On the Russo-Ukrainian War

Expect operational success but not war-ending decision from the coming Spring Offensive.

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I am beginning an ongoing analysis of the conduct of the Russo-Ukrainian War, with this note, summarized in four points:

> The balance in materiel has shifted decisively towards the Ukrainians, though their shortage of personnel reinforces their strategic choice for a campaign of mechanized maneuver.
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> Politics, misperceptions, and strategic mismatch will pin the Russians in place as the Ukrainians launch their Spring Offensive.
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> The assault will likely be very successful operationally, but unlikely to end the war fully. Much depends on the arrival of long-range British missiles, which could destroy the Kerch Bridge and much of the remaining Russian Black Sea Fleet.
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> Technologists, industrialists, and investors should consider the likelihood of a longer war when investing in development and production for real battlefield needs, and the conduct of the war when marketing to those needs.

I will update this analysis as events warrant and time permits.

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Situation: the balance in materiel has shifted decisively towards the Ukrainians.

“Moscow is running short of supplies in its war against Ukraine,” Elisabeth Braw wrote in the *Wall Street Journal*, well back in December 2022. Before the present intensified war, Russia had four times the population and ten times the economy of a comparably corrupt Ukraine. However, as Byron Callan of Capital Alpha Partners has observed, the question was not just gross domestic product or some similar statistic, but how output was divided amongst militarily useful and other activities. The continuing failure of the Russian military may have been a predictable but just under-anticipated result of the trajectory of post-post-Cold War Russia:

over-leveraged in commodities, remarkably de-industrialized, and technologically dependent on advanced inputs now under international sanctions. This has had deleterious effects on Russian materiel, and in turn, on Russian personnel.

Materiel

Photographically verified intelligence from Oryxspioenkop and others indicates that Russian equipment losses throughout the war have been running about four times than Ukrainian losses. Losses of tanks for the Russian land forces (Army, Airborne Forces, and Naval Troops) have been particularly bad. Most of the T-72s and T-80s have been destroyed or captured. Lack of photographic evidence suggests that Russia may still have about most of its pre-war inventory of T-90s, supplemented by some new production. By my estimate, this numbers between 450 and 750 T-90 tanks. Prewar production capacity may have been about 200 T-90s annually, but that figure seems never to have been actually procured. The shortage of modern inputs has indeed hurt Russian production of modern weapons. Last summer, the Russian Defense Ministry announced a plan to modernize 800 T-62s with reactive armor, cage armor, and somewhat better sensors, within three years. The timeframe, clearly too late to have any effect on the coming battles, partly explains the photos and videos of T-55 tanks coming from storage in Siberia and the Russian Far East. Mostly this just indicates “serious attrition, supply chain, and industrial capacity problems” (see Trevithick, 2022). Russian tanks have also proven been largely ineffective in combat, accounting for very few of the Ukrainian vehicles destroyed. At this point, Russian tanks be much less useful than Russian howitzers and rockets, even if those are comparatively inaccurate. (I will discuss this in a pending note on the utility of tanks, as shown in this war, and in the future). All of this has led to a thorough de-mechanization of the war effort: Russian land forces are now relying on masses of infantry to press their attacks around Bakhmut.

Personnel

During a briefing in Northern Virginia in late March, a Ukrainian military official reported their estimate that the Russian land forces (Army, Airborne Forces, Naval Troops, and Wagner Group contractors) have been losing 500 to 1,000 men daily, but that Ukrainian losses have been about one-tenth that rate. While this might sound like propaganda, the Ukrainian estimate of overall Russian casualties so far in the war (172,000) is lower than those of the US Department of Defense and British Ministry of Defence (both exceeding 200,000). Most of this fighting is indeed currently around Bakhmut. As this is an important road junction, and because the Ukrainians like the exchange ratio, they see little reason to retreat. The environs have thus become another Verdun, with the comparable effect of bleeding the Russian forces dry. Separate estimates suggest that half of the Russian Airborne troops are now hors de combat—consider their conspicuous absence from the Victory Day parade this past week. The fighting is now probably concentrated amongst ill-trained conscripts and contractors, which does not facilitate battlefield learning for any component of the land forces. We can thus expect Russian

