, that is, in situations where conflict-inducing conditions are present. In other words, for arms to have a destabilizing effect, there must be issues of contention between the government and other societal groups. Our results indicate that in such situations, arms imports are not an effective deterrent for governments against potential challengers. From a policy perspective, we would therefore caution against the idea of using weapon exports as a means of stabilizing a country facing a domestic conflict. Based on our results, escalation and violent conflict become more likely. However, note that our econometric approach focuses on the effect of changes in civil war-related weapon imports induced by our instruments – this local average treatment effect does not necessarily imply similar consequences for variation induced in arms imports through other factors. Particularly, we show that government imports due to motives unrelated to civil war onset make outbreaks more likely. Future research could study whether arms imported with the explicit aim of deterring domestic rivals can achieve this goal.

While we are quite confident in the robustness of our results, we are acutely aware that this can only be the beginning of our research. We only looked at major conventional weapons, which begs the question of what role small arms and light weapons could play. We also limited ourselves to conflict onsets, thus ignoring the effect of weapon deliveries on ongoing conflicts. Do they prolong or shorten them? Do they intensify them, leading to more deaths? Providing answers to these questions would bring us a step closer to fully understanding the role of the international arms trade in intrastate conflicts.

Replication data

The dataset, codebook, and do-files for the empirical analysis in this article, as well as the Online appendix, can be found at http://www.prio.org/jpr/datasets. All analyses were conducted using Stata 14.2.

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References

Amemiya, Takeshi (1978) The estimation of a simultaneous equation generalized probit model. *Econometrica: Journal of the Econometric Society* 46(5): 1193–1205.

Azam, Jean-Paul (2001) The redistributive state and conflicts in Africa. *Journal of Peace Research* 38(4): 429–444.

Balcells, Laia & Stathis N Kalyvas (2014) Does warfare matter? Severity, duration, and outcomes of civil wars. *Journal of Conflict Resolution* 58(8): 1390–1418.

Baliga, Sandeep & Tomas Sjöström (2004) Arms races and negotiations. *Review of Economic Studies* 71(2): 351–369.

Ball, Desmond (1993) Arms and affluence: Military acquisitions in the Asia-Pacific region. *International Security* 18(3): 78–112.

Beck, Nathaniel; Jonathan N Katz & Richard Tucker (1998) Taking time seriously: Time-series–cross-section analysis with a binary dependent variable. *American Journal of Political Science* 42(4): 1260–1288.

Besley, Timothy & Torsten Persson (2011) The logic of political violence. *Quarterly Journal of Economics* 126(3): 1411–1445.

Blanton, Shannon Lindsey (1999) Instruments of security or tools of repression? Arms imports and human rights conditions in developing countries. *Journal of Peace Research* 36(2): 233–244.

Blattman, Christopher & Edward Miguel (2010) Civil war. *Journal of Economic Literature* 48(1): 3–57.

Bueno de Mesquita, Bruce (2014) *Principles of International Politics*. Thousand Oaks, CA: CQ.

Buhaug, Halvard; Lars-Erik Cederman & Kristian Skrede Gleditsch (2014) Square pegs in round holes: Inequalities, grievances, and civil war. *International Studies Quarterly* 58(2): 418–431.

Carter, David B & Curtis S Signorino (2010) Back to the future: Modeling time dependence in binary data. *Political Analysis* 18(3): 271–292.

Cederman, Lars-Erik; Andreas Wimmer & Brian Min (2010) Why do ethnic groups rebel? New data and analysis. *World Politics* 62(1): 87–119.

Chassang, Sylvain & Gerard Padró i Miquel (2010) Conflict and deterrence under strategic risk. *Quarterly Journal of Economics* 125(4): 1821–1858.

Cheibub, Jose Antonio (1998) Political regimes and the extractive capacity of governments: Taxation in democracies and dictatorships. *World Politics* 50(3): 349–376.

Collier, Paul & Anke Hoeffler (2004) Greed and grievance in civil war. *Oxford Economic Papers* 56(4): 563–595.

Craft, Cassady B (1999) *Weapons for Peace, Weapons for War: The Effect of Arms Transfers on War Outbreak, Involvement and Outcomes*. London: Routledge.

Craft, Cassady B & Joseph P Smaldone (2002) The arms trade and the incidence of political violence in sub-Saharan africa, 1967–97. *Journal of Peace Research* 39(6): 693–710.

Cunningham, David E; Kristian Skrede Gleditsch & Idean Salehyan (2009) It takes two: A dyadic analysis of civil war duration and outcome. *Journal of Conflict Resolution* 53(4): 570–597.

