Manpower and Counterinsurgency: Empirical Foundations for Theory and Doctrine

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ABSTRACT. How does manpower affect counterinsurgency? Important debates about counterinsurgency theory, military doctrine, force planning, and ongoing military operations revolve around assumptions about the role manpower plays in determining counterinsurgency outcomes. But these assumptions have not, by and large, been subjected to large-n analysis. This paper helps serve that role by examining new data on counterinsurgents' deployments across 171 campaigns since World War I. These data provide insight into a range of important issues, such as how force size should be measured, whether it is related to counterinsurgent success, whether troop nationality matters, and whether the role of manpower varies across contexts. Of these findings, the most notable is that conventional rules of thumb for force sizing, including the recommendation put forth in official U.S. military doctrine, receive no empirical support. These findings therefore challenge the prevailing wisdom, while laying the groundwork for a range of future scholarship.

How does manpower affect counterinsurgency? The question is central to many of the most important ongoing debates about counterinsurgency theory and practice. A great deal of scholarly research, ongoing military operations, and contemporary defense planning turns on basic assumptions about the role of force size in determining counterinsurgency outcomes. Yet many of these assumptions remain untested and subject to dispute.

For instance, many people disagreed over whether President Obama should approve General McChrystal's September 2009 request for additional forces in Afghanistan; there is also currently a sharp debate over how many troops the United States should withdraw from the country in July 2011. In many ways, these debates reflect larger differences in the way analysts, policymakers, and the general public view the significance of manpower in counterinsurgency. Those who believe that outcomes are highly sensitive to changes in force size would be more inclined to support deploying more forces for longer periods of time. Conversely, those who believe that counterinsurgency outcomes are relatively *in*sensitive to troop levels would be more likely to have opposed General McChrystal's request and to advocate a larger withdrawal. The same could be said of current debates about sizing the U.S. Army and Marine Corps. Many observers advocate expanding the ground forces in order to provide more manpower for waging counterinsurgency in the future. But this

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recommendation depends on the assumption that manpower is in fact a significant predictor of success or failure in these wars. Without systematic evidence either way, it is hard to know what to think, or how to move these debates in a constructive direction.

A wide range of literature in both the scholarly and policy communities has helped structure analysis of manpower and counterinsurgency around a variety of important ideas. But until now, empirical work – limited by a lack of available data – has been insufficient to help adjudicate even the most basic theoretical disagreements. This paper advances new evidence that can help to do this. The results presented here are by no means the last word on the subject. But given the current state of the literature, many of the most important empirical foundations need to be built from the ground up, and that is the goal here.

The analysis proceeds as follows. Section 1 begins by reviewing military doctrine on manpower in counterinsurgency, integrating this doctrine into the broader literature, and demonstrating how it represents a range of prior assumptions that require more empirical examination than they have currently received. Section 2 describes a new data set that was gathered specifically for this purpose. Sections 3 and 4 present results and robustness checks, and Section 5 concludes.

The central finding of this paper is that the current conventional wisdom about the significance of manpower in counterinsurgency – codified in official military doctrine as the claim that counterinsurgents require roughly 20 troops per 1000 inhabitants in the area of operations in order to be successful – has no discernible empirical support. Across 171 counterinsurgency campaigns since World War I, there is no reason to think that this threshold (or any other threshold, for that matter) is a useful way to predict strategic outcomes. A broader implication of this finding is that much of the debate over force sizing for counterinsurgency is framed in a misleading fashion, searching for a "rule of thumb" that, in all likelihood, simply does not exist.

In addition, this paper provides evidence on several related issues: What is the best way to measure force size? Are indigenous troops more effective than foreign troops? Does manpower make a significant contribution to the odds of counterinsurgent success? Does the significance of manpower in counterinsurgency appear to vary over time, or by region, or across different regimes, levels of mechanization, or types of conflict? These are all important questions that tie into core themes in both the scholarly and policy literatures. The results presented in this paper add insight and empirical evidence that can help these debates move forward.

1. Military Doctrine, Social Science, and FM 3-24

Almost all military activity is guided by official doctrine. This doctrine is published in hundreds of manuals, on topics ranging from the general (e.g., FM 3-0: "Operations") to the specific (e.g., FM 1-140: "Helicopter Gunnery"). One of the most prominent pieces of military doctrine in recent memory is the Army and Marine Corps *Counterinsurgency Field Manual* (FM 3-24/JP 3-33.5), which was released in December, 2006. In a foreword to the edition published by the University of Chicago Press, John Nagl wrote that "perhaps no doctrinal manual in the history of the Army has been so eagerly anticipated and so well received." In another foreword, Sarah Sewall wrote that the manual hailed a "radical" change to the U.S. military's approach to counterinsurgency.[2]

[2] John A. Nagl, "Forward" in U.S. Department of the Army, *The U.S. Army/Marine Corps Counterinsurgency Field Manual* (Chicago: University of Chicago Press, 2007): xiv; Sarah Sewall, "A Radical Field Manual" in idem.

At the same time, FM 3-24 explicitly denies the notion that it should serve as a blueprint for military operations and strategy. In their own foreword to the Manual, the authors who oversaw its production (U.S. Army Lieutenant General David H. Petraeus and U.S. Marine Corps Lieutenant General James F. Amos) stress that "every insurgency is contextual and presents its own set of challenges"; that the manual is "not intended to be a standalone reference"; and that "users should assess information from other sources to help them decide how to apply the doctrine in this publication to the specific circumstances facing them."[3] The manual makes recommendations, but many of them are lined with caveats. So what is the proper way to interpret and evaluate the manual's substance? What is so significant about having doctrine if it only tells commanders to make ad hoc decisions based on other sources and specific circumstances?

A useful way to think about this issue is to place it in a Bayesian framework where a decisionmaker's baseline expectations (or "prior assumptions") are adjusted based on evidence (or "signals") to form a new, "posterior" hypothesis. There are numerous ways to form posterior hypotheses based on priors and signals, and the goal of Bayesian analysis is to impose structure on this process. The cycle of forming, using, and revising military doctrine fits nicely into this paradigm. As the authors of FM 3-24 describe it, the manual articulates "fundamental principles" that form a "solid foundation for understanding and addressing specific insurgencies."[4] Commanders are intended to adapt this foundation to the particular contingencies that they confront. By combining the Manual's basic guidelines (the priors), with the dynamics of specific contingencies (the signals), commanders can generate plans for tactics, operations, and strategy (the posteriors) that they believe are most likely to be effective. Doctrine helps to structure these discussions around a common set of expectations. To the extent that FM 3-24 articulated a new set of expectations driving military policy in Iraq, Afghanistan, and elsewhere, it was certainly worthy of the attention it received.

In addition to characterizing the relationship between doctrine and implementation, the Bayesian framework indicates a place where scholarly analysis can play an important role in debates over military operations. Though assessments of particular contingencies typically involve classified information, the formation of prior assumptions on which the policymaking process rests is often a matter of collecting and analyzing publicly available data. FM 3-24 and other doctrine is based on lessons that come from "broad historical trends" that are "applicable worldwide."[5] It is essentially the language of *ceteris paribus*: claims about what kinds of measures 'work,' all else being equal. Evaluating this type of claim is an enterprise where scholars and practitioners have an unusual amount of overlapping interest, and where social science research methods can prove useful.

For example, here is the paragraph in FM 3-24 that deals most directly with the question of force requirements for counterinsurgency:

> [Paragraph 1-67]. No force level guarantees victory for either side. During previous conflicts, planners assumed that combatants required a 10 or 15 to 1 advantage over insurgents to win. However, no predetermined, fixed ratio of friendly troops to enemy combatants ensures success in COIN [counterinsurgency]. The conditions of the operational environment and the approaches insurgents use vary too widely. A better force requirement gauge is troop density, the ratio of security forces (including the host nation's military and police forces as well as foreign counterinsurgents) to inhabitants. Most density recommendations fall within a range of 20 to 25 counterinsurgents for every

[3] David H. Petraeus and James F. Amos, "Forward" and "Preface" in ibid: xlv, xlviii.
[4] Ibid: xlvii, xlv. Cf. Barry R. Posen, *The Sources of Military Doctrine: France, Britain and Germany between the World Wars* (Ithaca: Cornell University Press, 1984): 14, which states: "Military doctrine includes the preferred mode of a group of services, a single service, or a subservice for fighting wars. It reflects the judgments of professional military officers, and to a lesser but important extent civilian leaders, about what is and is not militarily possible and necessary."
[5] Petraeus and Amos, "Preface" in *Counterinsurgency Field Manual*: xlvii.

> 1000 residents in an AO [area of operations]. Twenty counterinsurgents per 1000 residents is often considered the minimum troop density required for effective COIN operations; however as with any fixed ratio, such calculations remain very dependent on the situation.

As this section will explain, this paragraph packs together a number of important theoretical and empirical claims: about how force size should be measured; whether the relationship between force size and success is positive or negative; whether it is different for foreign versus indigenous troops; whether it responds to particular thresholds; and whether manpower is a substantively important factor in predicting the outcome of counterinsurgency campaigns. Together, these claims constitute the military's prior assumptions about the significance of manpower in counterinsurgency – assumptions that essentially boil down to the recommendation that counterinsurgents should deploy roughly 20-25 troops per 1000 residents in the area of operations. The manual clearly states that this number will have to be adjusted in particular cases. But the rule of thumb in Paragraph 1-67 represents the conventional wisdom, the officially endorsed expectation about what works all else being equal. As such, this assumption – and the range of claims behind it – deserve to be tested in a direct and rigorous fashion.

Yet this section will also seek to demonstrate that at present, many of these claims lack basic empirical foundations. Forming an appropriate prior assumption about the relationship between means and ends in counterinsurgency – or any other type of war – involves defining the proper case universe, operationalizing and coding key variables, examining relationships among these variables, and being sensitive to a range of potential confounds. In many ways, performing these tasks has simply been impossible heretofore due to the lack of data on the subject of manpower in counterinsurgency. The remainder of this section will integrate the Manual's claims on this subject with the existing literature, to show not only where that literature can play a role in informing military doctrine, but also where it currently falls short.

What is the best way to measure force size?

In assessing any claim about the relationship between force size and military effectiveness, there is first the question of how troop levels should even be defined. The issue is that the total number of counterinsurgents is probably uninformative without being compared to the magnitude of the war they are waging. FM 3-24 recommends that force requirements should be measured in terms of "troop density", or the ratio between counterinsurgents and local inhabitants in the area of operations (AO), and a wide range of policy analysis adopts this metric.[6] But there are at least two alternatives.

For instance, when T.E. Lawrence led the Arab Revolt during World War I, he wrote that the 75,000 soldiers opposing him were "too small to fulfill the doctrine of acreage: too few to adjust number to space." Lawrence calculated that the Turks needed at least 600,000 troops in order to cover more than half a million square kilometers in the Hijaz. He believed that properly matching forces with the physical size of the area of operations was a fundamental "algebraic element" of

[6] See, e.g., Frederick W. Kagan, "Why We Need More Troops in Afghanistan," *Washington Post,* 16 August 2009; Seth G. Jones et al., *Establishing Law and Order After Conflict* (Santa Monica: RAND, 2005): xiii; Michael E. O'Hanlon, *The Science of War* (Princeton: Princeton University Press, 2009); Kalev I. Sepp, "Best Practices in Counterinsurgency," *Military Review* 85, no. 3 (May/June 2005); Alan J. Kuperman, "Rwanda in Retrospect," *Foreign Affairs* 79, no. 1 (January/February 2000); James F. Dobbins et al., *America's Role in Nation-Building* (Santa Monica: RAND, 2003); R. Royce Kneece et al., *Force Sizing for Stability Operations* (Alexandria, VA: IDA, 2010); James Quinlivan, "Force Requirements in Stability Operations," *Parameters* 25, no. 4 (Winter 1995); and Quinlivan, "Burden of Victory," *RAND Review* (September 2010).

guerilla warfare.[7] Lawrence's observation could be connected to the broader literature on "force-to-space ratios," which are common heuristics for sizing conventional armies.

