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A HIMARS IN THE HAND IS WORTH TWO IN THE BUSH: MEASURING THE REAL ECONOMIC VALUE OF U.S. SUPPORT FOR UKRAINE

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ABSTRACT

A HIMARS in the Hand is Worth Two in the Bush: Measuring the Real Economic Value of U.S. Support for Ukraine

After three years of Russia's full-scale war against Ukraine, what is the total value of U.S. economic and military support for Ukraine? The U.S. Government on various occasions has claimed that the United States has spent upwards of $350B to sustain Ukraine's military efforts and fiscal budget. Open source trackers place the contribution at around $125B based on announcements and Congressional releases. We find that the true value of assistance delivered to Ukraine in the first three years of war has been much closer to $50 billion. The impact on domestic spending capacity and on the US Defense budget has been negligible, at roughly $11 per taxpayer per year.

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I. Introduction

Since early 2022, the United States has emerged as the leading national supporter of Ukraine's defense and economic stability amid Russia's full-scale invasion. However, confusion abounds over the true value of U.S. aid delivered. Headline figures often cite anywhere from $100 billion to as high as $300–$350 billion in "aid" to Ukraine (Masters and Merrow 2025), (Voice of America News 2024). These eye-catching totals are misleading. They bundle together multi-year appropriations, loans and guarantees, indirect spending on U.S. forces or regional allies, and committed (promised) funds that have not yet been disbursed and may never be disbursed. In some cases, the headline totals may even include contributions from other countries. As a result, the oft-quoted numbers inflate public perceptions of U.S. support, feeding into sensationalized narratives that all these budgetary resources have already been handed over to Ukraine. This has fueled an anti-aid sentiment in the United States, with existential consequences for Ukraine's future.

This paper addresses a fundamental question: What is the actual financial value of the aid that the U.S. has delivered to Ukraine since 2022? By focusing on delivered support, we aim to cut through the noise and provide a precise estimate. We value the total U.S. aid to Ukraine from February 2022 to December 2024 at $51 billion, including $21 billion in all forms of military aid, and $30 billion in budgetary grants and humanitarian aid.

The key contribution of our paper is a granular, transparent valuation of U.S. assistance to Ukraine. We compile and cross-verify data on every significant aid component: from heavy weapons drawn from U.S. stockpiles under Presidential Drawdown Authority (PDA), to financial grants processed through the World Bank, to humanitarian and indirect military transfer incentives to allies. Crucially, we distinguish between *appropriated* or *announced* sums and the resources actually *delivered* on the ground. Where military equipment is concerned, we account for its vintage and depreciation following the U.S. Department of Defense's own guidelines—for instance, older armored vehicles or munitions are valued at their remaining useful life and resale value, rather than at the cost of brand-new replacements of a substantially different type. Similarly, the non-capital-at-risk portions of loan guarantees and repayable financing are excluded from our totals or adjusted to reflect any subsidy elements, since such instruments do not represent a net expected outflow. This careful accounting yields a more accurate estimate of U.S. support than prior estimates in the media or the literature. In essence, we move beyond counting pledges and price tags to measuring real economic value delivered.

In positioning our work within the existing literature, we build on and go beyond several important efforts to track aid to Ukraine. The Ukraine Support Tracker by Kiel Institute (Trebesch et al. 2023) pioneered the documentation of commitments by country, providing a valuable comparative dataset. However, the Tracker tallies official commitments (budgeted amounts), not distinguish-

ing clearly between grants versus loans or delivered versus obligated funds. We refine this by examining actual disbursements and material transfers in detail. U.S. oversight bodies have also contributed pieces of the puzzle: the Government Accountability Office (GAO) has published reports on Ukraine supplemental appropriations and their execution (U.S. Government Accountability Office 2024*b*), and flagged issues in how the Department of Defense values weapons provided to Ukraine. In particular, (U.S. Government Accountability Office 2024*a*) noted that replacement costs were used to price drawdown equipment, inflating valuations – a concern our methodology directly addresses. The Congressional Budget Office (2024) has incorporated Ukraine aid into its budget projections (Congressional Budget Office 2024), finding the fiscal impact to be modest (on the order of a few hundredths of GDP). But neither GAO nor CBO offers a comprehensive valuation of the value of delivered aid to Ukraine – a gap this paper fills.

Our analyses address several related topics and misconceptions in the Ukraine support debate. Chief among these is the entrenched narrative that Ukraine is hopelessly corrupt and has misappropriated U.S. aid dollars or equipment. We show this common theme to not only be false, but also structurally implausible given the mechanisms of oversight that have existed–oversight which has made Ukraine the most audited aid recipient in history, and which has only disbursed funds *after* verified expenditures. Second, we address the common idea that supporting Ukraine has led to the United States trading off spending on important domestic priorities, and *caused* economic hardship at home. There is no economic evidence to support these claims. If anything, spending on Ukraine has had a small positive effect in certain sectors related to defense, agriculture, and logistics. The inherent structure and magnitude of aid to Ukraine could never have impacted the cost of borrowing, budget allocations, or spending power on U.S. domestic priorities. Third, we explore the timelines of Ukraine-support sentiment within the United States, correlated with the emergence of certain Russian-origin propaganda campaigns and right-wing political commentary. Our analyses suggest that between 2022 and late 2024, concerted efforts were made to undermine United States public support for Ukraine, often originating from Russia-linked sources, but amplified for political convenience and gain by certain elements of the United States political system. This highlights a clear need to better safeguard information flows and transparency in governance to avoid the engineering of public opinion for foreign advantage against the interests of the United States and its allies.