military effectiveness in the theater to remain unimpressive, except amongst air defense and electronic warfare troops. Numbers also remain unimpressive. In an interview with the Washington Post in February 2023, Max Bergmann of the Center for Strategic and International Studies estimated that the Russians had about 320,000 troops in and around Ukraine. This is probably considerably more than the Ukrainians are mustering, but increasing the force farther is an open question. As Matthew Luxmoore noted in the Wall Street Journal in March, draft-dodging has become challenging for both Russian and Ukrainian authorities.

Analysis: politics, misperceptions, and strategic mismatch will pin the Russians in place as the Ukrainians launch their Spring Offensive.

If one is genuinely considering the carnage, one might think then that a long war has disadvantages for both sides. Then why does this war continue? Indeed, why do some wars last much longer than others? Academic research suggests at least four important factors, which we can leverage in this analysis:

Domestic politics

As Goemans emphasized in his study (2000) of why the calamitous First World War lasted so long, international security is a two-level game, with both national and international components. The focus for domestic audiences of territorial conquest as the sole comprehensible war aim has led the Putin regime to attempt to hold exterior lines from Kharkiv to Kherson, the western extent of which follow a coastal strip about 100 miles deep. Retreat from the Azov and Black Sea coasts would expose Crimea to a Ukrainian offensive, as the Black Sea Fleet and the Kerch Bridge are no long-term guarantee of reliable resupply (see below).

Privacy and asymmetry of information

In war, neither side can really know what the other is thinking (Shirkey, 2016). Sam Greene and Alina Polyakova recent wrote that “Russia Wants a Long War,” figuring that Russian numbers and stoicism will eventually overtake Western industrial production and Ukrainian grit. Chelsea Michta argues that this “four-fold population advantage” means that “the coming Ukrainian offensive must therefore show that Kyiv can impose its own way of war on the Russians, with mobility and skill offsetting troop numbers.” On the other hand, underestimating Ukrainian capacity and resolve was long rampant from Moscow to Washington DC, until about late March 2022. The Russians may still not believe that the Ukrainians have become an impressive fighting force, and are yet getting better. The Russians may not fully grasp the meaning of battlefield learning and innovation, as they have little history of caring about it. For their part, the Ukrainians are signaling high expectations. Expect “a decisive battle this spring, and this battle will be the final one before this war ends,” Major General Kyrylo Budanov, head of Ukrainian military intelligence, told USA Today in early March.

Problems with credible commitment

Eliot Cohen argues that "accelerating the collapse of the Russian military is the most realistic way to end the conflict." But will collapse fully end the war? Negotiating with any implacable enemy may seem generally questionable (Reiter, 2009; Weisiger, 2013). At this point, reasonable negotiations with Vladimir Putin and his duplicitous, kleptocratic regime are indeed hard to imagine. Agreement is thus unlikely so long as Vladimir Putin remains in power in Moscow. Unclear remains what would convince even a successor Russian regime to sue for peace, or at least to stand down from active attacks. Wars can end in a sudden collapse or a slow exhaustion, but only the latter generally require negotiation. However, without negotiation and a credible commitment to peace, war may continue for some time. Putinists, even without Putin, may find recurrent war politically useful, as do the mullahs in Iran. This war thus may not end simply should Ukrainian troops retake Crimea and reach the Russian frontier in Donetsk and Luhansk.