Another prominent yardstick for gauging force size in counterinsurgency is the so-called "tie-down ratio" between counterinsurgents and their opponents. (Since it takes a certain number of counterinsurgents to "tie down" each insurgent.) This measure was a mainstay of Vietnam-era counterinsurgency theory.[8] But as FM 3-24 makes clear, the tie-down ratio has fallen out of favor, and it is at odds with the Manual's deductive foundation for approaching counterinsurgency. One of the Manual's core assumptions is that the main challenge facing counterinsurgents is not killing their opponents but rather finding them in the first place. This, in turn, requires that counterinsurgents win the loyalty of the population and protect any informants who come forward with information that is useful in locating the enemy. FM 3-24 therefore states that "the cornerstone of any COIN effort is establishing security for the populace" (para. 1-131).[9] This logic potentially implies that the number of insurgents may be a less valid denominator than the size of the population that supports them. Hence the emphasis on troop density over tie-down ratios.

But the reason for relying on troop density is almost entirely a function of its deductive appeal. There has been no systematic empirical study of whether one type of measure is more reliable than the others at predicting counterinsurgency outcomes across a wide range of cases. In large part, this is simply due to the problem of data availability. At present, there exists no data set that measures counterinsurgent force size, or insurgent force size, or the size and population of the area of operations across a wide range of cases. The closest thing currently available is a report produced by the Institute for Defense Analyses (IDA), which provides troop density data for 41 counterinsurgencies.[10] Yet there are three important drawbacks to these data, which are acknowledged clearly and up front by the authors. The first is scope: they comprise only a fraction of possible cases. (By contrast, this paper examines more than four times as many insurgencies, as discussed in the next section). The second drawback to the existing data is case selection. The authors of the IDA study write that "the main criterion for inclusion… was the availability of sufficient information. Thus, analytically speaking, one cannot assume that the conflicts… comprise a representative sample."[11] Third, these data do not include information on the physical size of the

[7] T. E. Lawrence, "The Evolution of a Revolt," *Army Quarterly and Defense Journal* (October 1920): 7-8.
[8] See, e.g., Robert Thompson, *Defeating Communist Insurgency* (London: Chatto and Windus, 1966); David Galula, *Counterinsurgency Warfare* (New York: Praeger, 1964); and more recently Anthony James Joes, *Resisting Rebellion* (Lexington: University Press of Kentucky, 2004): 171.
[9] See also para. 1-3: "Political power is the central issue in insurgencies and counterinsurgencies; each side aims to get the population to accept its governance or authority as legitimate." Para. 1-4: "Long-term succession COIN depends on the people taking charge of their affairs and consenting to the government's rule." Para. 1-108: "In almost every case, counterinsurgents face a populace containing an active minority supporting the government and an equally small military faction opposing it. Success requires the government to be accepted as legitimate by most of that uncommitted middle." Para. 1-113: "The primary objective of any COIN operation is to foster effective governance by a legitimate government." Para. 1-123: "Political factors have primacy in COIN." Para. 1-128: "It is easier to separate an insurgency from its resources and let it die than to kill every insurgent." Para. 1-129: "Dynamic insurgencies can replace losses quickly. Skillful counterinsurgents must thus cut off the sources of that recuperative power. Some sources can be reduced by addressing the social, political, and economic grievances that fuel the insurgency. Physical support can be cut off by population control or border security." Para. 1-149: "Ultimate success in COIN is gained by protecting the populace, not the COIN force."
[10] Kneece et al., *Force Sizing for Stability Operations*. These data were, in turn, based on the "Irregular Warfare" data set constructed by the Center for Army Analysis (CAA). The case universe for this data set covers 102 cases, but only 57 of them qualify as "insurgencies" under Lyall and Wilson's definition and force size information is only provided for 41 of these. For a discussion see Kneece et al. pp. 47ff.
[11] Kneece et al., *Force Sizing for Stability Operations*: 48.

AO or on the number of rebels involved in the fighting, or the breakdown between foreign and indigenous forces during the war. Thus they cannot assess whether troop density is a better predictor of success than force-to-space or tie-down ratios, nor can they address several additional questions raised in this section.

Is the relationship between manpower and success positive or negative?

No matter how forces are defined, another fundamental question is whether their relationship to effectiveness is increasing or decreasing. But scholars and practitioners lack agreement on even this most basic issue. For the purposes of simplicity, we can divide the literature into two camps on this question: manpower skeptics and manpower optimists. Manpower skeptics typically make one of three arguments.

One variant of manpower skepticism states that if counterinsurgents exceed a certain force size, then their effectiveness will begin to decline. The basic idea is that when there are too many troops employing too much force, they generate resentment among the local population and exacerbate the political problems at the heart of the insurgency.[12] In addition, incumbents that rely too heavily on military means for suppressing their opponents may fail to develop the basic structures of good governance and political legitimacy on which long-term stability depends. This argument is especially significant for military planners and strategists. It cautions decisionmakers against being too sanguine about the military's role in counterinsurgency. But if counterinsurgency is not a labor-intensive activity, then it is feasible to imagine conducting it, possibly in several places at once, without placing undue strain on the armed forces.

A second variant of manpower skepticism holds that higher troop levels may not undermine counterinsurgency, but that the returns to additional deployments diminish sharply when they pass a certain point. According to this argument, the utility of military force is limited, and counterinsurgents only need a certain amount of manpower to achieve it. This is therefore not just a view about the slope of the relationship between manpower and success, it is also a claim about its shape (and in particular, the notion that the relationship becomes concave at relatively low force levels.) This argument has ambiguous implications for theory and strategy: the feasibility of a given mission depends on the point where decisionmakers assume that returns begin to diminish. It is therefore important to know whether force size *does* have a concave relationship with military success – and if so, where we should expect the curve to flatten out.[13]

The third variant of manpower skepticism only applies to foreign soldiers: they are the ones who are most likely to enflame hostilities with the local population, and they are the ones who are most likely to prevent the host nation from developing functional institutions. In fact, subscribers to this argument often believe that foreigners should prioritize training and expanding the number of indigenous counterinsurgents. And this provides an additional implication for defense planning and strategy: the United States and its allies should focus on developing a "training corps" for the express purpose of putting competent, indigenous forces into the field as quickly as possible.[14]

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[12] The importance of a "light footprint" is often associated with the "British school" of counterinsurgency: see, e.g., *Journal of Strategic Studies*, Vol. 32, No. 3.

[13] On the importance of diminishing marginal returns for military planning, see Hans Binnendijk and Stuart Johnson eds., *Transforming for Stability and Reconstruction Operations* (Washington, DC: Center for Technology and National Security Policy, 2003): 37.

[14] See, e.g., Nagl, *Institutionalizing Adaptation* (Washington, DC: Center for a New American Security, 2007).

At the same time, many scholars and practitioners are not manpower skeptics. In particular, they claim that larger forces are better able to protect large populations. This issue receives particular emphasis in FM 3-24, which states "COIN is manpower intensive because counterinsurgents must maintain widespread order and security" (para. 1-68 cf. 1-131, 1-129, 1-149). Larger forces may also be more able to provide the local population with essential services; as a result, they may gain more legitimacy in the AO. Larger forces may be able to devote more effort to gathering information from the population, which will help them to locate and destroy the hard-core opposition.[15] Finally, larger deployments may generate a "demonstration effect" of the counterinsurgent's capabilities and commitment to the conflict, which may be important for swaying the population's loyalty.[16] For all of these reasons, larger forces may be able to apply violence in a more discriminating manner, based on better intelligence, more local support, and increased situational awareness.[17] As a result of doing so, they may be more effective.

Nevertheless, important questions remain. The returns to additional deployments could be strictly increasing, but they might also diminish. Conversely, force size might produce increasing marginal returns at certain levels, in which case the implications for theory and strategy would be very different. And of course, it is possible that the relationship between force size and counterinsurgents' success is mostly linear, with additional troops providing the same "bang for the buck" in most circumstances.

In these ways and more, the debate between manpower skeptics and manpower optimists can be broken down into disagreements about the sign, magnitude, and shape of the relationship between manpower and success in counterinsurgency. This discussion indicates that the question of whether "bigger is better" entails three main components: Is the relationship between force size and success increasing or decreasing? Is the relationship concave, convex, or linear? and Is the relationship different for foreign versus indigenous fighters? These are all testable questions that have important implications for theory and for practice. But again, the existing literature provides almost no way to assess these questions in a systematic manner.

The threshold concept

Perhaps the most significant claim about the role of manpower in counterinsurgency is the argument that there exist certain thresholds for force sizing that are particularly important. In this view, there is a dividing line between missions that are "properly resourced" and those that are not. Counterinsurgents should take care to be on the correct side of this line.[18]

This is perhaps the most important – and controversial – element of FM 3-24's discussion of manpower in counterinsurgency. The Manual states that a troop density of 20 counterinsurgents per 1000 inhabitants in the AO is typically seen as the "minimum" force requirement that can achieve

[15] See, e.g., Roger Trinquier, *Modern Warfare* (New York: Praeger, 1961); Stathis N. Kalyvas, *The Logic of Violence in Civil War* (New York: Cambridge University Press, 2006); FM 3-24 paras. 1-124, 1-126.
[16] See, e.g., Galula, *Modern Warfare*: 82; Joes, *Resisting Rebellion*: 234; FM 3-24 para. 1-134.
[17] See, e.g., Joes, *Resisting Rebellion*: 234; Dobbins et al., *America's Role in Nation-Building*: xxv; FM 3-24 paras. 1-150, 1-151.
[18] This language is prominent, for instance, in General McChrystal's 2009 report to the president recommending that additional forces be sent to Afghanistan. To quote: "[I]nadequate resources will likely result in failure.… A 'properly-resourced' strategy is imperative. Resourcing coalition forces below this level will leave critical areas of Afghanistan open to insurgent influence.… Failure to provide adequate resources also risks a longer conflict, greater casualties, higher overall costs, and ultimately, a critical loss of political support. Any of these risks, in turn, are likely to result in mission failure."

success. And in general, much of the literature on force requirements for counterinsurgency revolves around various "rules of thumb" for knowing what constitutes a "properly resourced" mission. Some of these heuristics are based on tie-down ratios: Thomson recommends 10 soldiers per insurgent and Joes recommends 20 soldiers per insurgent. Other proposed thresholds are based on troop density: for instance, Quinlivan, Kagan, O'Hanlon, Sepp, Kuperman, Dobbins, FM 3-24 and many others all suggest a troop density of about 1-to-50.[19]

So as not to misrepresent the literature, it is worth making clear that almost every proponent of these rules of thumb warns that force requirements for individual cases should be based on specific factors, and that the thresholds should not be taken as natural laws. But are they useful at all? Is there any empirical evidence indicating that a troop density of 1-to-50 or anything else is a reasonable benchmark for the theory and practice of counterinsurgency?

In the current literature, arguments supporting various rules of thumb are typically based on analyzing several case studies at a time. Two of the most prominent works are James Quinlivan's article "Force Requirements in Stability Operations" (*Parameters*, 1995/96) and a 2003 RAND study lead-authored by James Dobbins.[20] The Quinlivan paper is based on six cases that "portray a range of situations, from enforcing the laws in a generally ordered society to situations of maintaining order where the rule of law has collapsed."[21] From these cases, Quinlivan argues that counterinsurgents may often require more than ten members of the security forces for every thousand inhabitants they aim to protect. In an updated version of this work, published by RAND in 2003, Quinlivan added an analysis of US operations in Bosnia, Kosovo, Somalia, and Haiti. He concluded that "successful strategies for population security and control have required force ratios either as large as or larger than 20 security personnel (troops and police combined) per thousand inhabitants."[22]

The Dobbins report examines seven case studies of "America's role in nation-building": Germany, Japan, Somalia, Haiti, Bosnia, Kosovo, and Afghanistan. The key charts in the report (on pp. xvii and 150-51) show that successful missions in the Balkans began with roughly 20 soldiers per 1000 inhabitants in the area of operations, while unsuccessful missions in Haiti and Somalia had about a quarter of that number. The 20/1000 ratio is then taken as a yardstick for best practices and for assessing the U.S. presence in Iraq.[23]

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[19] See the citations in note 5. It is important to point out that the scope of these studies is not necessarily the same - Quinlivan's paper focuses on "stability operations"; Dobbins et al. and Jones et al. examine "nation-building"; Thomson, Joes, and Galula study "counterinsurgency" – and so their recommendations may differ in many ways simply as a function of different units of analysis. The Institute for Defense Analyses (Kneece et al., *Force Sizing for Stability Operations*) recommends a troop density threshold of roughly 40 troops per 1000 inhabitants in the AO. However, this recommendation is not based on the notion that the odds of success markedly increase at this level of force size – the recommendation is based on the predicted probabilities generated from a logistic regression which indicate that counterinsurgents with this size deployment win roughly 75% of the time.

