VICTORY AS A SERVICE (VaaS): AN ANALYSIS OF US AID TO UKRAINE AND ITS EFFECTIVENESS IN PRODUCING RUSSIAN PERSONNEL LOSSES, PREVENTING UKRAINIAN CIVILIAN DEATHS, AND RECAPTURING OCCUPIED TERRITORY

BY
KEVIN RYAN

A CAPSTONE SUBMITTED TO JOHNS HOPKINS UNIVERSITY IN CONFORMITY WITH THE REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN DATA ANALYTICS

BALTIMORE, MARYLAND
DECEMBER 2023

Abstract

What effect does aid to Ukraine have on battlefield success against the Russians? Are the billions of dollars in military equipment and financial aid sent by the United States substantially contributing to the factors which lead to victory? The provision of aid to Ukraine has been a complex and contentious issue, with strongly differing perspectives on both sides. In order to better understand the relationship between US aid and positive effects on the war effort, this paper uses detailed information on aid to Ukraine by type, quantity, value, and delivery date along with estimated daily totals for Russian soldiers killed in action (KIA), monthly totals of Ukrainian civilians killed, and monthly totals of territorial gains and losses of the Russian occupation in order to quantify the relationship between these variables. The resulting analysis reveals that a 42 day time shift is present between the arrival of US aid and the realization of positive effects on Russian KIA. Additionally, utilizing OLS regression techniques, this research finds that for each $1M in total US aid, we can expect to see a predicted decrease in Civilians Killed by approximately 0.0000018 lives, a predicted increase in Russian Armed Forces KIA of 0.11 lives, and a predicted territorial loss to the Russian occupation of approximately 0.000000133 km^2.

Table of Contents

1.0 Introduction

The ongoing conflict in Ukraine has captured global attention and raised significant questions about the role of external actors, particularly the United States, in providing support to Ukraine. The goal of this study is to investigate the relationship between US funding to the war in Ukraine and the promotion of Russian battlefield losses in terms of personnel, the reduction of Ukrainian civilian deaths, and the recapture of occupied territory. This research question is of paramount importance in understanding the dynamics of the conflict and its broader implications for future efforts of a similar nature.

1.1 Neo-Soviet Aggression and Violent Expansionism at the Edge of NATO

The ongoing Russian pursuit of violent expansionism along the edges of NATO and neighboring regions has been a source of concern for international security. This behavior is deeply rooted in historical and geopolitical context, often characterized by Russia's efforts to maintain influence and territorial control over what it sees as its rightful fiefdom.

The framework for these efforts is largely provided by Aleksander Dugin, an influential thinker among Russians, and outlined in his book “Foundations of Geopolitics.” Dugin’s primary vision is to replace the unipolar world- one he sees as dominated by western hegemony- with a multipolar one- consisting of unified "Atlantic" and "Eurasian" societies competing for dominance. Naturally, Dugin sees Russia as the leader of the Eurasian pole and the United States as the leader of the Atlantic pole. He makes the case for a Russian controlled sphere of influence in the former Soviet Union, which he refers to as a “zone of special privilege.” In order to bring this dream to reality, Dugin proposes several lines of effort, including information operations designed to sow subversion in “Atlanticist” societies, regional destabilization campaigns to shake the West’s grip globally, and asymmetric, or hybrid warfare operations led by the Russian special services. A strong component of this proposed strategy is the use of gas diplomacy to deliver a “carrot and stick” approach to coerce the targets of Russia’s policies to bend to its will. A lesser, though more alarming component includes the use of what Dugin calls “Special Military Operations” to conquer nations of the former Soviet Union by conventional military force.

"Foundations of Geopolitics" has been used as a textbook in the Russian Armed Forces Academy of the General Staff, as well as many other levels of the Russian military. It is impossible to understate the importance of Dugin's work when seeking to understand the goals and motivations of Russian behavior on the world stage.[1]

There are several historical examples of putting this theory to practice through Russian military aggression, led by Vladimir Putin as part of an ongoing campaign to restore a new vision of the former Soviet superpower:

- During the 1990s, Russia waged brutal wars in Chechnya, seeking to suppress Chechen separatism. The excessive use of force and human rights abuses perpetrated by the Russian Armed Forces in the Caucuses demonstrated Moscow's willingness to use suffering and humanitarian atrocities to maintain control over restive regions. Russia was successful in dominating the Chechens, and the hostilities ended when the dominant faction, under the leadership of then 30 year old Ramzan Kadyrov, pledged fealty to Putin.[2]
- The war with Georgia in 2008 marked another play at Russian expansionism, as Moscow supported separatist regions in Georgia- South Ossetia, and Abkhazia. Georgian President Mikheil Saakashvili was keenly aware of the buildup of Russian forces on his border, and triggered the war prematurely during the opening ceremonies of the 2008 Olympic Games in Beijing, China. The ensuing Russian advance on the capital was halted, momentum was lost, and the conflict resulted in the de facto annexation of these territories by Russia.[3]
- The 2014 annexation of Crimea and ongoing conflict in Ukraine epitomizes Russia's use of human rights violations and undisciplined aggression to pursue its goal of recreating the false memory of Soviet glory through territorial conquest. Moscow's desire to maintain control over

---

1 Dugin, "Foundations of Geopolitics," all.

2 Finch, "Why the Russian Military Failed in Chechnya," 12.

3 Charap, et al, "Russia's Military Interventions: Patterns, Drivers, and Signposts," 75.

Ukraine and prevent its alignment with Western institutions like NATO and the EU has resulted in a protracted and violent struggle that continues to this day.[4]

- Russia's tactics in Ukraine have raised concerns about its ambitions in neighboring regions as well. The use of Belarus as an intermediate staging base (ISB) to deploy troops from as well as stage attacks, in combination with the subservience of Belarusian President Aleksandr Lukashenko represents a bloodless defeat of the nation, and a win for the neo-Soviets. The possibility of defeating Ukraine and subsequently pursuing a similar course of action in Moldova, specifically emerging from Transdniestr, is a worrisome prospect. This will lead to further attempts to absorb former Soviet territories into the Russian Federation by force, inching closer to NATO.[5]
- Russia's expansionist ambitions are not limited to the former Soviet Union either- Russia has displayed an increased willingness to project force beyond its "zone of special privilege." Its military involvement in Syria, supporting the Assad regime, and its presence in the Central African Republic highlight Moscow's efforts to expand its global footprint and challenge Western interests, and are marked with Russia's signature use of human rights atrocities to break down their enemies.[6]

To counter this pattern of aggression and prevent further escalation, the international community, led by the United States, must respond to the invasion of Ukraine with a coordinated effort. Military aid to Ukraine is a crucial component of this response, providing support to resist external aggression and reinforcing the territorial sovereignty of Ukraine to deter further advances. A well-strategized comprehensive aid package that includes both financial assistance and military aid can strengthen Ukraine's ability to defend its sovereignty, serving as a deterrent against potential future aggression in

---

[4] Charap, et al, "Russia's Military Interventions," 43.

[5] Charap, et al, "Russia's Military Interventions," 61.

[6] Charap, et al, "Russia's Military Interventions," 72.

the region. This approach aligns with the global imperative to promote stability, security, and adherence to international norms in the face of Russian aggression.

2.0 Literature Review

The following section of this research paper serves as a comprehensive exploration of the existing knowledge landscape surrounding the conflict in Ukraine, with a particular focus on the role of U.S. aid, factors contributing to victory in war, and the theoretical framework of proxy war. This review aims to distill what is currently known, elucidate key schools of thought and rationale both for and against the provision of aid, and identify gaps in understanding that this research endeavors to fill with quantitative results through data analysis. By delving into the significance of aid and assistance to Ukraine, examining American opinions on providing aid, and establishing a robust theoretical framework, this literature review lays the groundwork for the analysis which follows. The exploration of existing research not only contextualizes the author's study within the broader academic discourse, but also identifies the unique contributions it brings with respect to addressing the complexities of the conflict and the effectiveness of U.S. aid through analysis of available data. Through performing this comprehensive review, we aim to enhance our understanding of the conflict dynamics and contribute novel insights to inform future policy considerations regarding the conflict, as well as future research.