We also draw inspiration from historical analyses of war expenditures and aid effectiveness, such as the Special Inspector General for Afghanistan Reconstruction (SIGAR)'s exhaustive audits of the $145 billion U.S. rebuilding effort in Afghanistan and the *Costs of War* project's accounting of over $2.3 trillion spent in that conflict (Watson Institute for International and Public Affairs 2022). Those works underscore the importance of financial transparency and realistic valuations in assessing large-scale aid. Finally, our study complements recent

World Bank and IMF assessments of Ukraine's financing needs by providing an independent academic estimate of what the U.S. has actually delivered to meet those needs. In sum, by uniting disparate data sources – from official budget reports (e.g., GAO, Department of State) to open-source trackers and contract records – we offer the first comprehensive economic appraisal of U.S. support to Ukraine during the 2022–2024 war period.

Beyond its immediate accounting, our analysis carries broader implications for policy and public discourse. Clarifying the true size of U.S. aid is vital for making informed budgetary tradeoffs. When the public hears exaggerated figures in the hundreds of billions, it may wrongly assume that aid to Ukraine is ballooning the deficit or draining funds from domestic priorities. By contrast, an accurate tally (on the order of a few tens of billions) situates aid to Ukraine in proper context—as a relatively small line item that can be sustained without undermining programs at home. This has important ramifications for transparency and democratic accountability: voters and lawmakers deserve fact-based assessments of foreign aid, especially for an effort as consequential as support for Ukraine's fight for sovereignty. Moreover, clear accounting enhances foreign policy communication. It allows U.S. officials to credibly demonstrate how assistance is being used and what taxpayers are getting in return, preempting misinformation. Ultimately, a better understanding of the true economic value of U.S. support will enable a more honest and productive debate about sustaining that support. The Introduction of this paper lays out these motivations and contributions. The remainder of the paper is organized as follows: Section 2 details existing data and trackers of Ukraine support, and their flaws; Section 3 presents the taxonomy of U.S. support broken down category by category; Section 4 covers our data sources and methodology for tracking and valuing aid deliveries; Section 5 presents the results, including our estimate of total delivered aid and its breakdown by category; Section 6 discusses the transparency and accountability of U.S. aid to Ukraine, explaining the mechanisms for transfers, audits, and ongoing verifications; Section 7 investigates the Ukraine aid's impact on the United States economy and its implications – comparing our figures to conventional narratives and considering economic spillovers; Section 8 analyzes the origins and evolution of United States public sentiment relating to Ukraine aid, showing how narrativesbecame completely detached from the reality of delivered support. Finally, Section 9 concludes with policy recommendations.

II. Existing Estimates and Data Limitations

Publicly available figures on U.S. aid to Ukraine often dramatically overstate the economic value of support actually delivered on the ground. Official announcements and media reports typically cite the total appropriations or committed funds – for example, roughly $113 billion authorized in four supplementals through 2022–2023 – as if this were the amount *spent* on Ukraine. In reality, a large share of these headline funds has not been disbursed or will never result in

value transferred to Ukraine's government or people. This disconnect arises from how aid is defined and tracked. In this section, we review the main sources of data on aid flows and highlight their limitations in measuring real delivered aid and the cost to U.S. taxpayers.

A. International Tracking of Commitments vs. Deliveries

One widely cited source is the *Ukraine Support Tracker* developed by researchers at the Kiel Institute (Trebesch et al. 2023). This tracker compiles pledges by governments to assist Ukraine, including military, financial, and humanitarian aid. While it provides a comprehensive record of announced support (over $250 billion from 41 countries as of the end of 2024, with the EU as the single largest donor), it is fundamentally tracking *commitments* – public announcements – rather than actual deliveries. The Kiel database focuses on commitments because detailed data on when and how aid is delivered is often difficult to compile; governments (including the U.S.) generally do not publish timely information on the exact quantities or value of assistance actually transferred to Ukraine, citing security and administrative constraints. As a result, the tracker's headline figures inevitably blur important distinctions: loans versus grants, cost to the donor versus value received by Ukraine, and pledges that may span many years into the future or never fully materialize. The authors have acknowledged that their commitment totals likely exceed the aid actually disbursed to Ukraine, given the lack of transparency on deliveries. In short, existing international trackers are valuable for comparing donor commitments, but they cannot tell us how much aid has truly been delivered or expended to date, which is arguably a far more important measure.

In addition to independent institutes, multilateral organizations track certain aid flows. For example, the OECD and World Bank record disbursements of financial loans and grants. However, these sources typically count funds at face value when disbursed and may not separate Ukraine-specific programs from broader regional initiatives. There is also often a lag in reporting. No centralized international database exists that reconciles all forms of support to Ukraine with actual on-the-ground receipt.

B. U.S. Government Reporting and Oversight Gaps

Within the U.S. government, tracking of Ukraine aid suffers from fragmentation and accounting practices that obscure the distinction between budget authority and outlays. As of the end of 2024, the U.S. Congress had passed five major emergency spending bills for Ukraine (including funds for related U.S. military readiness and related global issues). By that time, appropriations totaled approximately $183 billion, with about $140 billion obligated, and only about $83 billion actually made available to implementing agencies as of the end of 2024 (U.S. Department of State 2024). In other words, over 50% of the authorized funds had

not yet been spent by that point. Even among the funds counted as "disbursed," a significant portion had not reached Ukraine, but rather went to contracts with U.S. defense firms, U.S.-based programs, or remained as commitments to future projects.

An additional key issue is that different agencies report aid differently. The Department of State often communicates the total "committed" assistance to Ukraine—for instance, stating that the U.S. has provided over $60 billion through USAID and Treasury programs. These commitments bundle together budget reimbursement grants, humanitarian projects, and loan guarantees. These headline figures do not reflect the value of resources that have actually arrived in Ukraine or the impact on the U.S. budget. They also include expenditures that benefit other countries (for example, support for U.S. allies taking in Ukrainian refugees) or that will be repaid to the U.S. (loans).