[20] A third, related report is John J. McGrath, *Boots on the Ground: Troop Density in Contingency Operations* (Ft. Leavenworth, KS: Combat Studies Institute Press, 2006), which examines seven case studies and recommends 13 troops per 1000 inhabitants in the AO.

[21] These are: the UK in Malaya and in Ulster, the United States in the Dominican Republic and in Germany, the UN in Cambodia, and India in Punjab.

[22] Quinlivan, "Burden of Victory."

[23] The authors write, "It is unlikely that Iraq would get the same per capita level of international troops, police presence, or foreign aid that Bosnia and Kosovo did. Nonetheless, lessons should also be drawn from the British experience… of seeking to secure Iraq on the cheap"(p.194). And later, "Figure 10.1… indicates that, if Kosovo levels of troop commitment are used, some 526,000 foreign troops would need to be deployed through

To repeat, these authors include specific caveats that these thresholds are "suggestive rather than definitive" and that "numbers alone do not constitute a successful counterinsurgency strategy." Nevertheless, their work has been extremely influential, to the point where the 20/1000 ratio is explicitly mentioned in official U.S. military doctrine. If these types of thresholds are to form any part of the foundation for military operations and planning, then they deserve to be specified and tested more directly and systematically. A definitive account of troop thresholds – and of whether the concept is relevant at all – is exactly what we should be aiming for.

Is manpower decisive?

Finally, the most important substantive question about manpower is whether or not it makes an important contribution to counterinsurgency outcomes on the whole. To some extent, FM 3-24 declines to answer this question, stating that there is a recommended minimum troop density but not saying what happens when that threshold is not met (or when it is exceeded). But estimating manpower's marginal impact is a key element of important debates about military policy and strategy. Assessing the wisdom of sending additional troops to Afghanistan in 2009 (or beginning to withdraw them in 2011) largely turns on assumptions about whether adjusting force size up or down by a certain amount will make a significant impact on the overall odds of achieving a successful outcome.

This paper will therefore try to distinguish between statistical significance and substantive significance. Just because a relationship is consistent does not mean that it is an important determinant of success in counterinsurgency, and when it comes to informing theory and policy, substantive significance is generally what we care about the most. To the extent that it is possible to make causal inferences from observed data across a diverse range of cases, this paper will attempt to do so.

This paper therefore has a wide and predominantly empirical scope, aiming to provide baseline evidence about a range of important questions. The paper concludes with a brief discussion of how the findings in this paper can inform the way scholars and practitioners think about "rules of thumb" in military doctrine more generally. The paper does not, however, advance any new theory about the role of manpower in counterinsurgency per se, and this choice is an appropriate response to the current state of the research program on manpower in counterinsurgency.

As this section has aimed to demonstrate, the deductive framework behind military doctrine is already well-developed. Ideas about the role of manpower in counterinsurgency have been accumulating for more than half a century. But while the debate revolves around many ideas, it lacks empirical foundations. Scholarship has yet to produce even descriptive statistics or stylized facts about counterinsurgent force sizes outside a relatively small subset of modern experience. The main goal of this paper is to begin filling this important gap, and the following section describes the data and the research design used to do so.

2. Data

While this is hardly the first analysis of force sizes in counterinsurgency, it is the first attempt at studying the role of manpower across a comprehensive array of modern conflicts. In particular, the goal is to assess the full case universe with the full range of variables needed to evaluate the basic

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2005. At Bosnian levels, this figure would be roughly 258,000 by 2005; approximately 145,000 international troops would still be required to ensure security at Bosnia levels through 2008"(p.197).

theoretical propositions in the scholarly literature and the main manpower recommendations in FM 3-24. Doing so requires a new data set, and this section explains how those data were gathered.

To be specific, this paper examines 171 insurgencies since World War I: the universe of cases that, according to Lyall and Wilson, constitutes the "modern period" of counterinsurgency.[24] Across this universe of cases, this paper adds new data on: the number of counterinsurgents deployed in each campaign; the breakdown between foreign and indigenous counterinsurgents; the size of the area of operations (AO) in square kilometers; the population of the AO; and insurgent force size. Data on these factors across this range of cases simply do not exist elsewhere in the published literature.

These data are based on a wide variety of sources. These include previously published quantitative analyses[25] as well as prominent anthologies or almanacs on armed conflict, demography, and counterinsurgency.[26] But much of the data comes from military histories and case studies of individual conflicts. In total there are more than 400 individual sources cited in the data set. Where possible, each coding decision was cross-checked using multiple sources. For purposes of replication and additional analysis, the data set contains citations including each source that was used in each specific coding decision, along with a summary of the information that each source provided. The appendix describes each of the variables used in this paper, and Section 4 addresses several criticisms of the data and the research design. Nevertheless, it is important to address a few aspects of the data before moving to the empirical analysis.

First, the dependent variable for this study is Lyall and Wilson's coding of whether the counterinsurgent won the war. They write:

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[24] Jason Lyall and Isaiah Wilson III, "Rage against the Machines: Explaining Outcomes in Counterinsurgency Wars," *International Organization* 63, no. 1 (Winter 2009). There are actually 173 cases in the "modern period" of Lyall and Wilson's data set, but two were dropped from this analysis: For the Belgian defense of Rwanda (1956-62) it is difficult to distinguish between insurgents and counterinsurgents, since the Belgians supported the transition to Hutu rule. For China's campaign in Tibet in 1918, it was difficult to find reliable data on the number of forces deployed. The rest of Lyall and Wilson's case universe is included in the data set. Lyall and Wilson (p.70) provide the following rule for inclusion in their data set: "An *insurgency* is defined here as a protracted violent struggle by nonstate actors to obtain their political objectives—often independence, greater autonomy, or subversion of existing authorities—against the current political authority (the incumbent). Two rules for defining a case were chosen: First, we imposed a minimum 1,000 battle death inclusion rule, with at least 100 casualties suffered on each side. Second, the nonstate actor must have adopted a guerrilla warfare strategy. Here, *guerrilla warfare* is defined as a strategy of armed resistance that (1) uses small, mobile groups to inflict punishment on the incumbent through hit-and run strikes while avoiding direct battle when possible and (2) seeks to win the allegiance of at least some portion of the noncombatant population. An insurgency is therefore not synonymous with "civil war" since civil wars can be fought conventionally (that is, with direct battles between opposing armies), with guerrilla tactics, or through nonviolence."

[25] For instance, David E. Cunningham et al., "Non-State Actor Data," (online at author's website) provide data on rebel force size for some conflicts; Valentino et al., "Draining the Sea: Mass Killing, Genocide, and Guerilla Warfare," *International Organization* 50, no. 4 (Spring 2004) include data on the population of the AO for some conflicts; Patricia L. Sullivan and Michael T. Koch, "Military Intervention by Powerful States," *Journal of Peace Research* 46, no. 5 (September 2009) provide information on troop commitments by great powers for some conflicts.

[26] For instance, Micheal Clodfelter, *Warfare and Armed Conflicts* (Jefferson: McFarland, 2008), D. M. Condit et al, *Challenge and Response in Internal Conflict* (Washington, DC: American University, 1957-58), and Robert B. Asprey, *War in the Shadows* (London: Little, Brown, 1975) are excellent general resources; Brian R. Mitchell, *International Historical Statistics* (New York: Palgrave, 2007) and Saul B. Cohen, *The Columbia Gazetteer of the World* (New York: Columbia University Press, 2008) are reliable resources for demographic and geographic information.

> A win occurs when the insurgency is militarily defeated and its organization destroyed or the war ends without any political concessions granted to insurgent forces. Examples include Argentina's defeat of the ERP (1973-77)… and the crushing of the Huk rebellion in the Philippines (1946-51). (Lyall and Wilson, "Rage against the Machines": 71.)

Under this definition, Lyall and Wilson determined that the counterinsurgents won 62 of the 171 wars in the modern period (36%).

The ideal dependent variable for a study of counterinsurgency outcomes would be continuous: perhaps measuring "political concessions" or "organizational destruction" in a way that captures finer degrees of variation than yes or no. Lyall and Wilson do have an additional outcome coding for "draws" that is incorporated into robustness checks in Section 4 – but beyond that, a fine-grained treatment of outcomes does not yet exist in the current literature. (At least, not one that is commonly accepted.) And given the wide diversity of counterinsurgents' political and military objectives across time and space, it is difficult to know how they could be disaggregated and compared.

Moreover, the definition of success used in this paper is not far from the stated aims of Coalition forces in Iraq and Afghanistan, and it is the key issue for military operations and defense planning more broadly. Can the United States and its allies roll back the threat from forces like the Taliban and Al Qaeda with military means? Or will we be forced to tolerate their presence and even to make political concessions?[27] That is exactly what the dependent variable captures in this paper.

A second aspect of the data worth addressing up front is that all of the variables on force sizes and areas of operations are set to their maximum observed values during the campaign. For instance, the "number of counterinsurgents" is the largest number of soldiers assigned to participate in the war at any one time. (Though it does *not* include members of the counterinsurgent's army who were not involved in the fighting, nor does it include supporters of the insurgency who did not take up arms – see the appendix for more information.)

Setting force sizes to their maxima means that the data used in this paper do not capture variation in troop levels within conflicts. Indeed, in some cases, these changes can be large. For instance, the French counterinsurgency campaign in Algeria began in 1954 with roughly 61,000 counterinsurgents. By 1960, this force had expanded to nearly half a million.[28]

That being said, most fluctuations in counterinsurgent force size occur early in the conflict. Almost all of the French reinforcements to Algeria, for instance, arrived in the first two years. And after reinforcements arrive, troop levels often remain fairly stable: The British presence in Northern Ireland grew from 3,000 to 23,000 between 1968-72 but then remained essentially unchanged for 25

[27] This is a fundamental issue in the literature on grand strategy – in particular, whether the United States and its allies sustainably maintain a policy of militarily confronting its enemies, and if so, whether its goal should be to contain those enemies or to destroy them. See, e.g., Thomas P. M. Barnett, *The Pentagon's New Map* (New York: Penguin, 2005), Stephen Biddle, *American Grand Strategy after 9/11* (Carlisle, PA: Army War College, 2006); Philip H. Gordon, *Winning the Right War* (New York: Henry Holt, 2007); Ian Shapiro, *Containment* (Princeton: Princeton University Press, 2007); Michele A. Flournoy and Shawn Brimley eds., *Finding Our Way* (Washington, DC: Center for a New American Security, 2008); Melvyn P. Leffler and Jeffrey W. Legro eds., *To Lead the World* (New York: Oxford University Press, 2008).

[28] Yoav Gortzak, "Using Indigenous Forces in Counterinsurgency Operations: The French in Algeria, 1954-1962," *Journal of Strategic Studies* 32, no. 2 (2009): 308; Martin S. Alexander and J. F. V. Keiger, "France and the Algerian War: Strategy, Operations, Diplomacy," *Journal of Strategic Studies* 25, no. 2 (2002): 14; Anthony Clayton, *Frontiersmen: Warfare in Africa Since 1950* (London: UCL Press, 1999): 24; Edgar O'Ballance, *The Algerian Insurrection, 1954-62* (London: Faber and Faber, 1967); Condit et al., *Challenge and Response*, vol. 2: 189. See the data set for annual figures.

years;[29] combined U.S.-Vietnamese forces climbed from 100,000 to 1.2 million between 1962-66, but then remained roughly constant until the United States began major withdrawals in 1972;[30] combined Soviet-Afghan security forces rose from 90,000 to 120,000 between 1979-80, but did not meaningfully change until the Soviet evacuation in 1989.[31]

This is not to say that temporary surges in troop levels are not common across counterinsurgencies. They are, and their effects deserve to be studied in more depth.[32] But in general, within-conflict variation in force levels is relatively small compared to the difference in force sizes across wars in the data set. For instance, the U.S. troop surge in Iraq entailed the addition of 30,000 troops. This was about a twenty percent increase in American forces, and a ten percent increase in the total number of counterinsurgents, including Iraqis.[33] Even if the Surge included an expansion of the Iraqi Security Forces by 100,000, and the recruitment of another 100,000 "Sons of Iraq," it would have brought the counterinsurgency from a troop density of roughly 15 troops per 1000 Iraqis to 25 troops per 1000 Iraqis. By contrast, there were more than 100 American and local forces per 1000 people in South Vietnam in the 1970s. The change in force levels during the Surge is only a fraction of the variation across campaigns the United States has waged.