Interactions of strategies

Bennett and Stamm (1996, 2009) have investigated how the interaction of each side's strategy affects the duration of wars. Similar frameworks by Echevarria (2017) and Wylie (1967) can be helpful in describing the problem too. Particularly lengthy can be wars in which the attacker employs a cumulative strategy of attrition, but the defender responds with a sequential strategy, of maneuver (on the ground) or rollback (in the air). Sequential strategies can be inherently riskier, as the chain of fortuitous events can break down at any point, requiring rethinking of the strategy. On the other hand, sequential strategies can work more quickly, as most cumulative alternatives require a slow grinding down of the enemy. Belligerents can combine strategies of both types. In the Second World War in the Pacific, the US maneuvered around some Japanese strongholds in its island-hopping campaign, but did so ultimately to bring B-29 bombers close to the Home Islands, for their high-altitude bombing and maritime mining campaigns. The first approach was sequential; the latter approaches were cumulative and decisive. By Bennett & Stamm's framework, the current situation in the Russo-Ukrainian War is one of offensive attrition, defensive maneuver, which empirically take longer to resolve. For the Russians, attrition is not working, as Ukraine's friends to the west can continue feeding precision weapons into the war for years. If the Ukrainians take the offensive, however, offensive maneuver, defensive attrition can move the combatants more quickly to a new nature of conflict.

Implication: the Spring Offensive will likely be very successful operationally, but unlikely to end the war fully.

The current campaign has been frequently described as trench warfare, but that historical allusion is is not quite accurate. As Holman Jenkins recently wrote in the Wall Street Journal, the fighting is along a "front twice as long as the Western Front in World War I, yet sparsely manned on both sides, allowing any number of possibilities for breakthrough and maneuver." With actual historical figures, we can then consider a simple model to analyze how what one

Ukrainian general called “this combination of First World War shelling and precision warfare” will proceed.

Historical comparisons

Consider two historical cases of trench and not-quite-trench warfare from that war over a century ago, and then the situation today:

> Western Front, 1918. On 26 September 1918, the US Army and Marine Corps launched their Meuse-Argonne Offensive, along their sector of 101 miles of the overall 440-mile Western Front. General Pershing had assembled 1,200,000 troops, 324 tanks, 840 aircraft, and 2,417 guns. Back then, the tanks broke down quickly, the aircraft could strafe troops in the open, and the guns were quite inaccurate. Without accounting for defense-in-depth, reserves, and service units, that made for approximately 12,000 troops per mile. They were opposed by approximately 450,000 well-entrenched Germans. Over the ensuing 47 days (until the Armistice of 11 November 1918), the Americans advanced 34 miles, at a cost of 120,000 casualties.
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> Eastern Front, 1918. In October 1917, just before the Russian collapse, the Eastern Front stretched for about 1,000 miles, with over two million Russian troops, and a somewhat smaller number of attacking German and Austro-Hungarian troops. That density of 2,000 troops per mile did not afford the Russians a continuous line of trenches. It also did not prevent a continuous advance by the Central Powers, even though they largely lacked reliable tanks and motorized transport for following up on breakthroughs.
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> Eastern Front, 2023. In May 2023, the Russo-Ukrainian Front stretches 600 miles, and is covered by perhaps 320,000 Russian and a presumably smaller number of Ukrainian troops. Observing videos from Ukrainian soldiers from drones provides a sense of the sparsity of the battlefield. That defensive density of 530 troops per mile does not permit continuous entrenchment, or even continuous overwatch of obstacles such as minefields and tank-traps. The Russian forces are backed by perhaps three tanks and four guns per mile—hardly enough to discourage a breakthrough. Afterwards, the Ukrainian advance will be supported with plentiful armored motor-transport, countless small drones, and very accurate indirect artillery fire—much more accurate than is now available to the Russians.