Moreover, U.S. executive agencies have not systematically tracked Ukraine-specific spending across programs. GAO reports find that the State Department does not have a comprehensive system to track all economic and humanitarian funding provided for Ukraine, especially when funds are embedded in broader regional allocations (U.S. Government Accountability Office 2024*b*). For instance, aid to other countries affected by the war (e.g., Moldova or NATO allies) was sometimes recorded under "Ukraine response" appropriations but not distinguished in the State Department's tracking. On the military side, the Department of Defense (DoD) has delivered equipment at unprecedented speed from U.S. stockpiles, but lacked clear guidance for tracking these deliveries, resulting in inconsistent or inaccurate records (U.S. Government Accountability Office 2024*a*). In the rush to mobilize support, DoD's internal systems for monitoring weapons transfers and end-use were adapted on the fly, and only later audited for completeness. These oversight gaps mean that even within the U.S. government, it has been challenging to quantify exactly what share of authorized aid has been delivered to Ukraine.

In summary, existing data sources tend to report what has been *promised* or budgeted for Ukraine, not the realized value of aid on the ground. Independent trackers aggregate commitments, and U.S. official communications emphasize appropriations. Neither provides an accurate accounting of the resources that have been transferred to Ukraine in a given period, nor the effective impact on the U.S. budget and spending as a result of supporting Ukraine. This paper addresses that gap by assembling and analyzing granular data on delivered aid to produce the only economically grounded valuation to date of U.S. support to Ukraine from February 2022 to December 2024.

III. Taxonomy of U.S. Aid Mechanisms to Ukraine

U.S. assistance to Ukraine has been delivered through a complex array of programs and mechanisms, each with distinct financial characteristics. Before presenting our valuation, we first provide a detailed taxonomy of the forms of aid

involved. This classification clarifies which funds represent non-repayable support directly reaching Ukraine ("true aid") versus those that are loans or indirect expenditures. We identify eight major categories of U.S. aid to Ukraine since 2022. In addition, tables in appendices A-H provide detailed breakdowns of the monthly flows pertaining to each of the following categories:

- **Reimbursable budget support grants via international financial institutions.** The United States has provided substantial financial support to the Ukrainian government to sustain essential public services, primarily through World Bank-administered multi-donor trust funds. However, at no point has the United States directly transferred money to Ukraine. Instead, funds are disbursed only as *reimbursements* for verified expenditures already incurred by the Ukrainian government. Specifically, Ukraine makes payments—such as salaries for civil servants, pensions, or healthcare-related disbursements—from its own treasury, and then submits detailed documentation to the World Bank. U.S.-contracted audit firms, including PwC, KPMG, and Deloitte (depending on the period), conduct rigorous third-party verification to ensure the legitimacy of each claimed expenditure. Only after this audit process is completed does the World Bank disburse the equivalent amount from the trust fund account, drawing on U.S. appropriated funds. This structure ensures that every U.S. dollar can be traced to a verified prior payment, with no discretionary control by Ukraine over incoming funds. While approximately $31 billion has been obligated and disbursed through this mechanism as of December 2024, some portion of that total covered administrative and auditing costs. Nonetheless, the aid has enabled the Government of Ukraine to maintain critical civilian functions during wartime. Former Secretary of the Treasury Janet Yellen emphasized that such budget support was contingent on Ukraine's continued implementation of governance reforms and financial transparency standards (Yellen 2024). The system is further reinforced by Ukraine's digital public finance architecture (notably the Diia platform), which supports transaction-level auditability and provides international partners with visibility into how funds are managed (Motkin 2023).

- **Loans to the Government of Ukraine.** Certain U.S. aid has been in the form of repayable loans rather than grants. For example, the U.S. Export-Import Bank extended a $0.156 billion ($156 million) loan (Export-Import Bank of the United States 2024) to Ukraine to finance the purchase of 40 diesel locomotives from a U.S. manufacturer (supporting hundreds of jobs in Pennsylvania). Such loans, while beneficial for Ukraine's development or defense needs, do not constitute a permanent transfer of value since Ukraine is obligated to repay the principal (often at standard market rates). Loans should therefore generally be excluded from calculations of non-recovered aid. In our accounting, we note the existence of these loans but count only

a portion of v̈alue at risk̈towards the fiscal support totals provided by the United States to Ukraine. To further illustrate this point: a loan is an asset that balances against the expectation of the value of all future payments on the books. If loans were a net outflow, then BlackRock (BlackRock Inc. 2025) would be the world's worst-performing company, hemorrhaging 284x its revenues in net outflows to debt (approximately $6 trillion). Of course, BlackRock neither views the debt that it buys as a net outflow, nor does it get interpreted that way by BlackRock's investors. The same is true of loans the U.S. government has made to Ukraine.

- **Loan guarantees and collateral for third-party loans.** The U.S. has also helped unlock larger packages of international financing for Ukraine by pledging guarantees or collateral. One notable initiative is the G7's Extraordinary Financing framework (sometimes called "SPUR" loans), where approximately $25 billion in loans for Ukraine (and Moldova) were made possible through U.S. support. The U.S. contributed about $1.6 billion in seized Russian assets and U.S. funds to serve as collateral or guarantees for these loans. This means that if Ukraine defaults, that $1.6 billion (and related assets) could be forfeited; otherwise, the U.S. incurs no cost beyond the opportunity cost of funds. In public discussions, sometimes the full $25 billion in loan value is misleadingly tallied as "aid," but the economically relevant cost is the $1.6 billion at risk. We treat guarantees/collateral at their expected cost (in practice, the value at risk, here $1.6 billion, which is already included in the budgetary support funds described in the first category). As with direct loans, these instruments do not represent immediate resource transfers to Ukraine except in the event of default.