The variables used in this study thus represent a reasonable way of capturing counterinsurgents' deployments and success. And from a theoretical standpoint, these variables capture what we care about the most. When counterinsurgents are fully committed to counterinsurgency – when they have deployed their resources to the extent of their capacity and political will – what determines whether they succeed or fail? Section 3 will now examine the role that manpower has played in this equation since the end of World War I.

3. Empirics

The first empirical task in this paper is simply to figure out the proper way to count troops. Should force size be measured relative to square kilometers, to insurgents, or to the population in the area of operations?

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[29] Rod Thornton, "The British Army and the Origins of its Minimum Force Philosophy," *Small Wars and Insurgencies* 15, no. 1 (2007): 75-83; Caroline Kennedy-Pipe and Colin McInnes, "The British Army in Northern Ireland," *Journal of Strategic Studies* 20, no. 2 (2007): 12; Sullivan and Koch, "Military Intervention by Powerful States"; Quinlivan, "Force Requirements in Stability Operations"; Clodfelter, *Warfare and Armed Conflicts*: 578. See the data set for annual figures.

[30] R. Ernest Dupuy and Trevor N. Dupuy, *The Harper Encyclopedia of Military History* (New York: HarperCollins, 1993); Clodfelter, *Warfare and Armed Conflicts*. See the data set for annual figures.

[31] Jones, *In the Graveyard of Empires* (New York: W. W. Norton, 2009): 26-36; Clodfelter, *Warfare and Armed Conflicts*: 648; Joes, *Modern Guerilla Insurgency* (Westport: Praeger, 1992): 174; David C. Isby, *War in a Distant Country* (London: Arms and Armour, 1992): 81; Ian F. W. Beckett, *Modern Insurgencies and Counter-Insurgencies* (New York: Routledge, 2001): 210; Scott R. McMichael, *Stumbling Bear: Soviet Military Performance in Afghanistan* (New York: Brassey's, 1991):13. See the data set for annual figures.

[32] Panel data could be useful for this purpose, but it would face two main challenges. The first is data availability – reliably estimating troop density fluctuations within campaigns would be far harder than determining their maxima, especially if the researcher allowed for variation in force size *and* the area of operations. The second challenge is determining and coding an appropriate dependent variable that would capture intra-conflict variations in counterinsurgents' effectiveness, especially since this measure would need to be valid across the full range of conflicts in the data set. There is no reason to believe these challenges are insurmountable, but addressing them would make for a much more complicated (and much different) empirical project.

[33] The 2006 *Military Balance* (London: International Institute for Strategic Studies): 166 reported 240,000 Iraqi Security Forces and 135,000 U.S. personnel.

One way to approach this question is to see which measure most closely correlates with counterinsurgency outcomes. Perhaps the data will demonstrate that one measure is more relevant than the others from a statistical standpoint – and Table 1 shows that this is indeed the case.

[Table 1]

Table 1 contains the results of four probit regressions: each row presents a separate regression of outcomes on a different measure of force size. The left column presents the coefficient and standard error on force size in a univariate regression. The right column presents the coefficient and standard error on force size when accompanied by several control variables.[34]

According to these models, neither aggregate forces nor troops per square kilometer are statistically correlated with counterinsurgency outcomes. Tie-down ratios (troops per insurgent) only reach statistical significance when accompanied by controls. Meanwhile, force size as measured by troops per inhabitant in the area of operations demonstrates a consistent, positive correlation with counterinsurgents' success in both univariate and multivariate regressions. Troop density also has an advantage over the alternative measures in terms of model fit.[35]

This suggests that troops-per-inhabitant is the best way to measure force size in most cases.[36] Moreover, these regressions generate an additional theoretical insight. If troop density is positively related to counterinsurgents' success, then the empirical evidence runs counter to some of the manpower skeptics. Light footprints do not appear to be more successful.[37] Across the modern period of counterinsurgency, manpower appears to have made a positive contribution on the whole. But what is the shape of this relationship?

Figure 1 plots troop density on the x-axis, and the success rate for all counterinsurgents with at least that many forces on the y-axis. The relationship is remarkably linear.[38] This casts doubt on the

[34] Control variables include the four variables from Lyall and Wilson's paper that were statistically significant across the modern era. These are: a dummy indicating whether the counterinsurgent was a foreign "occupier"; an ordered variable indicating the extent to which the insurgents received support from a third party; an ordered variable capturing the degree to which the counterinsurgents' forces were "mechanized"; and the counterinsurgents' POLITY score. See the appendix for more detail on these variables, along with Lyall and Wilson, "Rage against the Machines": 88, 89, 93.

[35] In univariate regression, here are the McFadden's R^2, McKelvey and Zavoina's R^2, and Efron's R^2 terms for each variable: troops (.01, .03, .01); troops per square kilometer (.00, .00, .00); troops per insurgent (.01, .02, .08); and troops per inhabitant (.06, .31, .08). In multivariate regression, it is appropriate to use the Akaike Information Criterion, which calculates model fit while introducing a penalty for overfitting. Lower AIC scores indicate better model fit. The respective AIC scores for models including each variable with controls are: troops (1.23), troops per square kilometer (1.23), troops per insurgent (1.21) and troops per inhabitant (1.14). Troop density outperforms the alternative specifications on measures of McFadden's R^2, McKelvey and Zavoina's R^2, and Efron's R^2 in these multivariate models as well.

[36] Though its advantage over tie-down ratios is not as stark as some people claim. See, e.g, Richard L. Clutterbuck, *The Long, Long War* (New York: Praeger, 1966): 42-43: "Much nonsense is heard on the subject of tie-down ratios in guerilla warfare…. This is a dangerous illusion, arising from a disregard of the facts."

[37] Table 4 will show that this holds true for both foreign and indigenous counterinsurgents.

[38] Estimating this relationship using cubic splines, LOWESS curves, or local polynomial smoothing techniques produces a pattern that is essentially the same: none of them indicates that there are any prominent thresholds for sizing forces, nor that the odds of success climb dramatically in response to changes in force size. The main difference in employing these techniques is that they emphasize how counterinsurgents with troop densities between 40 and 75 troops per 1000 inhabitants in the AO (n=23) underperform in comparison to the rest of the data. This is an issue discussed in both Figure 2 and Section 4. None of these techniques indicates that there are any prominent thresholds for sizing forces: specifically, there is no point in the distribution where marginal increases lead to marked jumps in the probability of counterinsurgent success.

notion that there is any meaningful threshold for sizing forces. The threshold of 20 troops per 1000 inhabitants that is recommended in Field Manual 3-24 does not appear to be compelling: since World War I, less than 40 percent of counterinsurgents meeting that threshold have defeated the insurgents without making political concessions. The relationship is also remarkably flat. Counterinsurgents with a troop density of at least 80 troops per 1000 inhabitants were less than twice as likely to succeed as counterinsurgents with force sizes that were an order of magnitude lower.[39]

[Figure 1]

Figure 1 suggests that a great deal of conventional wisdom and military doctrine is substantially out of line with historical patterns. Nevertheless, it is worth examining the implications of this figure in closer detail. One way to examine the functional form of the relationship between force size and effectiveness is to plot the model's residuals (actual outcomes minus predicted probabilities of success). If the residuals are positively related to force size, this suggests that manpower has increasing marginal returns. If the residuals are negatively related to force size, this suggests that manpower has decreasing marginal returns. But as Figure 2 shows, the residuals are fairly consistent across a wide range of deployments.

Figure 2 plots the relationship between troop density on the x-axis and residuals on the y-axis, using locally-weighted scatterplot smoothing.[40] The smoothed curve is a useful tool for capturing the basic "shape" of the residuals, and it produces three main insights. First, it suggests that deployments at very low levels (<5 troops per 1000 inhabitant) have relatively high increasing marginal returns – this is demonstrated by the fact that the model underestimates the probability of success at this part of the distribution. Second, the curve suggests that counterinsurgents with troop densities between 40 and 75 soldiers per inhabitant have underperformed relative to the rest of the population. The dip in the curve is not large – average residuals in this region still have a magnitude less than 0.1 – and this may correspond to the fact that this part of the distribution contains a disproportionate number of colonial campaigns.[41] Finally, the curve indicates that despite some local irregularities, the overall relationship between manpower and success in counterinsurgency is fairly constant. It is striking to note that the average residuals are so close to zero at troop densities that differ across orders of magnitude.[42]

[Figure 2]

Figure 2 suggests that counterinsurgency outcomes are not particularly sensitive to force sizing "thresholds", but it is still worth testing that proposition in more detail. To do this, Table 2 presents the results of testing ten different thresholds between 5 and 50 troops per 1000 inhabitants in the area of operations. Each potential threshold is tested using a probit regression on three variables: a dummy for whether the counterinsurgent met the threshold; troop density; and an interaction term between the two. The dummy variable indicates whether the probability of success jumps up at any point along the distribution. The interaction term would be significant if the slope of the relationship

[39] The x-axis is bounded at 80 troops per 1000 inhabitants because there is only one counterinsurgent in the data set with a troop density between 80 and 115.

[40] The right side of the distribution is bounded at 160 troops per 1000 inhabitants, because there are only three observations between that point and 290 troops per 1000 inhabitants. Extending the range of the plot to this point would mask the drop in performance in the middle of the distribution and make the relationship seem more consistent than it really is.

[41] At the same time, this could simply be the result of a small sample size, since there are only 23 observations in the range.

[42] Another way to test the functional form of this relationship is to use polynomial terms: but neither a second-order nor a third-order term for troop density approaches statistical significance when added (either individually or together) to any of the regressions in Table 1, or in Table 4 below.

were to change significantly after passing that threshold. Table 2 reports the coefficients and standard errors for all ten thresholds and all ten interactions terms, and none of them is statistically significant at the $p<.05$ level.[43]

[Table 2]

What about the performance of foreign versus indigenous troops? Table 3 disaggregates counterinsurgents by nationality. It shows the results of a probit model in which the troop density of foreign soldiers and indigenous soldiers are separate predictors of success.[44] Since the definition of "foreign" is arguable, it is operationalized it in two different ways. Under the first coding, troops are "foreign" if they do not come from the same nation-state as the insurgents. The second coding also considers troops to be "foreign" if the rebels are trying to secede, because this might capture the same theoretical dynamics of occupation that is supposedly problematic. Table 3 examines each coding with and without control variables, and presents the coefficients and standard errors for each troop density variable.

In all four regressions, indigenous troops have a higher coefficient than foreign forces. At the same time, the coefficient on indigenous troop density varies substantially, and it misses statistical significance in one of the models. This pattern implies that indigenous counterinsurgents are on balance more effective, but also less consistent, than their foreign counterparts.[45]

[Table 3]

Finally, we can address the question of whether manpower is a powerful determinant of counterinsurgency outcomes. Just because a variable is statistically significant does not mean it is substantively significant. And the results in Table 4 suggest that this may be the case here. Model 1 is the univariate regression of outcomes on troop density with no controls; Model 2 adds controls from Lyall and Wilson (2009); Model 3 adds additional controls based on data gathered for this project; Model 4 combines all of the controls that satisfied a standard of $p<.10$ in Models 2 and 3. (See appendix for description of each variable.)

[Table 4]

The coefficient on troop density varies across these models from roughly three to five; taking standard errors into account, the coefficient is likely to be between two and six. We can treat these bounds as the "skeptical" and "optimistic" values, and then use them to estimate the substantive impact of changing troop levels.

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[43] Moreover, the $p=.05$ standard is inappropriate for testing so many hypotheses at once: Bonferroni's inequality indicates that this standard should be adjusted to $p=.0025$ because Table 2 is testing 20 separate hypotheses at once, increasing the chances that one will be supported by spurious variation in the data. When every threshold dummy and every interaction term is combined (along with troop density) in a single multivariate regression, there is one threshold (35 troops per 1000 inhabitants in the AO) with a positive coefficient that meets a Bonferroni-adjusted standard for statistical significance. However, the term for the interaction of this threshold and troop density is negative, and it is so large (close to -2,000) that it drowns out the dummy's substantive impact.

[44] Perhaps surprisingly, these variables are not correlated in a very consistent way. Their correlation coefficient is in fact weakly negative (-0.05 under the first coding and -0.09 under the second coding). Even if observations are limited to cases where the number of foreign counterinsurgents is greater than zero, the correlation coefficient is -0.10 for both codings.

[45] The same pattern holds when restricting the model to cases where the number of foreign insurgents is greater than zero. In fact, the pattern becomes more pronounced: the gap in coefficients widens, but the coefficient on indigenous troop density becomes less statistically significant. This suggests that foreign states may be more likely to intervene in wars that are less challenging on the whole, a topic discussed in Section 4.