Sequential simulation as thought experiment

With these comparisons in mind, we can think about a sequential, five-phased theater-level simulation of the pending offensive, with some highly subjective conditional probabilities, pointing to a though experiment about the difficulty of ending the present war decisively:

> Breakthrough (80 percent likelihood, within one week of initial attack). The Ukrainians are quite likely to break through the Russian front, somewhere in the Kherson, Zaporizhzhia, or Donetsk Oblasts. Attempting to hold static positions with T-55s and T-62s will work no better for the Russians now than it did for the Iraqis in 1991. Tanks in this war have proven very

vulnerable to top-attack, particularly when not well-camouflaged and periodically moving. If the Ukrainian effort ends here for this campaigning season, without an open-fields exploitation, Russian resolve could stiffen. However, the success of any Russian counterattack would remain unlikely, as the Russian land forces are already accomplishing nothing up in Donetsk.

Exploitation (80% x 60% = 48 percent likelihood, within one to three weeks). The Ukrainians will then drive to the coast of the Sea of Azov; seize road, rail, and terrestrial telecommunications links; and establish their own defensive positions facing east and west. Russian attempts at movement and counter-battery fire will be observed by Ukrainian drones and American satellites, and reported quickly (see Brian Everstine's recent article in Aviation Week). Russian forces moving or firing will then be attacked with indirect precision fire, first by GMLRS missiles, and then by howitzers, replicating the highways of death seen repeatedly around Ukraine. Across the open and flat terrain of southern Ukraine, surviving Russian tanks will be directly destroyed, quickly and at great distance, if they attempt to oppose an advance by hundreds of Ukrainian Leopard 2s, Challenger 2s, and missile-firing Bradley M2A3s. Of course, this begs the question of whether the Ukrainians think that all those tanks are still useful, or perhaps whether all the talk of tanks has been largely another ruse. Regardless, if the Ukrainian effort ends here for this campaigning season, without cutting the bridge link to Krasnodar Krai, then Russian positions in Kherson Oblast will likely still become untenable, leading to a Russian withdrawal across the Isthmus of Perekop.

Isolation (80% x 60% x 80% = 38 percent likelihood, within one week to several months). As Ukrainian forces move closer, they will initiate a precision bombardment of Russian troops and installations in Crimea, and the interdiction of traffic on the Kerch Bridge. After new long-range, precision missiles arrive (as recently indicated by the solicitation of the British Government's International Fund for Ukraine), the destruction of at least one span of the Kerch Bridge becomes highly likely. With such weapons, the Ukrainians will eventually bring under fire the large warships of the Russian Black Sea Fleet at their remaining base in Novorossiysk, including submarines seeking replenishment and repair. Without meaningful possibility of seaborne resupply, the Crimean peninsula will effective become a huge Snake Island: isolated, largely barren, and difficult to hold. The question is how long is required for the provision of those missiles: lengthy delay may mean that full effect would wait until the fall. If the Ukrainian effort ends here for this campaigning season, then the Russian Navy will at least lose its ability to threaten Ukrainian shipping out of Odessa to the Turkish Straits, and some Ukrainian mobile forces could be freed up to pursue further attacks in Donetsk and Luhansk Oblasts before the autumn rains, depending on their need to rest and reset.

Local Capitulation (80% x 60% x 80% x 50% = 19 percent likelihood). A further phase could involve a mass surrender of those troops isolated from resupply. If the trains are not constantly bringing more shells from Siberia, guns fall silent, and infantry die in their dugouts. Bases across Crimea are already showing far less occupancy and activity than last year, possibly for their known exposure to Ukrainian bombardment. Mass disintegration of fighting forces can end campaigns quickly, as for the Iraqis in 2003 and the Afghans in 2021. Ukrainian officials are speaking openly about their intent to spread panic amongst

the Russian troops opposing their coming offensive. Just this week, Russian Condottiero Supremo Yevgeny Prigozhin complained of the rout of the Russian 72nd Motorized Rifle Brigade, alongside his Wagner Group troops near Bakhmut, under Ukrainian counterattack. If the effects of the Ukrainian effort end here for this campaigning season, the Russian Army would be further debited many troops, and almost all committed Ukrainian mobile forces would be freed up to pursue further attacks in Donetsk and Luhansk Oblasts before the autumn rains, depending on their need to rest and reset.