- **Treasury Account grants for U.S. defense procurement (USAI).** A significant portion of U.S. support has been through budgetary allocations to the Department of Defense (Treasury accounts) for the Ukraine Security Assistance Initiative (USAI) and related programs. About $12.1 billion was appropriated to DoD specifically to procure new weapons, munitions, and training for Ukraine's forces. These funds are expected to result in contracts with U.S. defense manufacturers to produce equipment either for use by Ukraine or to backfill U.S. stocks after transfers to Ukraine. Economically, the expenditures function as an investment in the U.S. defense industry, helping to increase capacity and maintain continuous production at facilities that may have otherwise shut down or shed jobs. Part of the value of goods produced by this investment eventually reaches Ukraine, providing newly manufactured equipment or services. As of end-2024, not all of this $12.1 billion has translated into delivered equipment; production and delivery lead times mean some items will only arrive in 2025 or later (or be canceled altogether, depending on the administration's policy). Moreover, some portion of this budget may remain unspent or get reallocated if needs

change. Based on available data on contracts and deliveries, we estimate that roughly $3 billion of value had been delivered to Ukraine via these procurement programs by December 2024. This is considerably lower than the appropriated amount, reflecting both the slow pipeline of hardware (e.g., new air defense systems or armored vehicles still in production) and the possibility that Ukraine may not utilize the full menu of offerings (due to restrictions on what can be procured). In essence, this category represents a U.S. investment in its own and Ukraine's future military capacity, but the realized benefit to Ukraine so far is much smaller than the headline figure. We count the value of new equipment and training that was actually delivered through 2024 under USAI in our aid totals, and note the remainder as authorized but not yet materialized.

- **Presidential Drawdown Authority (PDA) – direct transfer of U.S. military stocks.** Perhaps the most visible form of aid has been the drawdown of existing U.S. military inventory for delivery to Ukraine. Between August 2021 and December 2024, the President exercised PDA 55 times to ship weapons and supplies directly from DoD stockpiles to Ukraine's front lines. The official accounting by DoD values these drawdowns at roughly $31 billion over FY2022–24. This figure, however, was initially calculated using the *replacement cost* of the items—i.e., what it would cost the U.S. to buy new ones—not the market value or depreciated value of the items themselves. Many of the weapons provided (such as older Humvees, armored carriers, munitions nearing end of shelf-life, etc.) were surplus or near-obsolete from the U.S. perspective, meaning their value to the U.S. (and arguably their fair value on any market) was far lower than the cost of a brand-new replacement. Under scrutiny from oversight bodies, DoD acknowledged in 2023 that it had *over-valued* a substantial portion of these drawdowns. In fact, DoD notified Congress of a cumulative overestimation error of about $6.2 billion, which effectively meant that amount of extra capacity remained to draw down (U.S. Government Accountability Office 2024*a*). The methodology was subsequently adjusted to value items at a lower, depreciated cost. However, this "depreciated replacement cost" approach was ad hoc and inconsistently applied, leading to confusion and what we have systematically determined to be an inflated valuation of the aid delivered.

  In our independent analysis, we conducted a detailed, item-by-item valuation of all military hardware and ammunition known to have been delivered under PDA. We collected data on each weapon system's age (year of manufacture), usage and storage condition, and, where possible, an estimate of remaining service life or failure rates in the field. Using standard military depreciation schedules and information on the condition and modernity of each system, we impute a fair value for each item to Ukraine. For example, older model armored vehicles like MRAPs or M113 APCs that were

produced decades ago and were sitting in storage have a low remaining value (their combat effectiveness is limited and maintenance costs are high), whereas newer equipment like modern radar systems retain high value. As an illustration, **Figure 1** shows our valuation for Stryker armored personnel carriers delivered, broken down by the year they were produced. Strykers produced in 2011–2012 have a much lower value than those produced in 2023, reflecting depreciation and likely wear. Indeed, a substantial share of the U.S. equipment provided to Ukraine consisted of excess stocks that the U.S. military no longer actively deployed (e.g., older anti-tank weapons, Vietnam-era artillery shells, etc.). From an economic standpoint, the U.S. was transferring assets that had little alternative use value (some might have eventually been scrapped or donated elsewhere). We conservatively estimate the total value of all drawdown items to Ukraine at about $17.7 billion. This represents a strong upper bound assuming the equipment is put to use; one could argue the *net* economic cost to the U.S. was even lower, since disposing of old munitions would incur costs if not given away. For our purposes, $17.7 billion is the figure we include for military aid delivered via PDA through 2024.

To put this analysis into context, our team of 19 research fellows worked on each item of military equipment and munitions transferred to Ukraine independently, starting from announcements and inventory lists, and tracking down each shipment to the origin of equipment in storage or in the possession of particular military units. Contracts for the procurement of the equipment were identified from U.S. government databases such as the Federal Procurement Data System (FPDS), a variety of open source intelligence tools, and archival procurement announcements going back to the 1990's. We identified for each item the dependent equipment lists, maintenance inventory, and any relevant upgrades that had taken place before shipping to Ukraine. Once the timeline was complete and substantiated for each item, a second team member independently audited the findings, looking for inconsistencies, missing data, or evidence to the contrary. Finally, the authors manually checked the dataset for consistency. Overall, the team collected tens of thousands of source documents and contracts, spending thousands of hours ensuring the data were accurate—and shedding light on a process that is generally considered too complicated to track, and therefore easy to spread misinformation about. In the end, the team covered 76 different weapons systems and munitions categories, accounting for more than 95% of claimed transfers by value.

- **Indirect "backfill" aid via allies (equipment transfer to third countries).** In some cases, U.S. support to Ukraine has been indirect: the U.S. finances or provides equipment to an ally, who in turn gives some of its own weapons to Ukraine. A prime example is U.S. funding for Poland and other Eastern European countries to modernize their arsenals, implicitly as com-

pensation for the tanks, fighter jets, and other Soviet-era equipment those countries transferred to Ukraine. About $2 billion of U.S. funds (Associated Press 2023) have been committed to bolstering Poland's defense industry and capabilities (often through Foreign Military Sales and joint programs). However, only a very small fraction of that sum corresponds to equipment that actually ended up in Ukraine. We estimate roughly $0.6 billion worth of U.S.-funded equipment was directly passed through (this includes the value of Polish MiG-29 aircraft and older tanks sent to Ukraine, for which the U.S. provided replacement equipment or financial credit). The remainder of the $2 billion benefits Poland (a NATO ally) by enhancing its security, and cannot be counted as aid to Ukraine per se. Therefore, in our accounting, we include only the portion that can be tied to Ukrainian end-use. In practice, this amount is negligible relative to other categories. It underscores how some public figures have overstated U.S. aid by including large outlays that strengthen NATO countries under the "Ukraine assistance" umbrella but do not equate to actual resources that benefit Ukraine.