Diehl, Paul (1983) Arms races and escalation: A closer look. *Journal of Peace Research* 20(3): 205–212.

Dixon, Jeffrey (2009) What causes civil wars? Integrating quantitative research findings. *International Studies Review* 11(4): 707–735.

Durch, William J (2000) *Constructing Regional Security: The Role of Arms Transfers, Arms Control, and Reassurance*. Houndmills: Palgrave Macmillan.

Fearon, James D & David D Laitin (2003) Ethnicity, insurgency, and civil war. *American Political Science Review* 97(1): 75–90.

Fordham, Benjamin O (2004) A very sharp sword: The influence of military capabilities on American decisions to use force. *Journal of Conflict Management* 48(5): 632–656.

Gleditsch, Nils Petter; Peter Wallensteen, Mikael Eriksson, Margareta Sollenberg & Håvard Strand (2002) Armed Conflict 1946–2001: A new dataset. *Journal of Peace Research* 39(5): 615–637.

Hanmer, Michael J & Kerem Ozan Kalkan (2012) Behind the curve: Clarifying the best approach to calculating predicted probabilities and marginal effects from limited dependent variable models. *American Journal of Political Science* 57(1): 263–277.

Heckman, James J (1978) Dummy endogenous variables in a simultaneous equation system. *Econometrica* 46: 931–959.

Hendrix, Cullen S (2010) Measuring state capacity: Theoretical and empirical implications for the study of civil conflict. *Journal of Peace Research* 47(3): 273–285.

Hirshleifer, Jack (2000) The macrotechnology of conflict. *Journal of Conflict Resolution* 44(6): 773–792.

Huth, Paul K (1988) Extended deterrence and the outbreak of war. *American Political Science Review* 82(2): 423–443.

Jackson, Matthew O & Massimo Morelli (2009) Strategic militarization, deterrence and wars. *Quarterly Journal of Political Science* 4(3): 279–313.

Jackson, Thomas (2010) From under their noses: Rebel groups' arms acquisition and the importance of leakages from state stockpiles. *International Studies Perspectives* 11(2): 131–147.

Jervis, Robert (1989) Rational deterrence: Theory and evidence. *World Politics* 42(2): 183–207.

Kalyvas, Stathis N (2006) *The Logic of Violence in Civil War*. New York: Cambridge University Press.

Kalyvas, Stathis N & Laia Balcells (2010) International system and technologies of rebellion: How the end of the Cold War shaped internal conflict. *American Political Science Review* 104(3): 415–429.

Keshk, Omar MG; Brian M Pollins & Rafael Reuveny (2004) Trade still follows the flag: The primacy of politics in a simultaneous model of interdependence and armed conflict. *Journal of Politics* 66(4): 1155–1179.

Kreps, David M & Robert Wilson (1982) Reputation and imperfect information. *Journal of Economic Theory* 27(2): 245–279.

Kugler, Jacek & Ronald Tammen (2010) *Performance of Nations*. Lanham, MD: Rowman & Littlefield.

Kydd, Andrew H (2000) Arms races and arms control: Modeling the hawk perspective. *American Journal of Political Science* 44(2): 228–244.

Kydd, Andrew H (2015) *International Relations Theory: The Game-Theoretic Approach*. Cambridge: Cambridge University Press.

Levi, Margaret (1988) *Of Rule and Revenue*. Berkeley, CA: University of California Press.

Levy, Jack S & William R Thompson (2010) *Causes of War*. Oxford: Wiley-Blackwell.

Lichbach, Mark I (1998) *The Rebel's Dilemma*. Ann Arbor, MI: University of Michigan Press.

Lichbach, Mark I (2009) Internal wars over the state: Rational choice institutionalism and contentious politics. In: Manus I Midlarsky (ed.) *Handbook of War Studies III. The Intrastate Dimension*. Ann Arbor, MI: University of Michigan Press, 100–154.

Maddala, Gangadharrao S (1983) *Limited-Dependent and Qualitative Variables in Econometrics*. New York: Cambridge University Press.

Marshall, Monty G (2016) Major episodes of political violence (MEPV) and conflict regions 1946–2013 (http://www.sys temicpeace.org/inscrdata.html; accessed 10 February 2015).

Marshall, Monty G; Ted Robert Gurr & Keith Jaggers (2016) Polity IV project: Political regime characteristics and transitions, 1800–2015 (http://www.systemicpeace.org/ inscrdata.html, accessed 1 March 2017).