2.1 Significance of Aid and Assistance to Ukraine

The significance of aid and assistance to Ukraine- especially in the form of war materiel- cannot be overstated, particularly in the context of Russian battlefield losses, prevention of civilian casualties, and the recapture of occupied territory. Aid in the form of weaponry, ammunition, and military equipment bolsters Ukraine's capacity to defend its sovereignty and territorial integrity. Financial assistance allows for continuity of government function and delivery of services that relieve domestic pressure, and lay the foundation for military success. This support enhances the Ukrainian military's ability to deter further Russian aggression, and protect their citizens against a much larger adversary with far greater resources.

The supply of ammunition and military equipment to Ukraine also has direct practical implications for Russian battlefield losses. Increased Ukrainian military capabilities with modern, Western weapons lead to more significant Russian battlefield losses, as well as presenting operational challenges that shift the balance and alter Moscow's strategic calculus in the conflict. In practical terms, these weapons are responsible for delivering the daily total KIA that has depleted the combat power of the Russian Armed Forces and left them reliant upon mercenary organizations such as Wagner, poorly trained conscripted citizens, prisoners, and international volunteers such as the Chechen factions loyal to Ramzan Kadyrov. Some of these weapons such as the Javelin Anti-Tank Guided Missile (ATGM) have had an outsized impact on the course of the war. Highly regarded by Ukrainian fighters, the Javelins were used to destroy a large number of both wheeled and tracked vehicles employed by Russia in the initial offensive, forcing them to dig deep into stockpiles to resource their effort using vintage cold war equipment. Many of these older vehicles have also been destroyed, leading to a shortage on the Russian side that can not be addressed due to a lack of resources resulting from sanctions.[7]

In addition to the immediate effects of military aid, a secondary benefit is the development of improved tactics, techniques, and procedures (TTPs) for the employment of these weapons on the modern battlefield. The Ukrainian Armed Forces have developed unique methods for using small unmanned aerial systems (UAS) to provide forward observation for the M777 155mm artillery pieces provided by the US. The integration of SpaceX Starlink satellite internet capabilities into military operations- in the contested environment, no less- is also groundbreaking. There are also new methods of data collection, and new tools for intelligence processing, exploitation, and dissemination that have benefitted greatly in their development due to the provision of US aid.[8]

Russia's military interventions in the former Soviet Union, have raised concerns among the free world regarding its expansionist ambitions. Another important element of aid to Ukraine is that it serves as a counterbalance to Russian military presence in the region, signaling that international support is available

[7] Abramson, Jeff. "West Rushes Weapons to Ukraine," 31.
[8] Logan, John. Acquiring Targets in the Bear's Backyard. 14

to nations facing Russian aggression- regardless of NATO membership. In addition to demonstrating to the Russian regime that such activities are not tolerated and should not be pursued, the most direct benefit is the decimation of Russian combat power among its armed forces. This is visibly demonstrated in their use of refurbished Cold War (and even World War II) equipment, the inability to produce modern weapons and equipment due to sanctions, and the reliance on external partners such as the Islamic Republic of Iran to provide modern weapons to fuel the Russian war effort.[9]

The provision of aid to Ukraine has great symbolic significance, in demonstrating solidarity and support for Ukraine's sovereignty. It sends a powerful message that the global community stands with Ukraine in its struggle against external aggression. This aid and assistance allows Ukraine to strengthen its position in negotiations and potentially regain control of these territories through military means or diplomatic leverage, should a Russian surrender or withdrawal be negotiated.

Overall, the significance of aid and assistance to Ukraine, especially in the context of war materiel, extends beyond immediate military support. It plays a critical role in Ukraine's efforts to defend itself, counter Russian aggression, and potentially regain control of lost territories while sending a strong message of solidarity among the free world. Additionally, it has practical implications for the dynamics of the conflict and applications for similar conflicts in the future. It is for this reason that the research contained in this study is extremely valuable to policymakers and warfighters alike.

2.2 American Opinions on Aid

Like all controversial issues in modern America, the topic of aid to Ukraine has been seized upon by partisan elements of the media and government. Each side has constructed arguments supporting their position, which constitute key schools of thought that must be taken into account when assessing the effectiveness of aid on the war. It is important to recognize that public opinion on this issue can be diverse, and individuals may have nuanced perspectives that don't neatly fit into these categories. The

[9] Semenenko, Oleh, et al. "Forecast of Economic Consequences of the First Stage of the Russian-Ukrainian War for Russia." 26.

geopolitical landscape is dynamic, and new battlefield developments as well as new information campaigns can heavily influence the discourse around providing aid to Ukraine.

2.2.1 In Support of Providing Aid to Ukraine:

The most powerful case for American intervention in the war in Ukraine is rooted in humanitarian concerns. Advocates argue that providing aid to Ukraine is essential from a moral standpoint. The conflict has resulted in a significant humanitarian crisis, with thousands of people displaced and in need of basic necessities. Russian atrocities such as the massacre at Bucha, attacks on civilian infrastructure, and attacks on healthcare workers and hospitals have shocked the world, and underscore the necessity of intervention, either direct or indirect. Aid can be seen as a means of addressing the immediate needs of civilians caught in the conflict, while contributing to Ukrainian victory.

Another powerful argument in favor of aid lies in the support for democracy and self determination. Providing aid to Ukraine is essential to resist foreign domination by the Russians. In this view, assistance helps Ukraine resist external aggression and maintain its own independence, contributing to the broader principles of democracy and international law. Related to this argument is the belief that a strong response, including military and economic assistance, can serve as a deterrent against further aggression on the part of the Russians. By demonstrating a Western commitment to supporting Ukraine now, Russia will be dissuaded from further aggression, and this will contribute to regional stability. Proponents of aid further contend that a stable and secure Ukraine is in the interest of global security. Instability in the region can have broader consequences worldwide, affecting neighboring countries and potentially creating a more volatile international environment. This is seen in the effect of the war on Ukrainian grain exports and the resulting global shortage and supply chain disruption.[10]

2.2.2 Against Providing Aid to Ukraine

A strong case against the provision of aid lies in the risk of potential escalation. Critics of providing aid argue that doing so could escalate the conflict and draw the United States and Western allies into a new

[10] Kagan, Robert. "A Free World, If You Can Keep It: Ukraine and American Interests" 39.

World War. Some fear that increased military assistance could lead to a direct confrontation between major powers, given the involvement of the former Cold War foes, the US and Russia.

Isolationists also argue that the United States should focus first on domestic issues. Opponents of aid believe that American resources should be directed toward addressing problems in the homeland rather than providing aid to foreign nations. They contend that the government should grant first priority to concerns such as the opioid crisis, unchecked immigration, the economic challenges in America's inner cities and rural areas, access to healthcare, and crumbling infrastructure. An obvious flaw in this argument lies in the perception that spending at the same levels would take place to address these domestic issues, if those same resources were not allocated to push back against the Russian invasion.