- **Lend-Lease program.** Soon after the full-scale invasion in 2022, the U.S. enacted a revival of the World War II-era Lend-Lease authority specifically for Ukraine, which would have allowed the Administration to lend military equipment with deferred payment. Despite considerable attention (and inclusion of notional large sums in some discussions), this program was never actually utilized. All U.S. military aid was provided via grants (drawdowns or USAI) rather than loans through Lend-Lease. The authority expired at the end of FY2023 without any equipment delivered under it. Thus, Lend-Lease contributes $0 to the tally of aid delivered, despite featuring in some political narratives.

- **Foreign Military Financing (FMF) for Ukraine and others.** Congress also authorized significant funding (around $9.2 billion) for Foreign Military Financing programs in response to Russia's war. FMF can be provided as grants or loans that allow countries to purchase U.S. defense articles. In this case, the $9.2 billion was not solely for Ukraine; it was a pool for Ukraine and 17 other affected countries (Baltic states, Balkan states, etc.) to strengthen their military (U.S. Department of State 2023). Ukraine could draw on this to finance purchases of U.S. arms, but any loans would be repayable, and any grants to third countries primarily benefit those countries. A portion of this FMF was arranged as loans for Ukraine to buy arms, which again are debt, not aid. The data on the usage of this facility by Ukraine specifically is limited; however, as of 2024, Ukraine had not procured anywhere near the full amount in new equipment via FMF. For our valuation, we do not count FMF loans as delivered aid. Any FMF grants that went directly to Ukraine's Ministry of Defense (if, for instance, the U.S. forgave certain loan portions) would be counted, but those have been minimal to date.

This taxonomy demonstrates that the oft-cited "$100+ billion" of U.S. assistance for Ukraine comprises very different components. Categories (1), (4), (5), and small parts of (6) are non-repayable resources that either have been or will be delivered to Ukraine (subject to timing). Categories (2), (3), and (8) involve loans or guarantees – potentially large headline amounts, but not a transfer of value unless defaults occur. Category (7) turned out to be a red herring. For an accurate valuation, we focus on the grant and direct transfer elements, accounting for their true economic worth. In the next section, we delve deeper into how the Department of Defense's accounting methods initially distorted the value of military aid (Category 5) and how our approach corrects for this inaccuracy.

IV. Valuation Methodology for Military Aid Deliveries

A central challenge in our analysis is determining the *economic value* of military aid delivered, as opposed to taking the nominal dollar figures at face value. As described above, the Department of Defense initially priced drawdown aid based on replacement cost. This meant, for example, if an M113 armored personnel carrier (a Vietnam War-era vehicle) was sent to Ukraine, DoD would count it as costing several million dollars (the price of a new armored vehicle) against the drawdown authority. In reality, those M113s were long paid for, in storage, and likely worth only scrap value to the U.S. military. Valuing them at new prices greatly exaggerated the "cost" of aid and quickly ran down the limit of what could be sent under congressionally authorized totals.

GAO investigations in 2023 found major inconsistencies in DoD's valuation methods for drawdown equipment (U.S. Government Accountability Office 2024*a*). In some cases, components used historical acquisition cost (often decades old), others used current replacement cost; about 12% of items were not valued according to any uniform guidance. Furthermore, 61% of the items lacked proper documentation for how their value was determined. Under pressure from GAO and Congress, DoD revised its valuation approach in mid-2023, switching to what it called "depreciated replacement value" for older items (essentially, depreciating the cost of replacement by some arbitrary proportion of the useful-life of the original equipment). This led to the revelation of the $6.2 billion overestimate, effectively freeing that amount in budgetary headroom for additional aid. While this fix acknowledged the problem, it was a crude solution: applying a uniform depreciation factor to broad categories of equipment. The revised method is still arbitrary—for instance, reducing the book value of all older armored vehicles by some percentage—and not necessarily reflective of their true utility or market worth under DoD accounting standards.

In our methodology, we pursue a more granular and economically meaningful valuation aligned with DoD official guidelines (U.S. Department of Defense 2024*b*):

- For each significant weapons system or equipment type delivered via PDA,

we gathered data on its production date or lot, the condition (where available, e.g., "unused in storage," "re-manufactured," "used"), and any known issues (such as the widely reported problems with older Javelin missiles' batteries expiring) (ESSA News 2024). We then applied depreciation schedules based on equipment type. For vehicles and aircraft, we assumed a service life and depreciated linearly; for munitions, we considered shelf-life expiry; for electronics, we used guideline obsolescence rates.

- We cross-checked these against any available third-party valuations. In some cases, allies' transfers provided a benchmark (e.g., when the Netherlands (Ruitenberg 2024) transferred older Stinger missiles to Ukraine, they reported the book value, which we can compare to the U.S. accounting of similar items).

- Where items were effectively at end-of-life (for instance, artillery ammunition manufactured in the 1980s that might misfire or be unsafe after prolonged storage), we assigned a nominal use value, considering that these would have had to be decommissioned at cost if not given away, but are still of use to Ukraine practically.

- For newer items, like precision-guided rockets or modern drones, we assumed the value to Ukraine is closer to their market price (often equal to replacement cost, since they are newly manufactured). But such cases are relatively rare in drawdowns; most high-end modern systems (HIMARS launchers, NASAMS air defense, etc.) were actually provided via procurement (Category 4) rather than drawn from existing stocks.