Political Reaction (80% x 60% x 80% x 50% x 20% = 4 percent likelihood). Pundits largely do not predict the downfall of Vladimir Putin, short of losing Crimea. Unclear is whether losing Crimea would actually spur an effort by the siloviki or the military to replace him. Like Saddam Hussein, plenty of tyrants have endured considerable battlefield reverses without losing power, at least for a time. Indeed, future Russian tyrants may target Ukraine for all manner of ill-conceived reasons. However, without such political change, effecting a lasting peace will even less likely, as the Putinists cannot credibly commit themselves.

My current procrustean model suggests a likelihood of approximately (19% – 4% =) 15 percent that the Spring Offensive will end this phase of the war, with a partial collapse of the Russian land forces, and a transition to or another frozen or actually simmering conflict at the original 1991 Russo-Ukrainian border. The likelihood that the war changes the regime in Moscow to one willing and capable or agreeing to peace is rather more remote—less than 4 percent. I estimate an 81 percent likelihood that the war continues at least into the autumn of this year. In truth, the numbers are very rough, and merely designed to indicate that this war, in one form or another, could continue for years.

Action: consider the likelihood of a long war when investing in development and production for real battlefield needs.

Technologists, industrialists, and investors should take note because a longer war makes greater demands on development, production, and financing. Usefully, military spending budgets are now greatly increasing across NATO, and as Diego Lopes da Silva of the Stockholm International Peace Research Institute commented last month in their analysis, “we can reasonably expect military expenditure in Central and Western Europe to keep rising in the years ahead.” This is good, because as I heard Norwegian Vice Admiral Louise Dedichen observed at the Norwegian-American Defense-Industrial Conference (NADIC) in late March, we should anticipate that the Russians will try to rebuild their army, if only because Russia has so few other tools for pursuing the Putinists’ “great power” ambitions. Two considerations: the war, and the next war:

- In the short run of the present war, Ukraine remains a valuable testing ground. As I recently heard a senior Ukrainian military official (Chatham House Rule) implore, “send us your weapons, and you can advertise: combat-proven.” The field-testing is now better funded than last year, at least in the US, the UK, and Finland. As US Deputy Assistant Army Secretary Margaret Boatner noted at NADIC, her people have been busy “writing sole-source contracts without the usual justification paperwork,” just for speed in execution.

- In the longer run, of this war or any war, working with the Ukrainian arms industry opens access to skilled, experienced armaments engineers and software developers amidst a worldwide shortage of such people. As Boatner quoted Under Secretary of Defense Bill LaPlante, “production is deterrence.” While that did not succeed in the late 1930s against a Japanese regime bent on conquest and confused about the United States, it may yet work against a possibly less bent and confused Chinese regime, perhaps for at least a few years.

But what to develop, produce, or finance? Tanks are a favored technology by most armies. In this war, however, tanks have so far proven largely ineffective, so the tactical conduct of the coming offensive should be watched closely. While less discussed above, ground-based air defenses have kept most fighter jets at bay, so most military aviation has been expressed through drones, cruise missiles, and indirect fire by helicopters, which are more nimbly based than fixed-wing jets. This echoes the concern in the Pacific that drones and missiles can outrange the F-35 and other strike fighters, and kill them on their readily identified airfields (see Cancian et al., 2023). Sharp loss rates are forecast, but military production cannot replace wartime losses, even with years of costly expansion of facilities and hiring of scarce, qualified staff. As T. X. Hammes concluded in a recent (2023) analysis of the current war, we cannot rebuild the industrial base of the Second World War, so we should not try. In considering investments, stress the opportunity costs: if not the old thing, what else could customers buy or do? Technologists, industrialists, and investors with long time horizons should emphasize to customers that they should structure forces not just both war today, but also the war coming years from now.

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