A point frequently made by the staunchest critics of aid to Ukraine also lies in concerns around corruption. Skeptics have expressed concerns about grift within Ukraine, often citing Transparency International's 2022 Corruption Perceptions Index (CPI), which scored 180 countries on a scale from 0 ("highly corrupt") to 100 ("very clean"), in which Ukraine received a score of 33. They argue that providing US aid could be counterproductive if it ends up benefiting corrupt officials rather than reaching those in need. Additionally, with respect to military aid, there are concerns that weapons and ammunition provided to the Ukrainian Armed Forces for use against Russian occupiers in the east may find their way into the global arms trade. These arguments are designed to appeal to the fear of unpredictable outcomes. It is a fact of life that the future is unpredictable, and providing aid could lead to unintended consequences.[11]

2.3 Theoretical Framework

Having established the goals and motivations of Russian violent expansion, reviewed the relevant history of such acts since the fall of the Soviet Union, and discussed the key schools of thought both in support of and against the provision of US aid, we now have a foundation upon which to base a theoretical framework for the analysis of the effectiveness of such aid. The knowledge gaps present in the current

[11] Mearsheimer, John J. "Playing With Fire in Ukraine: The Underappreciated Risks of Catastrophic Escalation," n.p.

research exist due to the use of foreign policy theory and partisan affiliation to substantiate the position with respect to providing US aid. A boundary exists in the body of research due to the limitations of this approach, in that it lacks quantified, evidence based supporting material, rooted in the available conflict data. This research will fill the gaps by providing a quantitative analysis of the effects of US aid on the factors leading to victory.

2.3.1 Foreign Policy Theory of Proxy War

Proxy wars are a well-established foreign policy strategy in which a state engages in a conflict by supporting a third party, often a non-state actor or a surrogate state, to pursue its strategic objectives without direct involvement in the hostilities. This approach has been a cornerstone of international relations- allowing powerful nations to exert influence and pursue their interests across the globe in a manner that mitigates the risk of direct confrontation and the associated costs. This strategy allows the sponsoring state to achieve its goals- whether they be territorial, economic, or geopolitical- while minimizing the potential for retaliation and also often maintaining some level of plausible deniability. Proxy wars have played a significant role in the dynamics of international conflict throughout history, with some examples ranging from the Cold War-era conflicts in Vietnam and Afghanistan to more recent instances in Syria and Ukraine. In each of those examples, the West, or what Dugin refers to as the Atlantic pole, battled the Eurasian pole represented by the Soviet Union/ Russia in the interests of liberty and western liberal democracy, in the face of totalitarian or communist rule.

At the most basic level, proxy warfare emphasizes the instrumental use of proxies to advance a state's interests while avoiding the direct costs and risks of full-scale military engagement. Realist foreign policy theories argue that great powers employ proxy wars as a means of expanding their sphere of influence or containing rival states, leveraging surrogates to achieve their strategic objectives. On the other hand, perhaps more optimistically, constructivist foreign policy perspectives emphasize the ideological and normative factors that drive states to support proxy actors. These theories emphasize that the choice of proxies is often driven by shared values, such as ideology or cultural affiliations. In

practice, states engage in proxy wars for a variety of different reasons- including geopolitical positioning, control of key resources, and regional domination. While proxy wars offer states strategic advantages, they also carry complex challenges, including the risk of unintended consequences (blowback), the potential for escalation, and the erosion of the rules based international order.[12],[13]

2.3.2 Factors and Metrics Contributing to Victory in War

There are a multitude of complex factors existing on the tactical, operational, and strategic levels of war that lead to victory. As many historians have noted, it is possible to win almost every battle on the tactical level while losing the overall war if the strategic goals are not met, and desired endstate is not achieved. Some of these factors include operational planning, military capability, logistics and support, intelligence and information warfare, economic and manufacturing capacity, morale and cohesion, political support, and others.

Among the many metrics we use to measure the effectiveness of the orchestration of these factors, delivering enemy personnel losses is the most important. Inflicting significant losses on enemy personnel is, indisputably, a critical component of achieving victory in warfare. A high number of casualties directly weakens the enemy's military capabilities, disrupts their ability to command and control their forces, and heavily erodes morale and the will to fight. The strategic importance of delivering enemy personnel losses lies in its potential to incapacitate key leaders, disrupt operational coordination, and diminish the overall combat power of the adversary. By targeting and eliminating Russian forces occupying Ukrainian territory, a decisive battlefield advantage can be gained in pursuit of conditions conducive to achieving the broader strategic objectives of the conflict. This not only weakens the adversary on a tactical level, but also acts as a strategic deterrent, dissuading future aggression and destroying the perception of Russian military superiority in the face of motivated, well trained, and equipped opposition forces.

[12] Watts, Stephen, et al. “Proxy Warfare in Strategic Competition: State Motivations and Future Trends,” 2.
[13] Foster, John Bellamy. "The US Proxy War in Ukraine," 11.

Another important metric effecting several of the “softer” factors including economic and manufacturing capacity, morale and cohesion, and political support is the level of friendly civilian casualties in the conflict. The protection of noncombatants is both a moral imperative and a strategic necessity in warfare. Civilian populations play a crucial role in sustaining a nation's resilience and stability. Ensuring the safety of civilians builds international support for military operations, fosters goodwill, and upholds the principles of international humanitarian law. The strategic significance of protecting friendly civilians lies in its impact on public opinion, both local to the conflict and on the world stage. Military success accompanied by a commitment to minimizing civilian casualties can contribute to long-term stability, mitigate potential humanitarian crises, and facilitate post-conflict reconstruction. Military and financial aid yielding a positive effect on suppressing civilian casualties not only garners increased support, but also contributes to overall victory. Additionally, effectively providing protection for the civilian population can help maintain ownership of the "hearts and minds" of the people, undermining the enemy's attempts to exploit civilian fear and discontent for strategic gain.

The recapture of occupied territory from the enemy stands as the paramount factor in the trajectory toward victory in armed conflicts. Beyond its strategic significance in disrupting the adversary's command and control structures and eroding their combat capabilities, territorial regain is instrumental in reshaping the narrative of the conflict. The liberation of occupied areas not only symbolizes a tangible shift in power dynamics but also carries profound psychological implications. It bolsters the morale and determination of friendly forces and their allies, instilling a sense of achievement and progress. Simultaneously, it undermines the morale of the occupying forces, sowing seeds of doubt and diminishing their perceived freedom of maneuver. The act of reclaiming territory not only secures tangible gains on the battlefield but also contributes to the intangible yet critical element of perception and momentum. As we have seen in the Ukraine conflict, the ability to retake and control territory is closely intertwined with the overall narrative of success and, consequently, plays a pivotal role in

shaping the course of conflicts and steering them toward victory. While much of the last year has been a stalemate in the war, there are still effects worthy of analysis.

2.3.3 Calculating Pyrrhic Victory

Determining whether a proxy war is heading toward a pyrrhic victory- where the costs outweigh the benefits- can be a complex and challenging assessment for sponsoring state. One of the earliest signs of a potential pyrrhic victory is when the sponsoring state (or coalition of states) find themselves expending vast resources, both financial and material, with diminishing returns. If the costs of supporting the proxy begin to outweigh the perceived benefits or strategic gains, it may signal a pyrrhic outcome. This study will specifically seek to examine that aspect in terms of enemy KIA delivered and the suppression of civilian casualties.

Another contributor to pyrrhic victory is if the proxy war escalates beyond the initial objectives and becomes a more extensive regional or international conflict. This can lead to an increased expenditure of resources and a situation where the benefits no longer align with the costs. Escalation may also attract more actors into the conflict, making it harder to control and potentially leading to unintended consequences. An example of this folly is the removal of the Ba'ath regime in Iraq followed by the installation of the Shia-dominated government. This directly led to the subsequent rise of militant Sunni transnational jihadists, first as part of al Qaeda in Iraq (AQI) and later under the black banner of Daesh/ ISIS. In responding to the escalation in violence presented by Daesh, Iranian backed militias collectively known as the Hash'd al Shaabi or Popular Mobilization Forces spread Iranian influence and control over much of Shia-inhabited Iraq.[14]

Popular support for a proxy war may diminish over time if the domestic population begins to question the wisdom or necessity of the conflict. Negative public opinion, protests, or political opposition can exert pressure on the sponsoring state to reassess its involvement. Russian information operations are in progress daily- designed to produce a domestic backlash against support for Ukraine. In both right and

[14] Nedeljković, Stevan, et al. "The United States and the War on Terror: The Cost of Pyrrhic Victory," 11.

left wing circles, messaging is inserted to portray Volodymyr Zelenskyy as corrupt, to smear the Armed Forces of Ukraine as Nazis, or to focus on unfunded necessities at home while aid flows to Ukraine. Popular support is also closely tied to the effectiveness and reliability of the proxy forces in battle. If the proxy fails to achieve its objectives or suffers significant setbacks, the sponsoring state is forced to reassess its strategy. Continued support for an ineffective proxy can be costly both in terms of resources and reputation for proponents of aid.