McGrath, Liam F (2015) Estimating onsets of binary events in panel data. *Political Analysis* 23(4): 534–549.

Meirowitz, Adam H & Anne E Sartori (2008) Strategic uncertainty as a cause of war. *Quarterly Journal of Political Science* 3(4): 327–352.

Melander, Erik; Therése Pettersson & Lotta Themnér (2016) Organized violence, 1989–2015. *Journal of Peace Research* 112(4): 727–742.

Moore, Matthew (2012) Selling to both sides: The effects of major conventional weapons transfers on civil war severity and duration. *International Interactions* 38(3): 325–347.

Most, Benjamin A & Harvey Starr (1989) *Inquiry, logic and international politics*. Columbia, SC: University of South Carolina Press.

Pamp, Oliver & Paul W Thurner (2017) Trading arms and the demand for military expenditures: Empirical explorations using new SIPRI-data. *Defense and Peace Economics* 28(4): 457–472.

Powell, Robert (1993) Guns, butter and anarchy. *American Political Science Review* 87(1): 115–132.

Powell, Robert (1999) *In the Shadow of Power*. Princeton, NJ: Princeton University Press.

Powell, Robert (2006) War as a commitment problem. *International Organization*, 60(1): 169–203.

Powell, Robert (2013) Monopolizing violence and consolidating power. *Quarterly Journal of Economics* 128(2): 807–859.

Reuveny, Rafael & Quan Li (2003) Economic openness, democracy, and income inequality: An empirical analysis. *Comparative Political Studies* 36(5): 575–601.

Richardson, Lewis F & Nicholas Rashevsky (1960) *Arms and Insecurity: A Mathematical Study of the Causes and Origins of War*. Pittsburgh, PA: Boxwood.

Sawyer, Katherine; Kathleen Gallagher Cunningham & William Reed (2015) The role of external support in civil war termination. *Journal of Conflict Resolution* 61(6): 1174–1202.

Sislin, John & Frederic S Pearson (2001) *Arms and Ethnic Conflict*. Lanham, MD: Rowman & Littlefield.

Slantchev, Branislav L (2011) *Military Threats: The Costs of Coercion and the Price of Peace*. New York: Cambridge University Press.

Smith, Ron P & Ali Tasiran (2005) The demand for arms imports. *Journal of Peace Research* 42(2): 167–181.

Sunde, Uwe & Matteo Cervellati (2013) Democratizing for peace? The effect of democratization on civil conflicts. *Oxford Economic Papers* 68(2): 774–797.

Suzuki, Susumu (2007) Major arms imports and the onset of civil and ethnic wars in the postcolonial world, 1956–1998: A preliminary reassessment. *Social Science Journal* 44(1): 99–111.

Thies, Cameron G (2010) Of rulers, rebels, and revenue: State capacity, civil war onset, and primary commodities. *Journal of Peace Research* 47(3): 321–332.

Thies, Cameron G (2015) State fiscal capacity and state failure. *European Political Science Review* 7(2): 167–187.

Thies, Cameron G & Timothy M Peterson (2015) *Intra-Industry Trade: Cooperation and Conflict in the Global Political Economy*. Stanford, CA: Stanford University Press.

Thurner, Paul W; Skyler Cranmer, Christian Schmid & Goeran Kauermann (forthcoming) The network of major conventional weapons transfers 1950–2013. *Submitted, under review.*

Tilly, Charles (1985) War making and state making as organized crime. In: Peter B Evans, Dietrich Rueschemeyer & Theda Skocpol (eds) *Bringing the State Back In*. Cambridge: Cambridge University Press, 169–191.

Vreeland, James Raymond (2008) The effect of political regime on civil war: Unpacking anocracy. *Journal of Conflict Resolution* 52(3): 401–425.

Walter, Barbara F (2009a) Bargaining failures and civil war. *Annual Review of Political Science* 12: 243–261.

Walter, Barbara F (2009b) *Reputation and Civil War: Why Separatist Conflicts Are so Violent*. Cambridge: Cambridge University Press.

Wimmer, Andreas (2013) *Waves of War: Nationalism, State Formation, and Ethnic Exclusion in the Modern World*. Cambridge: Cambridge University Press.

Wimmer, Andreas; Lars-Erik Cederman & Brian Min (2009) Ethnic politics and armed conflict: A configurational analysis of a new global data set. *American Sociological Review* 74(2): 316–337.

Wooldridge, Jeffrey M (2002) *Econometric Analysis of Cross Section and Panel Data*. Cambridge, MA: MIT Press.

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