Figure 3 represents the "typical" counterinsurgency, in which every variable in Model 4 is set to its median.[46] Having done that, the Figure shows what happens when troop density varies between 5 and 80 troops per 1000 inhabitants in the area of operations. For each force size, Figure 3 generates a new predicted probability of success in both the optimistic and the skeptical cases.

The predictions in Figure 3 do not support the notion that manpower is a decisive factor in determining counterinsurgency outcomes. As force size increases from 5 to 80 troops per 1000 inhabitants in the AO, the predicted probability of success rises by less than fifteen percentage points. And this troop increase is more than an order of magnitude – vastly larger than the Surge in Iraq, the McChrystal Plan for Afghanistan, or what is feasible for counterinsurgents in most areas of operations.

[Figure 3]

Readers should interpret these results cautiously. These results demonstrate general historical patterns that do not apply equally to all cases. It is perfectly plausible that the insurgencies in Iraq, Afghanistan, or anywhere else represent special instances whose dynamics are substantially different from the 171 campaigns this paper analyzes since World War I. This paper demonstrates general historical trends across those campaigns, and even this kind of analysis has several important potential drawbacks. Several of these are addressed in the following section.

4. Robustness checks and force employment

The most important methodological issue in the paper is the selection effect: if we think counterinsurgents send more troops to fight wars that are more difficult, then we would expect the perceived effect of manpower to be small. It is possible that the selection effect is driving the findings in the previous section, making force size seem much less important than it really is.

Selection effects recur throughout empirical analyses in security studies. One approach to the problem is to use instrumental variables; but in this case, it is hard to imagine instruments that would be valid enough and powerful enough to determine manpower's impact in a credible way.[47] Another

[46] These values correspond to a moderate level of mechanization (mech=2), the counterinsurgent not being an occupier (occ=0), the insurgent receiving either sanctuary or military assistance (support=1), the insurgents fighting for ethnic or religious issues (identity=1), the insurgents having a force size of 12,000, and the counterinsurgents consisting of 100% indigenous forces. The substantive results in Figure 3 do not change if the variables are instead set to their means, maxima, or minima – doing so adjusts the baseline probability of success, but not its responsiveness to troop density.

[47] For example, one suggestion for an instrument could be the counterinsurgent's regime type, especially given that Lyall, "Do Democracies Make Inferior Counterinsurgents?" *International Organization* 64, no. 1 (Winter 2010) found this variable to be uncorrelated with counterinsurgency outcomes. There are two problems with using this instrument, however. The first is that regime type is a weak predictor of force size – the correlation coefficient between POLITY score and troop density is -0.03 and the relationship is far from being statistically significant (in a univariate ordinary least squares regression, for instance, its p-value is roughly 0.7). Second, even though counterinsurgents' POLITY score is not correlated with outcomes in a probit analysis per se, it appears that anocracies (states with POLITY scores between -6 and +6) are significantly less likely to win counterinsurgency wars (cf. Fig. 7d). A potentially bimodal relationship between regime type and strategic outcomes does not necessarily challenge Lyall's main finding, but it casts doubt on the idea that regime type would be theoretically valid, even if it were not a weak instrument. In general, structuring the analysis here around instruments would lead to a very different paper, and one that would need to spend a large amount of space defending the instruments' validity. This would be a valuable task; but given that the goal of this paper is

common approach is to use matching techniques; but these are not well-suited to a project with a continuous variable of interest.[48] A third approach is a Heckman correction; but in this data set, there are no examples of insurgencies without counterinsurgents. In this context, the best approach may be to acknowledge the selection problem; theorize about how it may affect the empirical findings; and try to get a sense of how much of a difficulty it poses for interpreting those results.

From a theoretical standpoint: it is perfectly plausible that the selection effect makes manpower appear to be less effective than it really is – but there is no reason why this would necessarily drive the shape of the relationship between force size and effectiveness. In many ways, the shape of this relationship is important in and of itself, because it runs counter to the threshold models that are so prominent in the conventional wisdom and in FM 3-24.[49]

From an empirical standpoint: selection effects are only a problem if counterinsurgents actually send more troops to fight more difficult campaigns. This is a hypothesis like any other, and it deserves direct testing. One way to approach this is to create an index of "difficulty," representing the predicted probability that counterinsurgents will fail to win a given war. A straightforward method for constructing such an index is to use Lyall and Wilson's main model for "explaining outcomes in counterinsurgency wars" in the modern period.[50] Based on this index, we can see whether force size is indeed positively related to the "difficulty" of each campaign.

The relationship between troop density and this index of difficulty is in fact weakly negative (the correlation coefficient is -0.07) and this holds true when the index is specified in several alternative ways.[51] This suggests that counterinsurgents might actually be *less* likely to send forces to fight difficult campaigns. And there are many reasons to think this is plausible. Empirical work has shown that foreign powers are less likely into intervene in conflicts that are more intense; civil wars are more likely to occur in weak states, where the government will have a difficult time fielding a large army.[52]

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to establish basic empirical foundations to support a wide range of debates, the use of instruments or other econometric techniques is appropriate for future work.

[48] Matching techniques with continuous treatments are difficult to design or to implement, and they can be sensitive to assumptions. The theoretical literature on this method is relatively new – see, e.g., Kosuke Imai and David A.van Dyk, "Causal Inference with General Treatment Regimes," *Journal of the American Statistical Association* 99, no. 467 (September 2004) and there are few examples of it being implemented in applied work. This could be another valuable topic for follow-on study; but as with employing instrumental variables, it is not suited for a paper designed to establish basic empirical foundations for future work.

[49] In theory, it is possible that threshold effects exist, but that they vary in an essentially uniform distribution across campaigns. If true, this might conceivably be driving the linear patterns in Section 3. At the same time, it would be quite remarkable if these thresholds were indeed distributed so uniformly. And if this is the case, then it is *still* an argument against adopting a fixed "rule of thumb" for force sizing like the one in FM 3-24.

[50] Lyall and Wilson 2009: 88, Model 4. The variables are counterinsurgent regime type, insurgent's material support, per capita energy consumption, whether the counterinsurgent is an occupier, the logged elevation of the AO, the distance of the AO from the incumbent's capital, and whether the conflict took place during the Cold War.

[51] Similarly, the correlation coefficients between difficulty and troop density are negative using a logit model with only those variables that Lyall and Wilson find significant (-0.01); using Lyall and Wilson's Model 6 which includes mechanization and drops the Cold War dummy (-0.06); and using only the variables that Lyall and Wilson find significant in Model 6 (-0.06). This is not to say that it would be impossible to construct an index of difficulty that is positively related to troop density – only that there is evidence to suggest that the correlation may actually run in the opposite direction, that this correlation is not particularly strong, and that the findings in this paper are therefore not being undermined by some obvious selection effect.

[52] See, e.g., Patrick M. Regan, "Choosing to Intervene," *Journal of Politics* 60, no. 3 (1998); James D. Fearon and David Laitin, "Ethnicity, Insurgency, and Civil War," *American Political Science Review* 97, no. 1 (February 2003).

Thus there are both theoretical and empirical grounds for thinking that selection effects are not masking the effectiveness of force size, and that the findings in Section 3 are not simply being driven by this problem. Modeling manpower deployments and identifying their causal influence more precisely is undoubtedly an important task for future analysis. It is possible that different data or different analytic methods could find some evidence to support the notion that the threshold in FM 3-24 is a useful rule of thumb or that force size explains more variation in counterinsurgency outcomes. But there is no reason to assume that this will be the case ex ante.

A second potential shortcoming of this research design, as acknowledged in Section 2, is the binary definition of the dependent variable. To see whether this is driving the results, we can compare the relationship between manpower and three different definitions of "success" in Figure 4.

Figure 4 plots troop density on the x-axis and the success rates for counterinsurgents meeting that troop density on the y-axis. The first pattern, "WIN", is the same result presented in Figure 1 – it only considers counterinsurgents to have succeeded when the insurgency ends without extracting political concessions. The second pattern, "WIN OR DRAW" recodes "success" to include another set of outcomes, in which "an incumbent is forced to concede to some, but not all, insurgent demands, and neither side obtains its maximal aims." The third pattern, "WIN NO DRAW" drops all observations of "draws" from the data set, since these cases are potentially ambiguous.

[Figure 4]

These operationalizations do not make much of a difference. As we would expect, the broader the definition of "success" and the narrower the definition of "failure", the more likely counterinsurgents are to "succeed." But in all three instances, the relationship between force size and success is positive, it does not appear to have any meaningful thresholds, and it does not seem as though manpower is a particularly decisive factor in determining counterinsurgency outcomes. The coding of the dependent variable is not driving these patterns.

A third concern is whether it is inappropriate to compare a wide range of insurgencies that are so diverse. Again, this is largely an empirical matter: *does* the relationship between manpower and success vary across features that we expect to be important? To get a sense of this issue, it is useful to partition the data in several different ways.

[Figures 5a-5d]

Figure 5a examines whether the relationship between force size and success differs across conflict types. This relationship is compared across all insurgencies in the data set; for "identity wars" that were fought over ethnic or religious stakes; for non-"identity wars"; and for "wars of occupation" that were fought either against colonial powers or during World War II.[53] Though scholars have shown that conflict type affects many dynamics of internal wars – duration, military strategy, and post-conflict stability to name a few – conflict type does not seem to affect the significance of manpower in counterinsurgency.[54]

Figure 5b examines five different types of counterinsurgents: troops with low levels of mechanization, troops with high levels of mechanization, great powers, foreign troops, and "modern"

[53] Colonial wars and insurgencies during WW2 were combined because neither group alone had enough observations to create a meaningful sample.

[54] On the impact of conflict type, see e.g., James Fearon, "Why Do Some Civil Wars Last So Much Longer than Others?" *Journal of Peace Research* 41, no. 3 (May 2004); Biddle, "Seeing Baghdad, Thinking Saigon," *Foreign Affairs* 85, no. 2 (March/April 2006); Monica Duffy Toft, *Securing the Peace* (Princeton: Princeton University Press, 2010).

counterinsurgents who fought wars starting after 1975. These partitions help to examine whether certain types of counterinsurgents field forces that are systematically more effective than others. Yet there is again no clear difference in the slope of the relationship between force size and success across these subsets of the data. This is puzzling if we think that different types of counterinsurgents would get different marginal returns from their forces. For instance, Lyall and Wilson argue that the mechanization of modern armies has made them less effective at the kinds of prolonged, dismounted, labor-intensive operations that are important for counterinsurgency. Table 4 also found that their variable for mechanization was significant – but whatever makes these armies less effective on the whole appears to be something other than force employment. This helps to make a more general point: without data on the *size* of counterinsurgent forces, it is difficult to examine the *quality* of counterinsurgent forces. The causal logic of force employment involves an interaction between quality and quantity. The data in this paper therefore provide a new opportunity to examine a number of hypotheses about not just whether, but also *why* some counterinsurgents are more effective than others.[55]

Figure 5c shows that the relationship between manpower and success is essentially the same across Asia, North Africa and the Middle East, and Europe. Counterinsurgents in Sub-Saharan Africa, however, have been systematically less effective in employing their forces.[56] This is another empirical pattern with theoretical significance. One reason that African states are typically thought to be unstable is that they are not able to maintain large militaries – but Figure 4 suggests that larger militaries have not actually been any more successful on this continent since World War I.

Finally, Figure 5d divides counterinsurgents into democracies, autocracies and mixed regimes (or "anocracies"). Interestingly, autocracies and democracies get fairly similar returns from their troop deployments. Yet anocratic counterinsurgents seem to be much less effective at employing their forces, and this finding is statistically significant.[57] This suggests why scholars have had such a difficult time finding a systematic relationship between regime type and counterinsurgent success – if the mechanism by which regime type influences outcomes has to do with the way counterinsurgents employ their forces, then it would be very difficult to identify this pattern without data on how many forces they employ.

So the relationship between force size and effectiveness varies across some dimensions, but on the whole, it is quite consistent. And even in Sub-Saharan Africa or with anocratic counterinsurgents, the main substantive import of this paper appears to hold: manpower is not a particularly decisive factor in predicting counterinsurgency outcomes, and there do not appear to be any meaningful thresholds for success.