A protracted proxy war can also have severe economic consequences for the sponsoring state. These negative effects include inflation, decreased economic growth, and increased debt. If these economic impacts become unsustainable or carry on for too long, it may indicate that the costs are outweighing the benefits.[15]

The decision to continue or disengage from a proxy war is a complex one, influenced by a variety of political, strategic, and ethical considerations. Assessing these factors requires a careful analysis of the effectiveness of aid provided in achieving the relevant metrics. That is the goal of this study.

2.3.4 Hypothesis

While US aid produced spectacular effects during the early phases of the war as well as during the Kharkiv offensive which recaptured a great deal of territory, the effects of aid in the current stalemate situation are reduced.

Through quantifying the effects of US aid on daily Russian KIA as well as the effect on preventing civilian deaths and recapturing occupied territory, we can determine the efficacy of American support in contributing to Ukrainian victory.

It is the author's hypothesis that within the unique environment of the Ukrainian conflict, US aid has been producing significant positive effects which contribute to victory, and it is critically important to continue through to Russian defeat. This necessary outcome will have wide reaching effects for the

15 Mbah, Ruth et al. "Russian-Ukraine 2022 War: A review of the economic impact on the USA, UK, Canada, and Europe," 2.

future of the region and global stability as we risk entering a historical era of increased competition, conflict, and war.

3.0 Data and Methods

This analysis leverages available open-source data to explore the intricate dynamics of U.S. funding to Ukraine within the context of Russian battlefield losses in terms of personnel, the suppression of Ukrainian civilian casualties, and the recapture of occupied territory. The goal is to shed light on the broader implications of U.S. aid in conflict settings and assess its effectiveness in achieving victory. This research contributes insights into the impact of foreign aid in conflict scenarios and its role in shaping conflict outcomes.

3.1 Data Sources

In order to analyze the impact of U.S. funding on the war effort in Ukraine, data has been collected from various sources available for academic research, aggregated, and enriched into a common dataset keyed on date. The accuracy of this data represents the author's best effort to collect from reputable open sources. The quality of this data has been improved through enrichment and feature engineering conducted as part of the analysis. No data used in this study was sourced from the US government, and no classified material was used in developing the background, methodology, analysis, or interpretation of the results.

3.1.1 US Aid Delivered

The primary data source utilized is the U.S.-specific portion of the Kiel Institute's records of foreign assistance to Ukraine by country known as the "Ukraine Support Tracker." This dataset offers comprehensive information on financial and material support provided by the United States, including details on the type, quantity, estimated value, delivery date, and links to relevant information for both military aid and financial assistance. While this dataset includes a great number of variables, many of them were not relevant to the study and have been excluded.

The dataset is structured with individual aid disbursements as the unit of analysis, measured in U.S. dollars. The unit of observation is days, and it comprises a total of 572 observations. Although the dataset covers several years leading up to the conflict, the analysis focuses on the period from the start of the invasion in February 2022.[16]

3.1.2 Russian KIA

In addition to the U.S. funding data, details regarding Russian battlefield losses in Ukraine have been sourced from Dr. Petro Ivaniuk, a data scientist based in Lviv. This dataset comprises personnel numbers, with the principal variable of interest being members of the Russian Armed Forces Killed in Action (KIA). It is important to note that the Russian daily KIA figures provided in this dataset are estimates, and potential bias may be present in the information. Similar to the U.S. funding data, the unit of analysis in this dataset is days, encompassing a total of 591 observations. Despite the potential limitations, Dr. Ivaniuk's dataset offers valuable insights into Russian military casualties on a daily basis, contributing to a more comprehensive understanding of the conflict dynamics in Ukraine.[17]

3.1.3 Ukrainian Civilians Killed

The data source for Civilians Killed in this study is the Office of the UN High Commissioner for Human Rights (OHCHR), a reputable and authoritative organization in the field of human rights monitoring. The OHCHR provides a comprehensive and meticulously documented dataset that encompasses monthly totals of civilians killed in the ongoing conflict in Ukraine. This dataset is particularly valuable due to the UN's commitment to impartiality, accuracy, and transparency in reporting human rights violations. The OHCHR's role as a neutral observer enhances the credibility of the Civilians Killed variable, offering a reliable foundation for analyses examining the impact of conflict dynamics on civilian casualties. The monthly granularity of the data further allows for a summarized exploration of temporal patterns, providing insights into the ebb and flow of civilian casualties throughout the duration of the conflict. While this data source contributes valuable information to the study, it is essential to acknowledge the

16 Trebesch, Christoph et al, "The Ukraine Support Tracker," Release 13.
17 2022 Russia Ukraine War: Equipment Losses, Death Toll, Military Wounded, and Prisoner of War of Russians

potential limitations associated with the inherent complexities of collecting accurate and real-time data in conflict zones.[18]

3.1.4 Territorial Gains and Losses

Data on Russian territorial gains and losses in Ukraine was sourced from The Institute for the Study of War along with AEI's Critical Threats Project. While the recapture of occupied territory may seem like the most obvious and direct metric contributing to victory, it must be acknowledged that it is extremely difficult to reliably calculate territorial control across a highly dynamic front such as the one that still exists in parts of Eastern Ukraine, particularly the Avdiivka front. Fueled by information warfare on both sides of the conflict, disputes among open source analysts regarding the zones of control are common. Many of these discrepancies also concern unpopulated or uninhabited areas that are neither completely under the control of the Russians or the Ukrainians. Since the introduction of stalemate conditions, we have seen no definitive gains or losses for many consecutive months.[19]

3.2 Methods of Analysis

The primary goal of this analysis is to quantify the impact of US aid on producing Russian KIA, suppressing Ukrainian civilian deaths, and recapturing occupied territory. Specifically, this research aims to determine if continued US aid to the conflict in Ukraine is expected to make measurable contributions to the factors that lead to victory, and if so, at what level of impact.

The primary method used to guide the analysis in this study will be OLS regression. Regression analysis will be employed to assess the relationship between the variable of interest, namely the impact of $1M in aid, and the target outcomes, including increasing Russian KIA, decreasing Ukrainian civilian deaths, and recapturing occupied territory.

[18] Office of the UN High Commissioner for Human Rights (OHCHR), Ukraine: Civilian Casualty Update, 11 September 2023
19 Institute for the Study of War and AEI's Critical Threat Project, "Russian-held Territory in Ukraine, Control Shift."

Data visualization tools will be used to illustrate key findings and trends in a clear and accessible manner. This will inform and guide the analysis as well as provide a visual representation of the data and its implications.

In order to isolate and examine the effects of aid provided, we must align with the operational phases of the conflict, which each contain a unique mission, set of goals, and desired endstate within the overall campaign. Through employing feature engineering such as this, we are better able to understand the alignment of the data with mission objectives and the battlefield situation. The campaigns of the conflict are depicted in Table 1, below.