Through this bottom-up accounting, we arrived at an upper-bound conservative estimate of $17.7 billion. A detailed month-by-month accounting of these transfers can be seen in Table F1. For example, DoD's initial accounting treated all Stryker Armored Personnel Carriers uniformly. Our approach differentiates them according to when they were produced. **Figure 1** displays the depreciated valuation for Strykers by production year: the dark blue portion is the residual value of all Stryker Armored Personnel Carriers that have not exceeded their useful-life span. The yellow portions are then the part of the total Stryker value that was delivered to Ukraine. The light blue indicates the total inflation-adjusted cost of manufacturing the Strykers by year of production. This approach was applied across all systems based on the specific equipment sent to Ukraine and the value of that specific equipment by DoD accounting standards.

It is important to stress that even our "depreciated value" estimate likely *overstates* the true incremental cost to the U.S. of providing this equipment. The vast majority of hardware drawn down was sitting idle; for example, thousands of Humvees that were in surplus depots. From the U.S. taxpayer's perspective, one could argue the cost was incurred when these items were originally procured, and by 2022, they had little residual value. However, from Ukraine's perspective, they

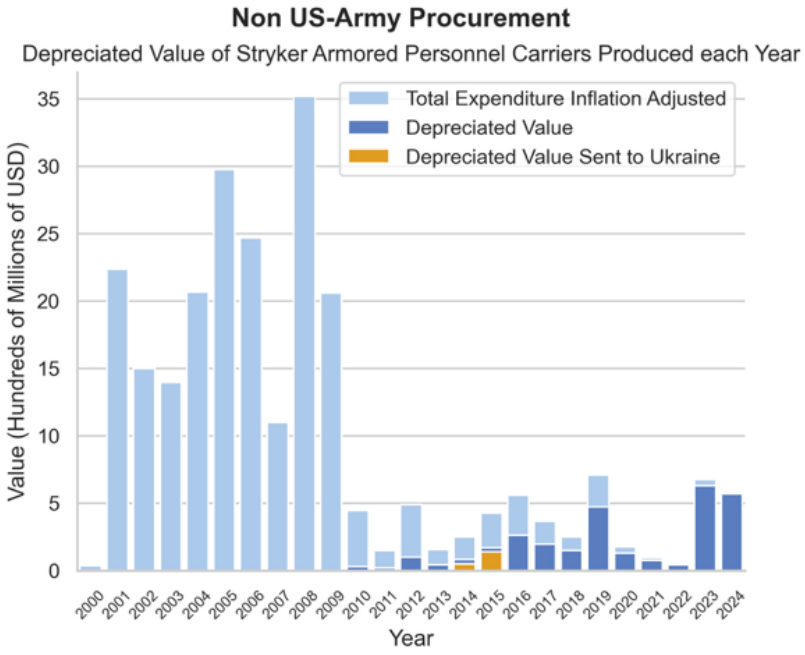

Figure 1. The value of Stryker Armored Personnel Carriers produced, depreciated, and the proportion of the total that were transferred to Ukraine between 2022-2024.

do have value (a well-maintained Humvee can still transport troops even if it's 30 years old). Our goal is not to ignore that value to Ukraine, which lies somewhere between the near-zero book value to the U.S. and the higher replacement cost of new Humvees rolling off the production line. By taking into account depreciation and condition, we approximate an upper bound of what this aid is "worth" in economic terms.

For the other military aid category – new procurement under USAI (Category 4) – a different valuation issue arises (see Table D1 for a month-by-month breakdown). There, the U.S. is spending dollars to purchase equipment for Ukraine. The value to Ukraine of a Javelin missile produced and delivered in 2023 is essentially the contract cost (since it's brand new). The challenge is determining how much of the money has (a) been spent and (b) resulted in delivered items. Our accounting for Category 4 therefore focuses on contracts, disbursements, and timing: out of $12.1 billion, how much had turned into actual equipment or training delivered by the end of 2024? The remainder, while potentially obligated, does not yet confer benefit to Ukraine (and if the war ended abruptly, or U.S. policy towards Ukraine were to change, contracts might be canceled, or produced units rerouted). Therefore, we only count $3 billion as delivered aid value so far. This number is informed by U.S. contract and procurement databases and delivery reports; for example, by late 2024, the U.S. had delivered several hundred newly built armored vehicles and drones to Ukraine and had initiated training programs for them, but relatively few big-ticket items like Patriot missile systems and Abrams tanks were delivered or in progress.

Humanitarian and budget support aid (Category 1) requires a more detailed approach to valuation than often assumed (see Tables A1, A2, and A3 for a month-by-month accounting of budget support, and Table B1 for humanitarian transfers). While approximately $31 billion was obligated for U.S. budget support to Ukraine through World Bank-managed trust funds as of December 2024, it is critical to understand that the actual transfers to Ukraine's government accounts did not occur automatically or in full despite the headline figures. Our analysis dissects monthly financial flows: specifically, we tracked when Ukraine submitted reimbursement requests for eligible expenditures, when these requests were audited and approved by the designated international auditing firms (PwC, KPMG, or Deloitte, depending on the period), and when funds were disbursed by the World Bank. The structure of this mechanism ensures that no funds were transferred in advance; rather, Ukraine first made domestic payments—such as salaries to healthcare workers, teachers, and, for part of the period, pensions—and only subsequently received reimbursed funds upon independent verification of those expenditures. Thus, our accounting reflects the actual amounts reimbursed, not simply the appropriated sums.

For valuation purposes, we treat the verified reimbursed amounts as the full economic value delivered to Ukraine, since these funds directly supported critical public sector functions without creating future repayment obligations. However,

it is important to note that a small fraction of the appropriated funds covered administrative overhead—such as audit services provided by PwC, KPMG, Deloitte, and World Bank operational fees—which did not directly reach the Ukrainian treasury. Nevertheless, these overhead costs are essential to maintaining a high-integrity aid delivery system and ensuring that funds are accurately tracked and used as intended. On a net basis, over 95% of the U.S. budget support funding can be attributed to direct disbursements to Ukraine for eligible expenditures. In sum, by reconstructing the timing and magnitude of reimbursement approvals, we ensure that our valuation captures only the real, documented flow of resources to Ukraine's government and avoids the overstatements common in public reporting that cite obligated or appropriated sums without adjusting for verification processes and delivery lags.