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[55] For instance, a prominent debate in the literature on counterinsurgency is the importance of regular soldiers relative to police or militia. Just as Lyall and Wilson coded data on the extent to which counterinsurgent forces were mechanized, it would be possible to code data on the extent to which counterinsurgents integrated police or militia forces into their security structure. In general, there are any number of ways to define the "treatment regime" that counterinsurgents are employing: data on force size provide important traction for determining whether or not the causal impact of these factors runs through the channel of force employment. On controversy over the importance of police in counterinsurgency see, e.g., G.D.T. Shaw, "Policeman versus Soldiers, the Debate Leading to MAAG Objections and Washington Rejections of the Core of the British Counter Insurgency Advice," *Small Wars and Insurgencies* 12, vol. 2 (Summer 2001) and Ivan Arreguin-Toft, "Unconventional Deterrence" in T.V. Paul et al., eds., *Complex Deterrence: Strategy in a Global Age* (Chicago: University of Chicago Press, 2009).

[56] This finding narrowly misses being statistically significant at the $p<.05$ level. In a probit regression with troop density, and African dummy, and an interaction term, the coefficient (standard error) on the interaction term is -28.9 (15.2).

[57] In a probit regression examining troop density, a dummy for anocracy, and an interaction term, the coefficient (standard error) for the interaction is -5.9 (2.7), which is significant at the $p<.05$ level.

5. Discussion

There are many more ways to partition and analyze these data.[58] And readers who are skeptical of quantitative work might continue to believe that the cases in the data set are not comparable. But more broadly, if these wars cannot be compared in meaningful ways, then statistical patterns would be no less meaningless than military doctrine that *also* attempts to generalize about the phenomenon of counterinsurgency as a whole. Social science and military doctrine both attempt to capture patterns that hold, all else being equal. It is hard to believe that one is useful and not the other. The key question in both cases is how analysts can draw inferences in a manner that is informed, systematic, useful, and accurate.

We have seen this kind of debate before. Twenty years ago, one of the most prominent themes in security studies scholarship was the conventional balance in Europe, how it could be measured, and what that meant for doctrine and deployments. As with current discussions of force requirements for counterinsurgency, analyses of the conventional balance revolved around various rules of thumb. In particular, scholars debated the "3:1 rule" for determining the likelihood that the Soviets would break through Western defenses, along with the notion that NATO needed a "force to space ratio" of roughly one division for every twenty-five kilometers of battle front.

These debates played a prominent role in the "renaissance of security studies" because they brought together scholars with different theoretical, methodological, and professional backgrounds to push forward a cohesive line of research that had clear implications for the conduct of contemporary defense policy.[59] Just as importantly, the debate forced scholars to engage broader, fundamental issues. Is "military power" something that can be studied using static measures like force ratios, or does it require a more dynamic analysis?[60] How should analysts evaluate the role of doctrine, or politics, or military strategy in determining the appropriate "balance"?[61] What role should formal modeling play in formulating defense policy?[62] What is the place for empirical analysis, and what are the strengths and limitations of existing data?[63]

Disagreements about force requirements for counterinsurgency have similar potential for sparking a deep and systematic discussion about the basic theory and practice of modern war. The topic is

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[58] Here are some other ways to divide the data that do not meaningfully alter the relationship between force size and success: partitioning conflicts by duration; by the per capita income of the host nation; by the per capita energy consumption of the host nation; by the urban population of the host nation; by whether the counterinsurgency was one of the forty "relevant" campaigns in Sepp, "Best Practices in Counterinsurgency"; by the size of the insurgent force (in absolute or per capita terms); by rebel lethality; by counterinsurgent lethality; and by terrain type.

[59] Stephen Walt, "The Renaissance of Security Studies," *International Studies Quarterly* 35, no. 2 (June 1991): 218; cf. Richard K. Betts, "Should Strategic Studies Survive?" *World Politics* 50, no. 1 (October 1997): 19.

[60] John J. Mearsheimer, "Numbers, Strategy, and the European Balance," *International Security* 12, no. 4 (Spring 1988); idem, "Assessing the Conventional Balance," *International Security* 13, no. 4 (Spring 1989); Joshua M. Epstein, "Dynamic Analysis and the Conventional Balance in Europe," *International Security* 12, no. 4 (Spring 1988); idem, "The 3:1 Rule, the Adaptive Dynamic Model, and the Future of Security Studies," *International Security* 13, no. 4 (Spring 1989).

[61] Stephen Biddle, "The European Conventional Balance," *Survival* 30, no. 2 (March/April 1988); Eliot A. Cohen, "Toward Better Net Assessment," *International Security* 13, no. 1 (Summer 1988); Samuel P. Huntington, "Conventional Deterrence and Conventional Retaliation in Europe," *International Security* 8, no. 3 (Winter 1983/84).

[62] Stephen Biddle et al., *Defense at Low Force Levels* (Alexandria: IDA, 1991); Epstein, *Strategy and Force Planning* (Washington, DC: Brookings, 1987).

[63] Trevor N. Dupuy, "Combat Data and the 3:1 Rule," *International Security* 14, no. 1 (Summer 1989); Mearsheimer, "Assessing the Conventional Balance."

likely to remain prominent for the foreseeable future. The Surge in Iraq produced a voluminous debate about whether the reduction in violence in 2007 was due to the additional boots on the ground, versus qualitative factors like a change in Coalition strategy, or factors that had nothing to do with the Coalition at all such as Al Qaeda's alienation of Sunnis in Anbar and the Shiite ethnic cleansing campaign in Baghdad.[64] Afghanistan will probably produce a similar debate, especially as the United States approaches its deadline for beginning troop withdrawals in 2011. More broadly, defense planners and budgeters will continually ask how many forces they need to earmark for counterinsurgency.

It is important to approach all of these issues from informed theoretical and empirical foundations. And this paper has presented new evidence contradicting many of the most prominent ideas about the role of manpower in counterinsurgency. Empirical patterns suggest that force size offers positive returns, but that these returns are fairly constant and not very large. Indigenous forces may be more effective than foreign forces, but their performance is also less predictable. Most importantly, there does not appear to be a sharp dividing line between missions that are adequately resourced and those that are not. Official military doctrine appears to be misleading on this issue, and it runs counter to empirical evidence. Unless its proponents can muster systematic support, the rule of thumb for deploying 20 troops per 1000 inhabitants in the area of operations should be scrapped.

What kind of doctrine should take its place? Perhaps the broadest implication of this paper is that defining doctrine for force requirements in terms of thresholds is probably inappropriate. The empirical findings here do not simply indicate a need to tweak the recommended troop density up or down by a certain amount.[65] The data show that it is hard to defend the notion that any fixed number provides a useful benchmark.

Instead of viewing the problem of force requirements for counterinsurgency through the lens of thresholds, a better analytic approach is to see the issue as a tradeoff. Additional forces entail both benefits and costs. Because the difficulty and importance of different conflicts can vary widely, so will the optimal point at which to strike this balance. So instead of providing a fixed threshold for force sizing, it is more useful to determine what this tradeoff looks like by saying what the relationship between manpower and counterinsurgency outcomes actually is. This relationship is an empirical matter. In principle, it is something that can be identified with careful measurement and analysis. All else being equal, how much does a marginal increase in manpower affect the odds of counterinsurgents' success? How much benefit do counterinsurgents typically get from providing additional troops?

This paper has taken a first-cut at answering this question. When it comes to forming a baseline, prior assumption about the role of manpower in counterinsurgency, it appears that the outcomes of these wars are not particularly sensitive to force size. This is also a "rule of thumb" for force sizing – but it is a very different kind of rule of thumb. The rule of thumb here is a relationship, not a point estimate. That relationship is not complicated and it can be expressed in simple, two-dimensional

[64] Different views on these factors are expressed, inter alia, in Kimberly Kagan, *The Surge: A Military History* (New York: Encounter, 2008); Bing West, *The Strongest Tribe: War, Politics and the Endgame in Iraq* (New York: Random House, 2008); Stephen Biddle, Michael O'Hanlon, and Kenneth Pollack, "The Evolution of Iraq Strategy," in *Restoring the Balance: A Middle East Strategy for the Next President* (Washington, DC: Brookings, 2008); and Nils B. Weidmann and Idean Salehyan, "Violence and Ethnic Segregation: A Computational Model Applied to Baghdad," Presented to the Peace Science Society annual conference, Chapel Hill, NC, Nov. 20, 2009.

[65] In this way, the paper differs from recent analyses such as McGrath, *Boots on the Ground* and Kneece et al., *Force Sizing for Stability Operations*, which argue for adjusting the recommended troop density to 13 and 40 troops per 1000 inhabitants in the AO, respectively.

figures. It is also a more useful and more informative way to frame debates over theory, policy, and doctrine.

Examining the relationship between manpower and success supports the argument – widely held in the scholarly and policy communities but not previously documented with the kind of evidence presented here – that the number of troops is less important than the manner and the context in which they are employed.[66] And in this respect, the findings and implications of this paper are actually quite close to current military thought if we leave aside the rule of thumb in FM 3-24. For instance, General McChrystal's 2009 report to the president was characterized in the public debate as a request for more troops, and a warning that failure to provide these troops would critically endanger the mission in Afghanistan. General McChrystal did propose to expand both foreign and indigenous security forces in the country. But his report explicitly downplayed the importance of quantitative factors. "Success is achievable," he wrote,

> but it will not be attained simply by trying harder or 'doubling down' on the previous strategy. Additional resources are required, but focusing on force or resource requirements misses the point entirely. The key take away from this assessment is the urgent need for a significant change to our strategy and the way that we think and operate. (COMISAF, *Initial Assessment*, 2009.)

The evidence presented in this paper supports this argument – and not just for Afghanistan, but for counterinsurgency as a whole. Force size may be one of the most quantifiable (and politically controversial) factors that predict success or failure for counterinsurgents, but that does not mean that it is also the most important. In debating withdrawals from Afghanistan or the appropriate size of the U.S. military moving forward, fixating on troop numbers will also probably "miss the point." This perspective will surely continue to have supporters and detractors, both inside and outside the armed forces. But at the very least, policy debates and scholarship on this issue can now build off better empirical foundations.

[66] An important task for future research is to develop more specific and testable ways of defining these factors, and studying how they interact with counterinsurgents' material capabilities. A straightforward way to do this would be to define a taxonomy of counterinsurgent strategies, code dummy variables for each type, and then test interaction terms combining strategy with troop density. (Interpreting interaction terms in nonlinear models is more complicated than in linear models, but the basic research design is the same.) Such a study would face many of the same problems this paper confronts: defining terms, finding and coding data, considering sensitivity to within-conflict variation, selection problems, and population subsets. In addition, it would be difficult to code strategy as an ordered variable in a way that is convincing. For these reasons, examining the interactive effect of manpower and strategy is a subject that is beyond the scope of this paper, but it is clearly worthy of future study.

Appendix

Below is a description of the main variables coded for this project by the author. All coding decisions are cited in the dataset. Most data points have three or more sources; in most cases, the final coding was made by taking the average of each figure found in the sources.

"Forcemax" is the maximum number of counterinsurgents deployed to fight the insurgency at any one time during the conflict. This number includes both foreign and indigenous soldiers. It also includes any police, militia, constables, gendarmes, or any other units contributing to the counterinsurgency campaign. It does not include forces that were on active-duty but not assigned to the area of operations. "Forcemax" is based on several hundred individual sources, and all of its data points are documented to specific page numbers in the data set. Where possible, the data set also distinguishes between the nationality and type of units employed.

"AO-pop" is the population in the area of operations that the counterinsurgents seek to control, measured in the year the war started. This figure is often far less than the total population of a state (though in some cases, the area of operations does cover an entire country). "AO-pop" only includes inhabitants of the AO that the counterinsurgents presume to be potentially hostile. In Sri Lanka's ethnic warfare between Tamils and Sinhalese, for instance, only the Tamil population is counted in "AO-pop". In conflicts where the size of the AO varies over time, "AO-pop" measures the largest number of people to fall within the area of operations.

"AO-size" is the size of the area of operations in square kilometers. Sometimes, the area of operations covers the entire territory of the host nation. Where only a portion of the host nation is engaged in insurgency, the size of the AO is usually measured by the smallest administrative unit that contains the fighting: in some cases this is a state or province; in other cases it is a city. In conflicts where the size of the AO varies over time, "AO-size" measures the largest extent of territory to experience significance violence.

"Rebelmax" is the maximum number of insurgents deployed at any one time during the conflict. This figure only includes insurgents who carry arms and participate in the fighting: it does not include non-violent supporters of the insurgency.