Phase	Begin	End
Prelude		23-Feb-22
Phase 1: Initial Invasion	24-Feb-22	7-Apr-22
Phase 2: Southeastern Front	8-Apr-22	28-Aug-22
Phase 3: Counteroffensive	29-Aug-22	11-Nov-22
Phase 4: First Stalemate	12-Nov-22	28-Mar-23
Phase 5: Second Stalemate	29-Mar-22	8-Oct-23

Table 1 - Phases of the Conflict in Ukraine

4.0 Results

This study investigates the impact of US aid on producing Russian KIA, suppressing Ukrainian civilian deaths, and recapturing occupied territory. The hypothesis is that within the unique environment of the Ukrainian conflict, US aid has been producing significant positive effects which contribute to victory, and it is critically important to continue through to Russian defeat. The goal of performing this research is to provide an informed and factually qualified position to continue or disengage from providing US aid to Ukraine.

What we arrive at through analysis is statistical evidence to support the Author's hypotheses regarding the impact of US funding on Russian battlefield losses- that the provision of US aid is yielding positive effects in both producing Russian KIA and suppressing Ukrainian civilian deaths.

4.1 Data Visualizations

For contextual purposes, we begin with a visualization of daily Russian KIA across the campaign phases of the conflict, shown below in figure 1. While we predictably observe high daily losses during the initial invasion (when the Russian advance on Kiev was halted and effectively repelled), we see a period of low daily totals leading into the fall Counteroffensive of 2022 that recaptured a great deal of territory in northeastern Ukraine. What is interesting to observe is that daily Russian KIA continued to rise into the first stalemate, and remained significantly higher during both stalemate phases than it was during the campaign along the Southeastern Front that included the siege of Mariupol (24 February 2022 - 20 May 2022) and the accompanying battle for the Azovstal plant.

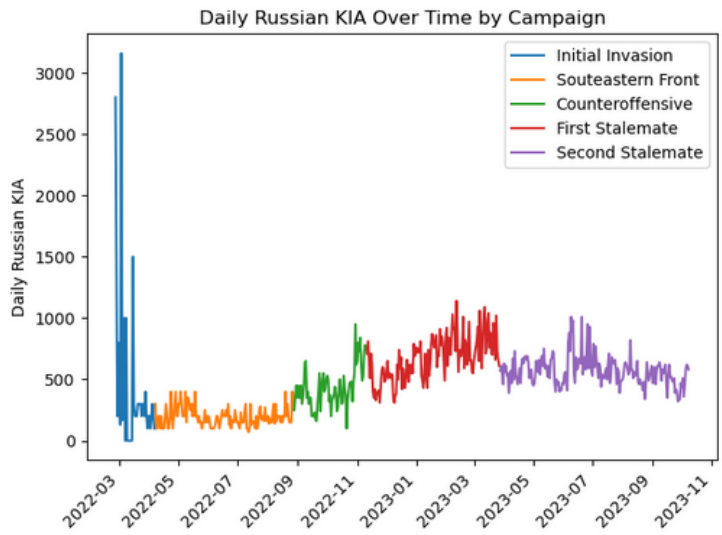

Figure 1 - Daily Russian KIA Over Time by Campaign

When overlaid with the log of total aid (both military aid and financial assistance), it becomes apparent that a relationship exists between the two variables such that an infusion of aid corresponds with an increase in daily Russian KIA approximately a month and a half from the date of delivery. This could be due to the time it takes for military aid to arrive at the front lines, or by slowly easing the level of austerity in governance operations once additional resources trickle down to the requiring offices and

activity sites. This is displayed in figure 2 below, after truncating the initial invasion phase to exclude both abnormally high daily KIA and infusions of aid.

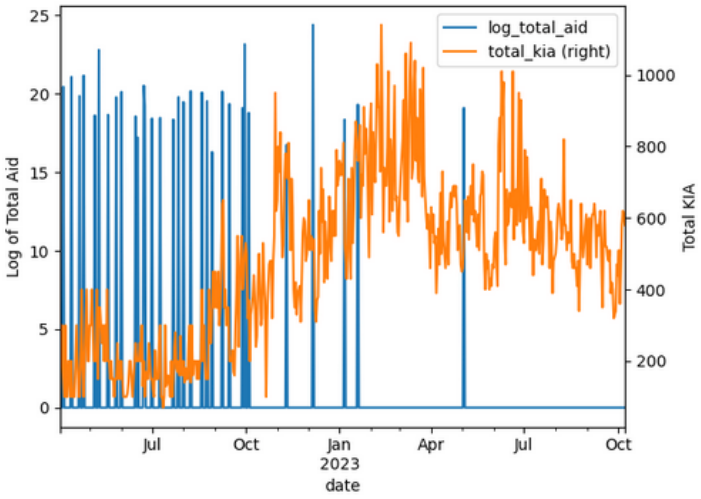

Figure 2 - Log of Total Aid and Daily Russian KIA

4.2 Regression Results

We assess the impact of US aid by performing a series of OLS regression models on the aggregated and enriched data. Model 1 solely compares the effects of total US Aid on daily Russian KIA, while Model 2 incorporates a 42 day time shift to account for what was observed in our visualization of the data. The

results of Model 1 are show below, in Table 2 and accompanying Figures 3 and 4.

OLS Regression Results

Dep. Variable:	total_kia	R-squared:	0.698
Model:	OLS	Adj. R-squared:	0.691
Method:	Least Squares	F-statistic:	90.33
Date:	Mon, 06 Nov 2023	Prob (F-statistic):	1.06e-11
Time:	09:57:43	Log-Likelihood:	-361.51
No. Observations:	41	AIC:	727.0
Df Residuals:	39	BIC:	730.4
Df Model:	1		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	2156.6569	522.268	4.129	0.000	1100.270	3213.044
total_aid	9.408e-08	9.9e-09	9.504	0.000	7.41e-08	1.14e-07

Omnibus:	4.948	Durbin-Watson:	0.698
Prob(Omnibus):	0.084	Jarque-Bera (JB):	5.380
Skew:	0.189	Prob(JB):	0.0679
Kurtosis:	4.734	Cond. No.	1.05e+11

Notes:
[1] Standard Errors assume that the covariance matrix of the errors is correctly specified.
[2] The condition number is large, 1.05e+11. This might indicate that there are
strong multicollinearity or other numerical problems.

Table 2 – Model 1 OLS Regression Results, Effect of Total US Aid on Daily Russian KIA

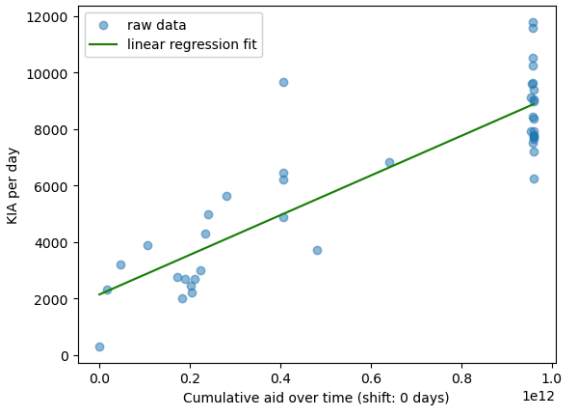

Figure 3 - Model 1 Linear Regression Fit

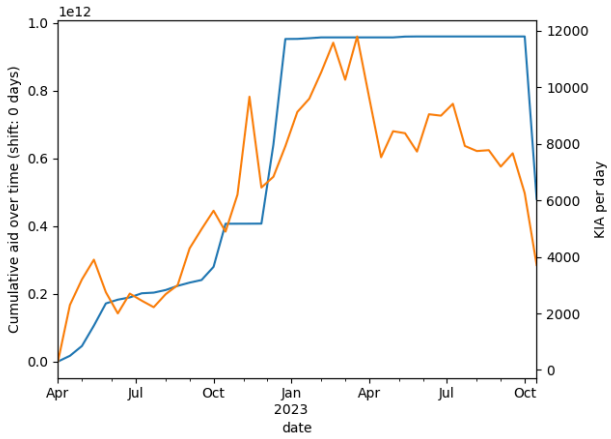

Figure 4 - Model 1 Data Plot

Incorporating a 42 day time shift to model 2 to account for the lag between the arrival of aid and positive effects on Russian KIA results in a better fit and improved R-squared. The results of Model 2 are show below, in Table 3 and accompanying Figures 5 and 6.