By applying appropriate valuation to each category of aid, we ensure that our total tally reflects real economic support to Ukraine, free of overestimation or double-counting. The next section presents the results of this comprehensive valuation and contrasts them with the nominal figures commonly cited.

V. Results: Delivered Aid Value vs. Announced Amounts (Feb 2022–Dec 2024)

Pulling together all categories described, we find that the **total economic value** of U.S. non-debt aid delivered to Ukraine from the start of the 2022 invasion through December 2024 is approximately **$51.2 billion**. Of that sum, only about $33 billion ($30 billion in reimbursed budget support and $3 billion via USAI procurement spent on U.S. defense firms), or roughly $11 billion per year from 2022 through 2024, was fiscally impacting, amounting to 0.15% of the U.S. federal budget. In real terms, aid to Ukraine raised total U.S. obligations by $/120 per U.S. taxpayer over 2022-2032; the U.S. government spends more than this ($17 billion per year) on ther

Table 1 summarizes the breakdown between military and non-military aid and compares our estimates of total delivered value to common official figures. We see that of the roughly $51.2 billion delivered value to Ukraine:

- About $21.1-billion is military aid (drawdown, new procurement, transfers, training, and logistics).
- About $30.2 billion is civilian aid (budget grants and humanitarian aid).

These categories can be seen as cumulative aid delivery values in Figure 2, which graphically shows the progression of aid by category between 2022 and the end of 2024.

Figure 3 visualizes eight categories of aid (as discussed in the taxonomy) in terms of how much value was ultimately delivered to Ukraine. The colored segments of the inner circle correspond to verified deliveries of budgetary support, humanitarian aid, military aid, etc., whereas the gray segments represent the difference between deliveries and announcements.

Table 1—Monthly U.S. Aid Delivered to Ukraine by Aid Type (Feb. 2022 – Dec. 2024)
(All Figures in Millions of US Dollars)

	Civilian Aid		Military Aid			
Month	**Budget Grants**	**Human. Aid**	**Newly Procured**	**Drawdown (PDA)**	**Indirect Aid**	**Total**
Feb 2022	0	0	0	75	0	75
Mar 2022	0	0	0	250	0	250
Apr 2022	480	3	0	500	150	1,133
May 2022	480	2	0	200	25	707
Jun 2022	1,248	0	20	600	0	1,868
Jul 2022	1,633	20	0	400	20	2,073
Aug 2022	2,881	50	30	1,200	0	4,161
Sep 2022	1,344	25	20	1,000	0	2,389
Oct 2022	0	53	20	1,200	0	1,273
Nov 2022	0	5	320	400	20	745
Dec 2022	3,361	2	30	350	220	3,963
Jan 2023	960	18	490	1,000	0	2,468
Feb 2023	1,296	22	0	600	20	1,938
Mar 2023	960	4	0	500	20	1,484
Apr 2023	960	25	25	600	0	1,610
May 2023	0	3	20	800	20	843
Jun 2023	1,200	9	25	700	0	1,934
Jul 2023	0	100	40	500	0	640
Aug 2023	1,152	11	30	300	20	1,513
Sep 2023	960	21	135	350	20	1,486
Oct 2023	1,104	9	340	250	0	1,703
Nov 2023	960	5	90	180	0	1,235
Dec 2023	960	23	70	450	0	1,503
Jan 2024	192	0	90	0	0	282
Feb 2024	0	1	90	0	0	91
Mar 2024	0	4	90	200	0	294
Apr 2024	96	4	90	600	0	790
May 2024	0	4	140	450	0	594
Jun 2024	96	15	140	180	0	431
Jul 2024	0	6	140	400	20	566
Aug 2024	3,745	15	90	180	0	4,030
Sep 2024	0	5	90	450	0	545
Oct 2024	0	13	140	600	0	753
Nov 2024	1,296	8	90	500	0	1,894
Dec 2024	2,305	12	145	1,500	20	3,982
Total	**29,673**	**494**	**3,040**	**17,465**	**575**	**51,247**

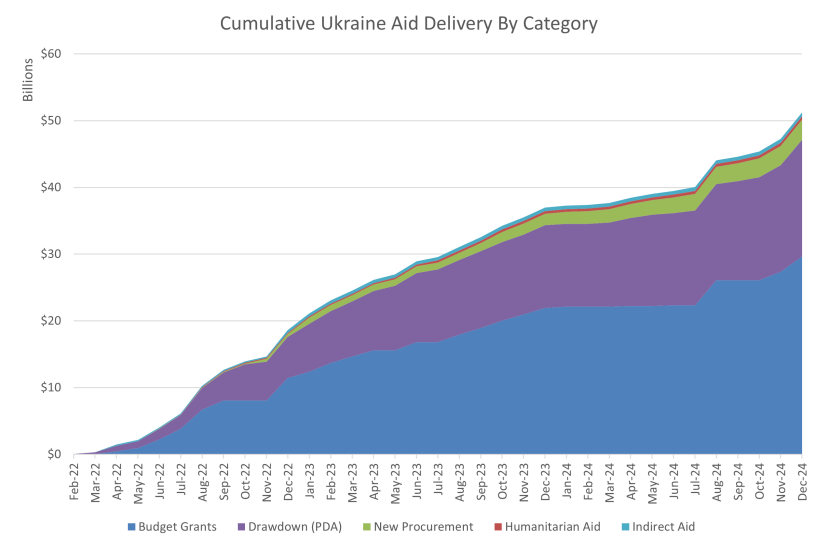

FIGURE 2. THE CUMULATIVE VALUE OF AID TO UKRAINE BETWEEN 2022-2024, SPLIT BY CATEGORY AND SHOWN MONTHLY.