"Foreign": The maximum number of foreign troops employed in counterinsurgency at any one time. The variable is coded two different ways. The first coding only considers troops to be "foreign" if they come from a different nation-state. The second coding considers troops to be foreign in the additional instance that they are fighting a secessionist movement and they are not part of the population that is trying to secede. For instance, Azeri troops in Nagorno-Karabakh would be considered indigenous in "foreign 1," and foreign in "foreign 2".

"Ethnic/religious war": Dummy variable coded as 1 if the war is rooted in ethnic or religious identity. (Sources: Toft, *Securing the Peace*, and additional codings by the author.)

The following variables constitute the dependent variable and the control set taken from Lyall and Wilson (2009). The descriptions are reproduced directly from Lyall and Wilson's Table 1 (p.85). Explanations of each variable are quoted from Lyall and Wilson's codebook.

"Win": A win occurs when the insurgency is militarily defeated and its organization destroyed or the war ends without any political concessions granted to insurgent forces. Examples include Argentina's defeat of the ERP (1973-77), the second Boer War (1899-1902), and the crushing of the Huk rebellion in the Philippines (1946-51).

"Draw": A draw occurs when an incumbent is forced to concede to some, but not all, insurgent demands, and neither side obtains its maximal aims. Typical examples of concessions include the voluntary disarmament of insurgents in exchange for greater participation in the state's political affairs (i.e. as a political party or as members of a power-sharing government) or the granting of greater regional autonomy (but not independence). The political settlement reached between Colombia's government and the M-19 insurgent group, in which M-19 voluntarily demobilized in exchange for its participation as a political party, is one example of a draw. Similarly, Djibouti's government struck a deal with its secessionist Afar rebels (FRUD) that traded FRUD's demobilization for two of its leaders becoming cabinet members, thus ending the Afar insurgency (1991-94).

"Loss": We define a loss as a situation in which the incumbent unilaterally concedes to all, or nearly all, insurgent demands, including the granting of independence or the deposition of current leaders. Examples include the United States in Vietnam, the USSR in Afghanistan, the United Kingdom against nationalist insurgents in Aden (1963-67), and the Chinese Nationalist government against PLA insurgents (1945-49).

"Mechanization": Mechanization level is a scaled index that records the prewar soldier-to-mechanized vehicle ratio in the state's military. More specifically, the size of the country's military was drawn from the Correlates of War dataset and then divided by the number of mechanized vehicles in the country's arsenal.2 Data for mechanization values were obtained from numerous sources (see the article) and specific national histories. To avoid endogeneity with war dynamics, both observations are lagged a year prior to the conflict. There are 167 observations for mech. These values were then collapsed into a four-fold ordinal variable with cutpoints at the 25% quartiles. A "1" value represents the lowest level of mechanization (>834 soldiers per vehicle), a "4" the highest level (11-108 soldiers per vehicle), and the "2" (288-833 per vehicle) and "3" (109-287 per vehicle) values the midway points between these extremes. This produces a scaled variable that has minimal skewness (0.08) and kurtosis (1.62) and that weights mechanization values by the size of the country's military personnel. Treating mech as an ordinal variable is also appropriate since it reduces sensitivity to data inaccuracies that inevitably arise from state secrecy.

"Regime": Polity2 score (-10 to +10 scale) measured in last prewar year (Source: PolityIV).

"Support": Equals 2 if [insurgents received] sanctuary and external support; 1 if only sanctuary or support; 0 if non (Source: Various).

"Occupy": Equals 1 if the incumbent is an external occupier; 0 otherwise (Source: Various).

Table 1. Which measure of force size is most appropriate?

Force size measure	n	No controls	With Controls
Troops	165	-4.60e-7 (2.9e-7)	-3.18e-7 (2.0e-7)
Troops/sqkm	168	4.63e-3 (6.7e-3)	8.25e-3 (6.3e-3)
Troops/insurgents	158	0.01 (0.01)	0.02 (0.01)*
Troops/pop	171	3.10 (1.08)**	3.80 (1.04)***

All models clustered on counterinsurgent. *: p<.05 **: p<.01 ***: p<.001

Table 2. Do force sizes have meaningful thresholds?

Troops-per-1000-Inhabitants	Threshold Dummy	Threshold Interaction
5	-0.08 (0.26)	122.53 (180.14)
10	-0.05 (0.37)	5.32 (57.58)
15	-0.06 (0.35)	-22.42 (33.85)
20	-0.14 (0.32)	-8.67 (25.86)
25	-0.19 (0.31)	-5.54 (21.81)
30	-0.23 (0.30)	5.86 (16.02)
35	-0.25 (0.31)	-0.05 (14.14)
40	-0.41 (0.34)	-0.78 (10.02)
45	-0.61 (0.34)	0.45 (8.85)
50	-0.54 (0.35)	4.34 (7.94)

Table 3. Foreign versus Indigenous Counterinsurgents

Variable	No controls	With controls
First coding: secessionists are not "foreign"		
Foreign soldiers/pop	2.40 (1.2)*	2.07 (0.8)*
Indigenous soldiers/pop	3.42 (1.4)*	4.55 (1.2)***
Second coding: secessionists are considered "foreign"		
Foreign soldiers/pop	2.69 (1.0)**	3.54 (1.0)***
Indigenous soldiers/pop	7.41 (3.66)*	5.93 (3.8)

Each model has 171 observations without controls, 165 observations with controls. The models are clustered on counterinsurgent. *: p<.05 **: p<.01 ***: p<.001

Table 4. Troop Density with Different Control Sets

	Model 1	*Model 2*	*Model 3*	*Model 4*
Troop Density	3.102(1.08)**	3.802(1.04)***	3.597(1.27)**	4.689(1.02)***
Mechanization		-0.223(0.09)**		-0.227(0.10)*
Occupation Dummy		-0.523(0.19)**		-0.228(0.25)
Insurgent Support		-0.517(0.14)***		-0.497(0.14)***
Incumbent POLITY		-0.021(0.02)		
Identity War			-0.834(0.27)**	-0.749(0.25)**
% Foreign Troops			-0.992(0.44)*	-0.294(0.42)
Number of Rebels			-5.3e-6(0.4e-6)*	-1.2e-6(1.0e-6)
Economic Growth Rate			1.942(1.28)	
Constant	-0.548(0.12)***	0.554(0.27)*	9.05e-3(0.22)	0.884(0.33)**
N	171	165	124	154
Pseudo R^2	0.0645	0.1842	0.1854	0.2228
Wald chi2	8.25(1)	48.23(5)	32.27(5)	48.35(7)

Each model is clustered on counterinsurgent.

*: p<.05 **: p<.01 ***: p<.001

Figure 1. Manpower and Success

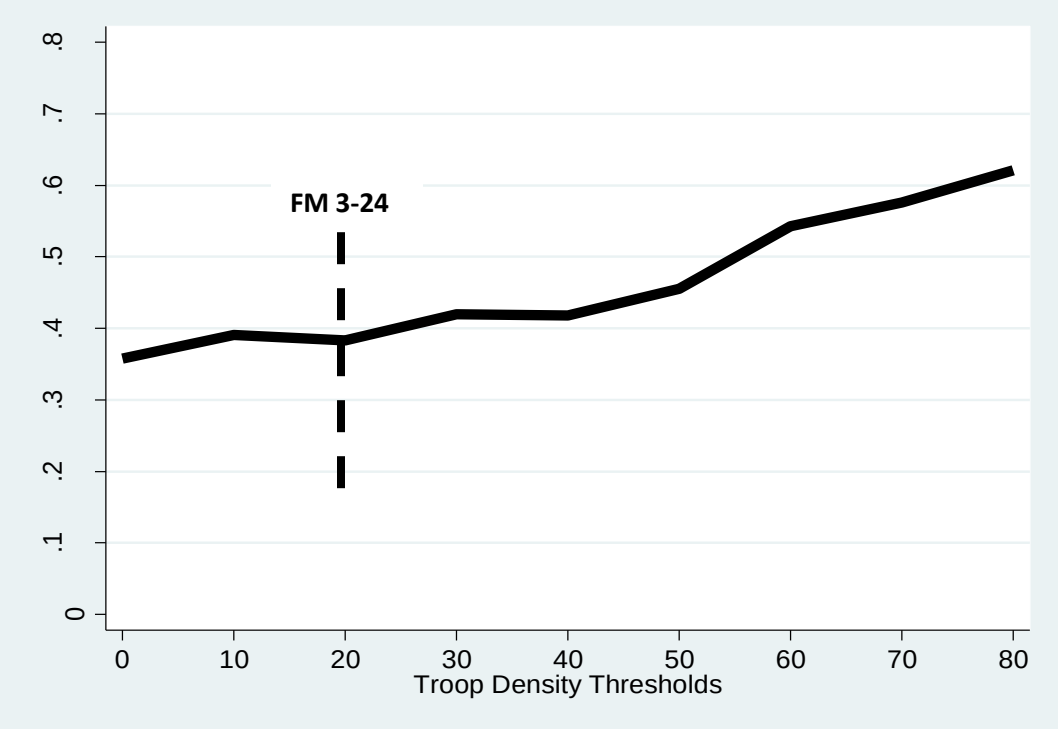

Figure 2. Residuals versus Troop Density

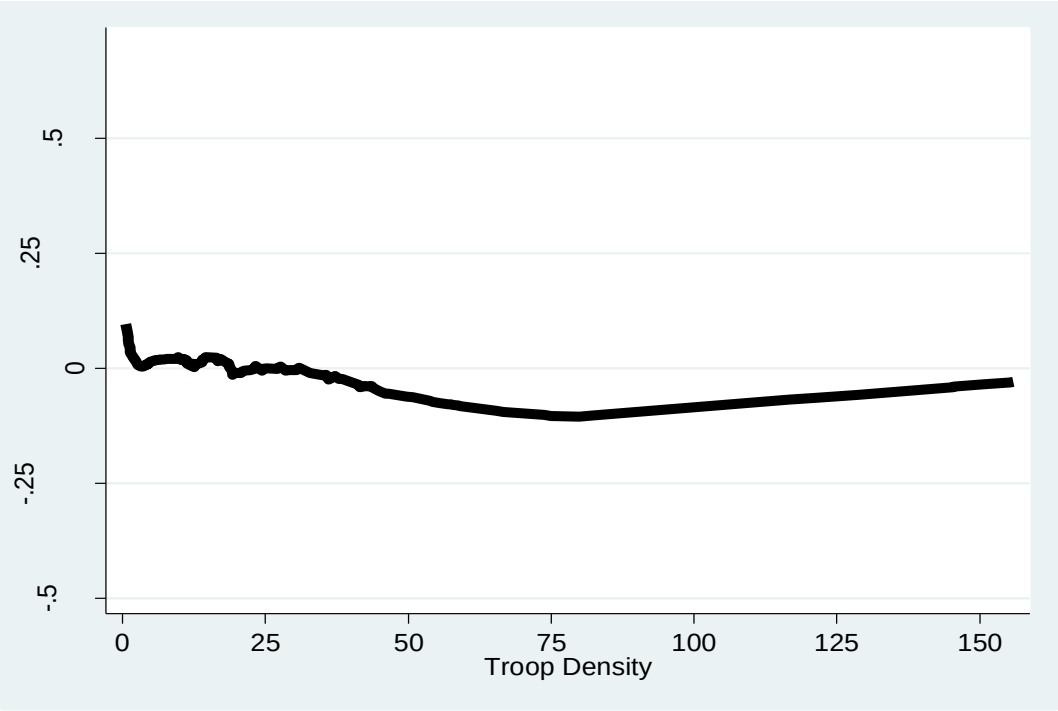

Figure 3. Predicted Probability of Success as a Function of Force Size

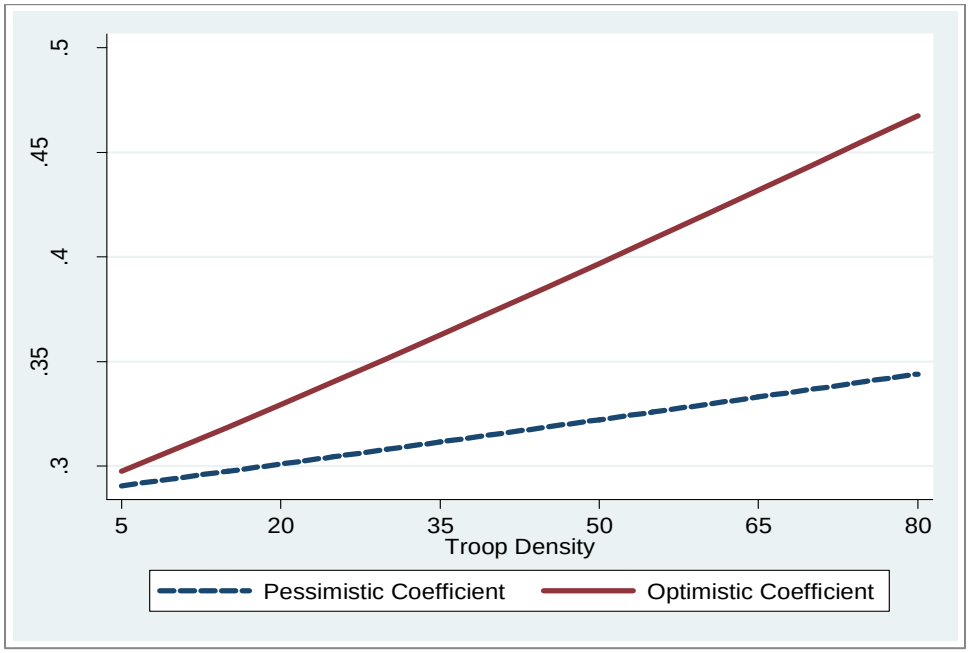

Figure 4. Three Different Codings of "Success"