OLS Regression Results

Dep. Variable:	Total KIA	R-squared:	0.760
Model:	OLS	Adj. R-squared:	0.753
Method:	Least Squares	F-statistic:	114.0
Date:	Sun, 26 Nov 2023	Prob (F-statistic):	1.05e-12
Time:	15:04:37	Log-Likelihood:	-332.04
No. Observations:	38	AIC:	668.1
Df Residuals:	36	BIC:	671.4
Df Model:	1		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	2314.0901	458.196	5.050	0.000	1384.826	3243.355
Cumulative Aid	1.104e-07	1.03e-08	10.675	0.000	8.94e-08	1.31e-07

Omnibus:	9.425	Durbin-Watson:	0.985
Prob(Omnibus):	0.009	Jarque-Bera (JB):	11.191
Skew:	-0.688	Prob(JB):	0.00372
Kurtosis:	5.275	Cond. No.	8.08e+10

Notes:
[1] Standard Errors assume that the covariance matrix of the errors is correctly specified.
[2] The condition number is large, 8.08e+10. This might indicate that there are
strong multicollinearity or other numerical problems.

Table 3 - Model 2 OLS Regression Results, Effect of Cumulative Aid on Daily Russian KIA

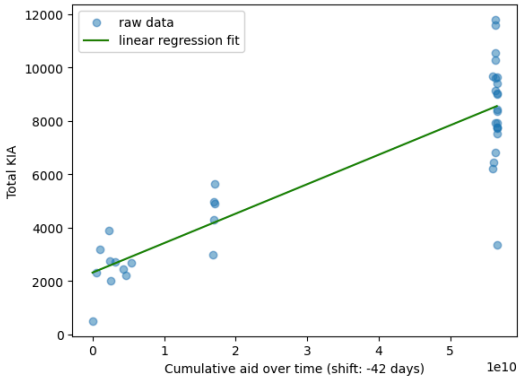

Figure 5 - Model 2 Linear Regression Fit

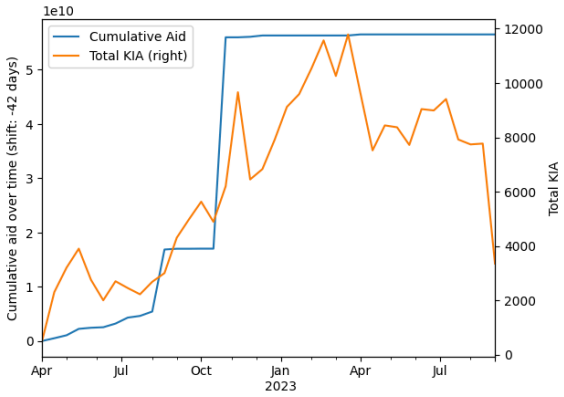

Figure 6 - Model 2 Data Plot

With respect to the effect of total US aid on civilian casualties, the relationship is weaker, but still present. Model 3 compares the effects of cumulative US Aid on Ukrainian civilian deaths using an OLS regression model and dispensing with the 42 day time shift, due to the monthly granularity of the civilian casualty data obtained. The results of Model 3 are show below, in Table 4 and accompanying Figures 7 and 8.

OLS Regression Results

Dep. Variable:	Civilians Killed	R-squared:	0.675
Model:	OLS	Adj. R-squared:	0.652
Method:	Least Squares	F-statistic:	29.07
Date:	Sun, 26 Nov 2023	Prob (F-statistic):	9.50e-05
Time:	15:04:37	Log-Likelihood:	-96.589
No. Observations:	16	AIC:	197.2
Df Residuals:	14	BIC:	198.7
Df Model:	1		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	588.6691	59.281	9.930	0.000	461.524	715.814
Cumulative Aid	-5.703e-09	1.06e-09	-5.392	0.000	-7.97e-09	-3.43e-09

Omnibus:	9.199	Durbin-Watson:	1.049
Prob(Omnibus):	0.010	Jarque-Bera (JB):	6.544
Skew:	0.920	Prob(JB):	0.0379
Kurtosis:	5.535	Cond. No.	1.23e+11

Notes:
[1] Standard Errors assume that the covariance matrix of the errors is correctly specified.
[2] The condition number is large, 1.23e+11. This might indicate that there are strong multicollinearity or other numerical problems.

Table 4 - Model 3 OLS Regression Results, Cumulative US Aid on Ukrainian Civilians Killed

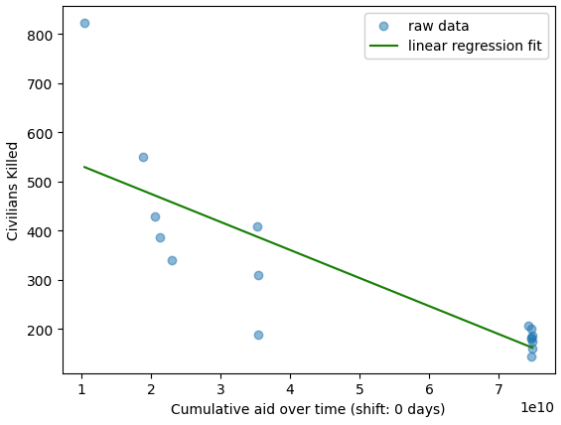

Figure 7 - Model 3 Linear Regression Fit

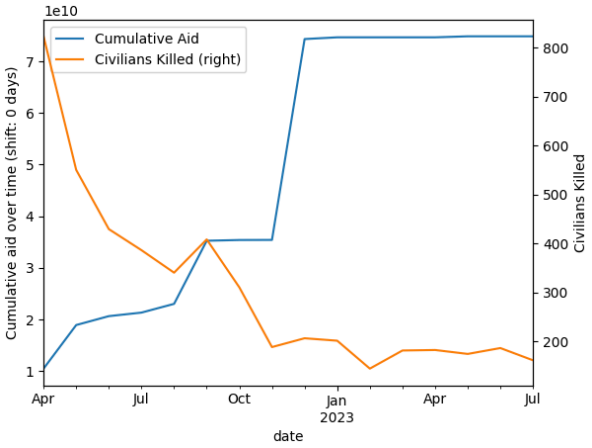

Figure 8 - Model 3 Data Plot

Model 4 compares the effects of cumulative US aid on recapturing occupied territory, and exhibits similar R-squared to Model 3, as shown below in Table 5 and accompanying Figures 9 and 10.

.

OLS Regression Results

Dep. Variable:	Russian Territorial Loss (cumulative)	R-squared:	0.668
Model:	OLS	Adj. R-squared:	0.644
Method:	Least Squares	F-statistic:	28.16
Date:	Sun, 26 Nov 2023	Prob (F-statistic):	0.000111
Time:	15:04:37	Log-Likelihood:	-147.26
No. Observations:	16	AIC:	298.5
Df Residuals:	14	BIC:	300.1
Df Model:	1		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	3.554e+04	1407.069	25.262	0.000	3.25e+04	3.86e+04
Cumulative Aid	1.332e-07	2.51e-08	5.306	0.000	7.94e-08	1.87e-07

Omnibus:	5.756	Durbin-Watson:	0.893
Prob(Omnibus):	0.056	Jarque-Bera (JB):	3.867
Skew:	1.203	Prob(JB):	0.145
Kurtosis:	3.090	Cond. No.	1.23e+11

Notes:
[1] Standard Errors assume that the covariance matrix of the errors is correctly specified.
[2] The condition number is large, 1.23e+11. This might indicate that there are
strong multicollinearity or other numerical problems.

Table 5 - Model 4 OLS Regression Results, Effect of Cumulative Aid on Cumulative Russian Territorial Losses

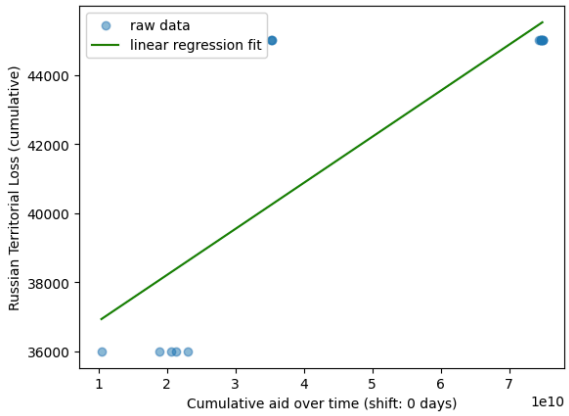

Figure 9 - Model 4 Linear Regression Fit

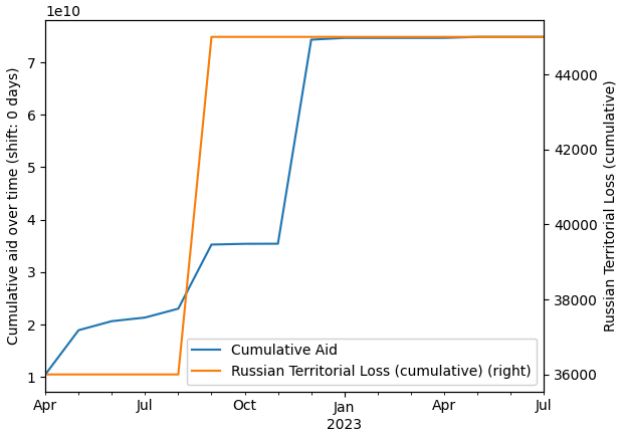

Figure 10 - Model 4 Data Plot

4.3 Descriptive Analysis of the Results

In examining the relationship between cumulative US aid to Ukraine and the total Russian KIA, our Model 2 reveals a robust statistical significance. The R-squared value of 0.76 suggests that approximately 76% of the variance in Russian KIA can be explained by the model. The F-statistic of 114 further supports the overall model's statistical significance (Prob < 0.0001). The model's coefficients indicate that for each additional $1,000,000 of total US aid to Ukraine, there is a predicted increase in the total Russian Killed in Action by approximately 0.11 units. This substantiates the author's hypothesis regarding the substantial predictive power of total US aid over daily Russian KIA.

In contrast, when examining the relationship between cumulative US aid to Ukraine and the number of Civilians Killed in Model 3, the findings are less conclusive. The R-squared value of 0.675 indicates that approximately 67.5% of the variance in civilian casualties can be elucidated by the model, suggesting a moderate but not overwhelmingly robust predictive capacity. The F-statistic of 29.07, while not attaining conventional statistical significance levels with a p-value of 0.0752, hints at a noteworthy relationship. The coefficients suggest that for each additional $1,000,000 of total U.S. aid to Ukraine, there is a predicted decrease in Civilians Killed by approximately 0.0000018 units. However, the modest R-squared value and non-significant F-statistic caution against placing too much confidence on this model for predicting civilian casualties. The regression results imply that while cumulative U.S. aid may exert some mitigating effect on civilian casualties, the intricate nature of conflict dynamics and the multitude of contributing factors necessitate a more comprehensive exploration of the relationship. The cautionary note is reinforced by the relatively low F-statistic and the possibility of numerical issues indicated by the large condition number, suggesting potential challenges like multicollinearity that warrant further investigation.

Turning to Model 4, which assesses the relationship between cumulative U.S. aid to Ukraine and cumulative Russian loss of occupied territory, the results present revealing insights in light of the stalemate. The similar R-squared value of 0.668 suggests that approximately 66.8% of the variance in Russian territorial losses can be explained by the model, indicating a moderate predictive capacity. The F-statistic of 28.16, coupled with a p-value of 0.000111, attains conventional statistical significance levels, reinforcing the robustness of the relationship, despite the lower p-value compared to Model 3. The coefficients reveal that for each additional $1,000,000 of total U.S. aid to Ukraine, there is a predicted increase in Russian Territorial Losses by approximately 0.000000133 units. This implies that as cumulative U.S. aid to Ukraine rises, there is an associated increase in the territorial losses suffered by Russian forces. While the results present a statistically significant relationship, the cautionary note from the relatively large condition number persists, indicating potential numerical challenges such as

multicollinearity may be present. Further investigation into the nuanced dynamics shaping Russian territorial losses, accounting for various additional factors influencing conflict outcomes, is needed to unpack the intricacies of this relationship and enhance the usefulness of the model.

In summary, while Model 2 demonstrates a significant association between total US aid and Russian military casualties, Model 3's predictive power regarding civilian casualties appears limited, though a relationship still exists. Model 4 displays a more robust relationship between the variables, but additional data is needed to clarify the relationship. These results underscore the complexity of the relationship between aid and the factors leading to victory, prompting the need for careful interpretation and potential avenues for additional data gathering, further analysis, or model refinement.

4.4 Discussion of Results

This research seeks to deepen our understanding of the dynamics of the conflict in Ukraine, U.S. foreign policy implications, insights into Russia's motivtations, and the factors which lead to victory. The analysis, grounded in a theoretical framework utilizing Ordinary Least Squares (OLS) regression models, has provided intriguing findings.

The results of Model 2 demonstrate a significant positive relationship between total U.S. aid to Ukraine and total Russian KIA. This suggests that increased aid is associated with higher Russian military casualties, implying a potential impact on battlefield success for Ukraine. This aligns with the broader context of the conflict, illustrating the effectiveness of U.S. military aid in bolstering Ukraine's defense capabilities against Russian aggression. It provides empirical support for the hypothesis that increased aid contributes to a more effective defense.

In contrast, the limited predictive power of Model 3 for Civilians Killed speaks to the complexity of the dynamics of war. While US aid appears to more directly influence the offensive aspects of the conflict, its impact on the defense, and civilian casualties is less pronounced. This finding suggests the need for a more well-balanced approach to U.S. foreign policy, suggesting that a comprehensive strategy addressing both military and humanitarian aspects is imperative.

In contrast to the nuanced relationship observed in Model 3, the results of Model 4 shed light on the intricate interplay between U.S. aid to Ukraine and Russian territorial losses, despite the well known stalemate conditions of the current conflict. The significant positive relationship, as indicated by the statistically significant coefficients and F-statistic, suggests that heightened U.S. aid is associated with increased territorial losses suffered by Russian forces, though at low levels per one million dollars of aid.

In the broader context, these results contribute to the ongoing discourse on Neo-Soviet aggression, highlighting the adaptability of Russia's military strategy in response to external assistance to Ukraine. As the conflict evolves, Russia may need to reassess its tactics in light of increased losses in areas receiving significant U.S. aid, or advanced weapons. The findings also emphasize the need for a multifaceted understanding of "victory" in warfare, encompassing not only military metrics but also the protection of civilian lives. Continuity of governance, economic function, and preservation of infrastructure all play important roles as well.

This discussion resonates with the theoretical framework we reviewed of the foreign policy theory of proxy war, elucidating how U.S. aid functions as a strategic tool in countering Russian aggression and achieving US foreign policy goals. Additionally, it aligns with the factors contributing to victory in war, where total cumulative aid emerges as a significant determinant of battlefield success. This study contributes to the literature reviewed by offering empirical insights into the calculation of victory, beyond basic ideological discussions, shedding light on the evolving nature of contemporary conflicts.