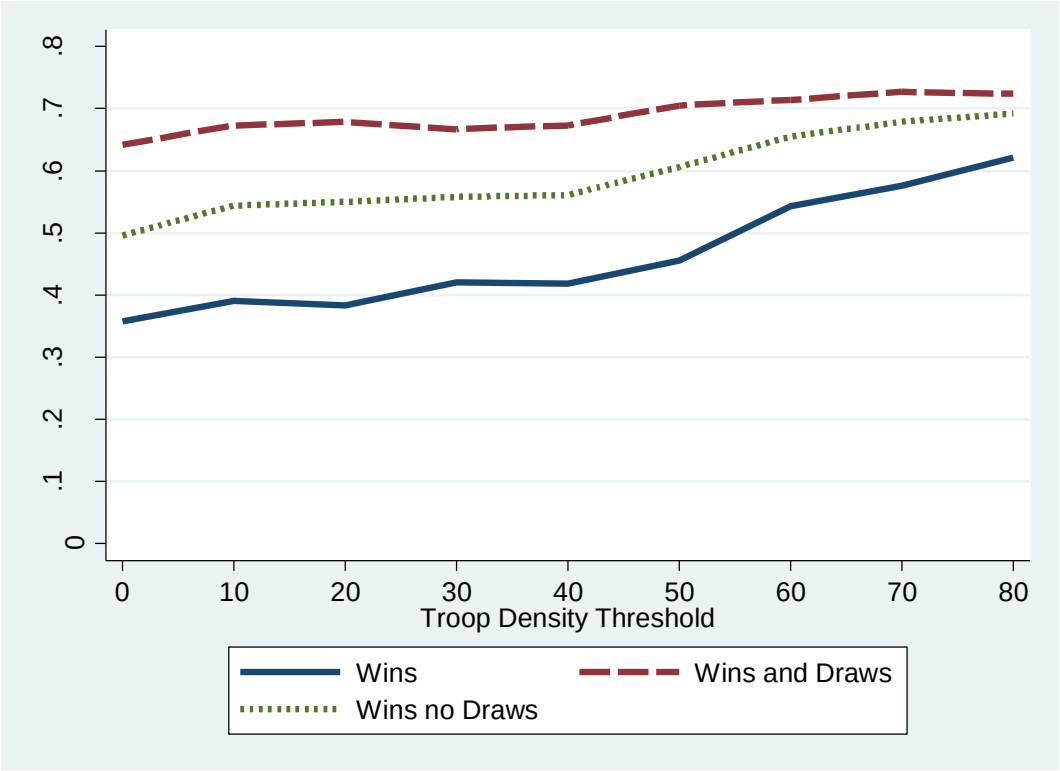

Figure 5a. Manpower and Success across Conflict Type

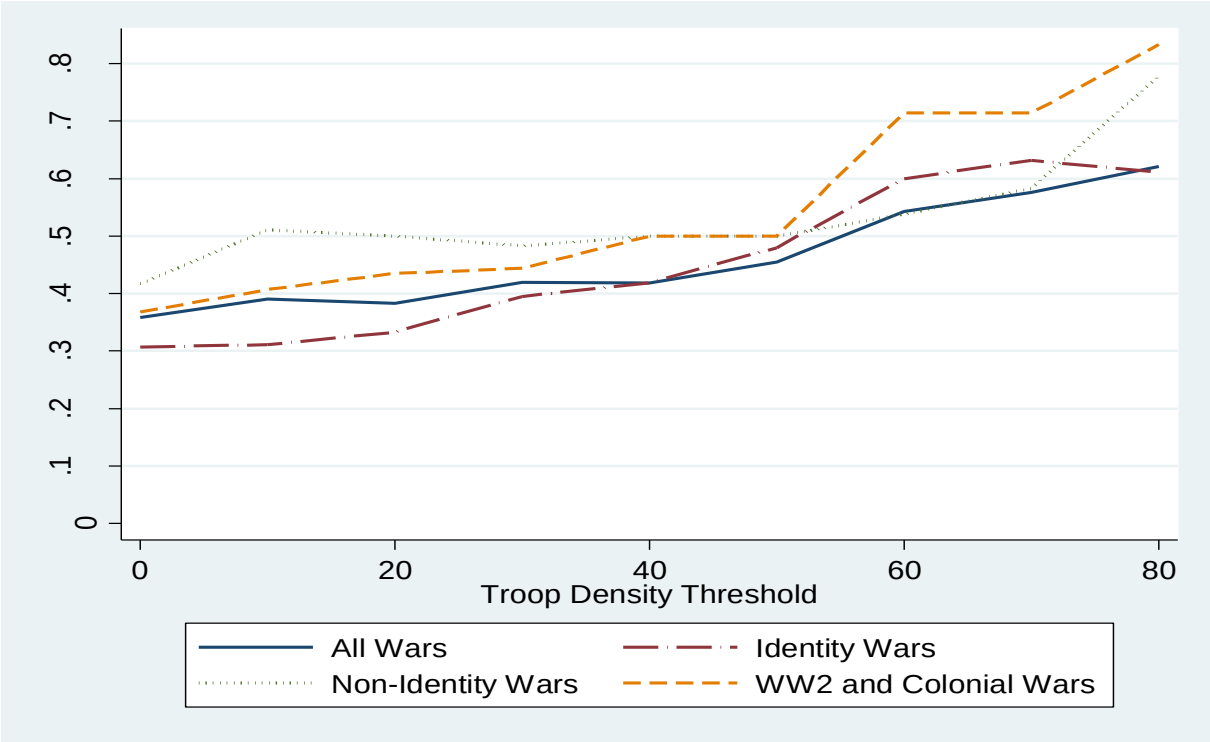

Figure 5b. Manpower and Success across Counterinsurgent Type

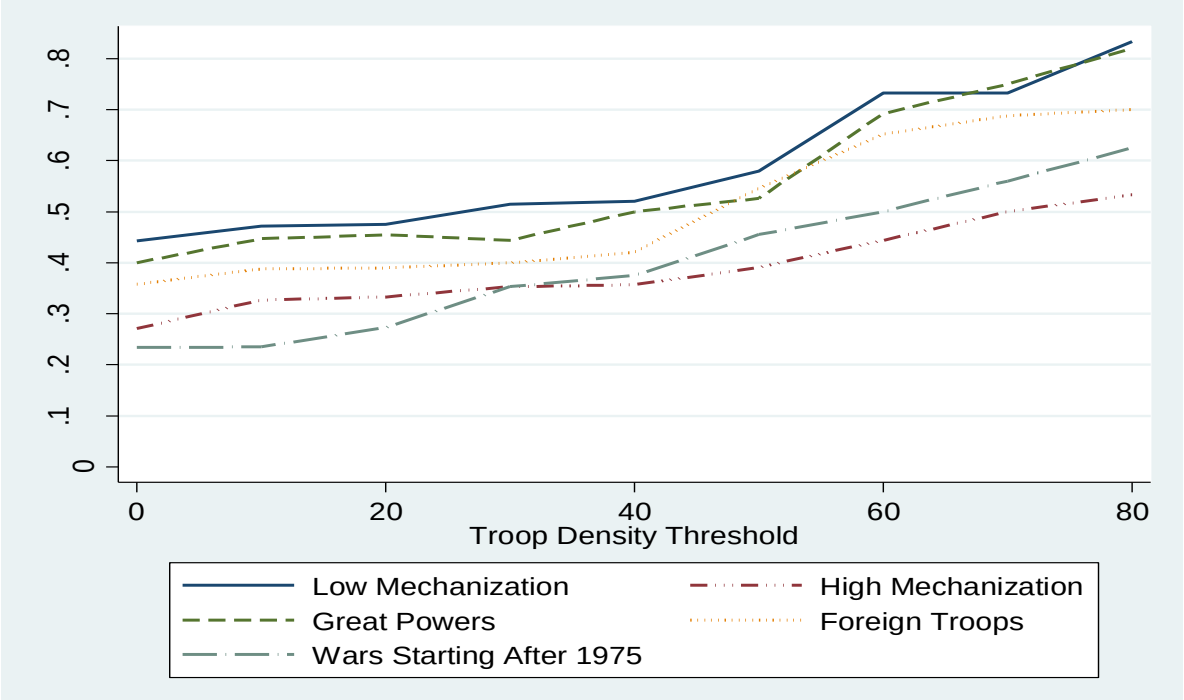

Figure 5c. Manpower and Success across Different Regions

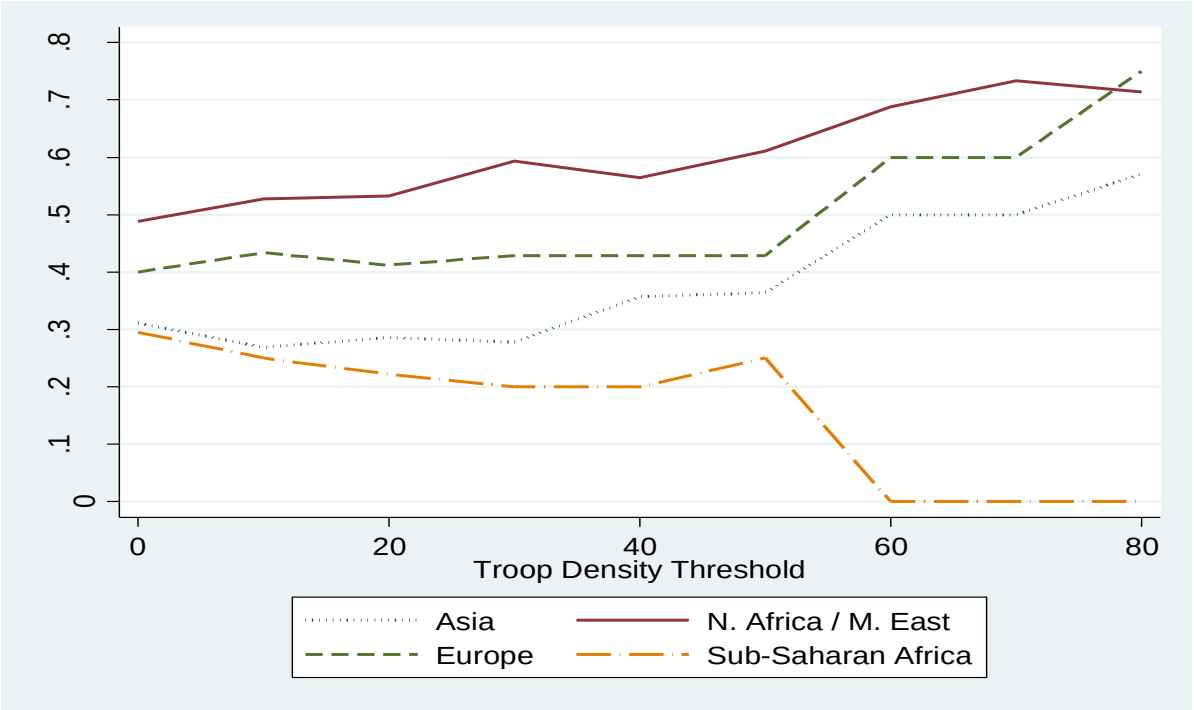

Figure 5d. Manpower and Success across Different Regime Types