4.5 Limitations of the Study

Despite the insightful findings presented in this study, it is crucial to acknowledge and consider several limitations that may impact the robustness and generalizability of the results. Firstly, the study encounters challenges stemming from the uneven levels of authority and reliability between the data sources for different variables. While the dataset for total U.S. aid to Ukraine stands out for its meticulous detail and precision, down to the penny, the daily Russian Killed in Action (KIA) totals rely on estimates derived from the intensity of fighting rather than official, verifiable sources. This introduces

a potential source of uncertainty and subjectivity in assessing the true impact of aid on Russian military casualties. Moreover, the dataset for Civilians Killed, though better documented than Russian KIA, is reported on a monthly basis, introducing a temporal misalignment that may influence the accuracy of the analyses. Furthermore, variations in the levels of fidelity between data sources present another limitation. While total aid is documented daily, it exhibits sporadic patterns, in contrast to the daily and consistent reporting of Russian KIA. These variations in data fidelity and reporting frequency necessitate a cautious interpretation of the results and underline the need for further research that integrates data with greater uniformity and reliability across variables.

4.6 Potential Avenues for Further Research.

This study lays the groundwork for further research avenues that can deepen our understanding of the complexities surrounding conflict dynamics and U.S. foreign policy in the context of Ukraine. One promising avenue is the exploration of additional independent variables that contribute to victory, extending beyond the scope of military aid. Weather data, for instance, could be integrated to assess its impact on the intensity and outcome of military operations, considering the influence of climatic conditions on both offensive and defensive strategies. Furthermore, sentiment analysis of social media postings could offer valuable insights into the morale of soldiers on each side, as well as that of the civilian population, providing a nuanced perspective on the psychological dimensions of the conflict. Additionally, an intriguing avenue for exploration involves investigating the provision of U.S. aid to other geopolitical conflicts, such as Israel, and assessing the reverse coefficient for civilian deaths. Examining scenarios where the provision of U.S. aid might lead to higher numbers of civilian casualties can shed light on the complex interplay of factors influencing victory in conflict settings, contributing to a more comprehensive understanding of the broader implications of foreign aid on conflict outcomes. These potential avenues for further research offer exciting opportunities to refine and expand upon the insights garnered from this study, addressing the multifaceted nature of contemporary conflicts.

5.0 Conclusion

In conclusion, this research advances our comprehension of the complexities surrounding U.S. aid to Ukraine and its ramifications for the success of the ongoing conflict. The nuanced findings underscore the need for a holistic foreign policy approach, recognizing the multifaceted nature of victory in war. As U.S. policymakers navigate these complexities, informed decisions can be made to align foreign policy objectives with the evolving dynamics of the conflict at the edge of NATO.

References

Abramson, Jeff. "West Rushes Weapons to Ukraine"
Arms Control Today; Washington Vol. 52, Iss. 3, (Apr 2022): 29-31.

Boggild, Troels, Goebel, Lutscher, and Nyrup. "Standing with Ukraine? An Experimental Test of the Main Arguments for and against Supporting Ukraine." December 22, 2022.

Burbank, Jane. "The Grand Theory Driving Putin to War."
The New York Times 22 (2022).

Charap, et al. "Russia's Military Interventions: Patterns, Drivers, and Signposts."
RAND Corporation, 2021.

Chesterton, Hannah, and Tricia Bacon. "Defining Proxy Warfare."
Routledge Handbook of Proxy Wars. (2023).

Dugin, Aleksander. "Foundations of Geopolitics." 1997.
https://web.archive.org/web/20230404155207/https://agdugintranslate.gitbook.io/foundations-of-geopolitics/
Translated from Russian by Google Translate.

Finch, Raymond. "Why the Russian Military Failed in Chechnya."
Foreign Military Studies Office (FMSO), Center for Army Lessons Learned (CALL), Fort Leavenworth, KS.

Foster, John Bellamy. "The US Proxy War in Ukraine."
Australian Socialist 28, no. 1 (2022): 11-15.

Grossi, Giuseppe, and Veronika Vakulenko. "New Development: Accounting for Human-made Disasters—Comparative Analysis of the Support to Ukraine in Times of War." Public Money & Management 42, no. 6 (2022): 467-471.

Institute for the Study of War, AEI's Critical Threat Project. "Russian-held Territory in Ukraine, Control Shift." September 30, 2022

Ivaniuk, Petro. "2022 Russia Ukraine War: Equipment Losses, Death Toll, Military Wounded, and Prisoner of War of Russians."
Kaggle, 2023.

Kagan, Robert. "A Free World, If You Can Keep It: Ukraine and American Interests."
Foreign Aff. 102 (2023): 39.

Logan, John. "Acquiring Targets in the Bear's Backyard."
Naval War College, Newport, RI. May 13, 2022.

Mbah, Ruth Endam, and Divine Forcha Wasum. "Russian-Ukraine 2022 War: A Review of the Economic Impact of Russian-Ukraine Crisis on the USA, UK, Canada, and Europe." Advances in Social Sciences Research Journal 9, no. 3 (2022): 144-153.

Mearsheimer, John J. "Playing With Fire in Ukraine. The Underappreciated Risks of Catastrophic Escalation."
Foreign Affairs 17 (2022): 2022.

Muradov, Ibrahim. "The Russian Hybrid Warfare: The Cases of Ukraine and Georgia."
Defence Studies 22, no. 2 (2022): 168-191.

Nedeljković, Stevan, and Marko Dašić. "United States and the War on Terror: The Cost of Pyrrhic Victory."
Politika Nacionalne Bezbednosti: 75. Translated from Serbian by Google Translate.

Office of the UN High Commissioner for Human Rights (OHCHR). "Ukraine: Civilian Casualty Update." September 11, 2023.

Pellicciari, Igor. "Aid in War or Aid to War? Foreign Aid in the 2022 War in Ukraine."
The Review of International Affairs 73, no. 1186 (2022): 61-78.

Semenenko, Oleh, et al. "Forecast of Economic Consequences of the First Stage of the Russian-Ukrainian War for Russia: Loss of Personnel and Weapons and Military Equipment, Costs, Possible Consequences."
Social Development and Security, vol. 12, no. 2, 2022, pp. 31-43, doi:10.33445/sds.2022.12.2.3. Translated from Ukrainian by Google Translate.

Trebesch, Christoph, Arianna Antezza, Katelyn Bushnell, André Frank, Pascal Frank, Lukas Franz, Ivan Kharitonov, Bharath Kumar, Ekaterina Rebinskaya, and Stefan Schramm."The Ukraine Support Tracker: Which Countries Help Ukraine and How?" No. 2218. KIEL Working Paper, 2023.

Watts, Stephen Baldwin, Bryan A. Frederick, Nathan Chandler, Mark Toukan, Christian Curriden, Erik E. Mueller, Edward Geist et al. "Proxy Warfare in Strategic Competition: State Motivations and Future Trends." RAND Corporation, 2023.

Wimberley, Laura H. "Pyrrhic Peace: Governance Costs and the Utility of War."
University of California, San Diego, 2007.

Appendices

PLACEHOLDER

Curriculum Vitae

Kevin Ryan is a defense industry executive with 15 years of experience supporting technical projects including AI/ML products, cybersecurity, cloud infrastructure, unmanned aerial systems (UAS), and wireless communications. His non-technical professional experience involves multifunctional logistics support and work with the Intelligence Community (IC). Prior to his civilian career, he served in the United States Army from 1998 to 2009 with two deployments to Operation Iraqi Freedom (OIF). He holds a Bachelor of Science in Management from the A.B. Freeman School of Business at Tulane University and a Master of Business Administration from the Pamplin College of Business at Virginia Tech. He resides in Arlington, Virginia.