Breaking down the delivered military aid, we find that $17.5 billion resulted from direct equipment transfers under the Presidential Drawdown Authority, representing the largest portion of military aid by value. A further $3.0 billion was delivered through the Ukraine Security Assistance Initiative (USAI) procurement process, and an additional $0.56 billion through indirect equipment transfers, cumulatively totaling approximately $21.1 billion in verified military aid delivered to Ukraine. Notably, this delivered total is significantly lower than the initially announced $70.4 billion, highlighting the Pentagon's substantial overvaluation in initial announcements and the inclusion of undelivered equipment and future procurement contracts.

On the civilian side, approximately $29.7 billion was delivered in direct budget support managed through World Bank-administered trust funds, with rigorous auditing by external parties (PwC, Deloitte, KPMG) ensuring accountability. An additional $0.49 billion in humanitarian assistance was also delivered, supporting refugee relief and internal humanitarian programs in Ukraine. Compared to the announced civilian aid total of $51.7 billion, our estimate of $30.2 billion indicates a notable discrepancy, largely due to the inclusion of loans and pledged amounts not fully realized by the end of 2024 in official figures.

Overall, our comprehensive analysis reveals that only about $51.2 billion of the publicly announced $125.4 billion in U.S. aid had been effectively delivered to Ukraine by December 2024, representing approximately 41% of the announced totals. This result aligns closely with oversight assessments from entities such as

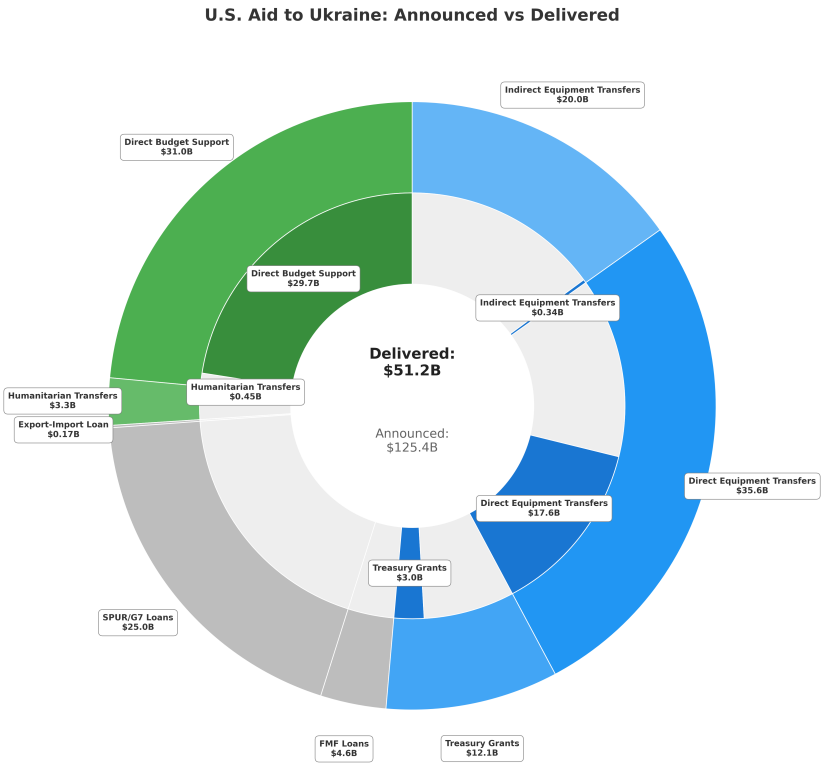

FIGURE 3. THE DELIVERED VALUE OF AID TO UKRAINE VS. THE ANNOUNCED AID VALUE, BROKEN DOWN BY AID CATEGORY.

(U.S. Government Accountability Office 2024*b*), which found substantial portions of Ukraine supplemental appropriations remained unobligated or unspent.

From a U.S. budgetary perspective, this verified delivered aid ($51.2 billion) represents an exceedingly modest financial commitment relative to total federal spending, with the fiscally impacting portion ($33 billion) equating to approximately 0.15% of annual federal outlays during the 2022-2024 period. This proportion underscores that U.S. support for Ukraine has been fiscally manageable, posing negligible risks of crowding out domestic spending priorities or significantly impacting broader economic conditions, as we test in Section 7.

VI. Transparency and Accountability of U.S. Aid to Ukraine

Since the full-scale Russian invasion in February 2022, Ukraine has arguably become the most extensively audited recipient of foreign aid in history. The comprehensive oversight framework has included frequent, rigorous audits conducted by multiple U.S. Inspector General offices, including the Government Accountability Office (GAO), the Special Inspector General for Ukraine Assistance, and the Inspectors General of the Department of Defense, State, and USAID. Additionally, the World Bank has managed independent external verification processes, involving reputable international auditing firms such as PwC, Deloitte, and KPMG. These combined efforts constitute an unprecedented level of scrutiny for foreign aid, significantly exceeding that seen in previous large-scale international assistance programs.

Notably, despite this exhaustive and continual auditing process, no significant instances of fraud, corruption, or misuse of U.S. aid have been identified as of the end of 2024 (U.S. Government Accountability Office 2024*b*); (Yellen 2024). The remarkable absence of documented corrupt activities related to U.S. aid underscores the effectiveness of the rigorous accountability mechanisms established for Ukraine. The structure of the aid itself further reinforces accountability: direct budgetary support to Ukraine is only disbursed as reimbursements for explicitly verified expenditures. Payments have been made only after thorough audits confirmed expenditures such as public salaries for healthcare workers, teachers, emergency services, and pensions, leaving no room for unrestricted or unmonitored transfers.

Moreover, significant conditions have been attached to the continuation of aid, explicitly tying financial support to institutional reform benchmarks aimed at strengthening governance, transparency, and anti-corruption capacities. These requirements have compelled Ukraine to accelerate aggressive reforms, including the enhancement of judicial and prosecutorial effectiveness, the expansion of anti-corruption bodies, and the systematic digitalization of public sector transactions. Notably, platforms such as ProZorro, Ukraine's public procurement system, and Diia, arguably the world's most advanced e-governance platform (Motkin 2023), have drastically increased transparency and public accountability, effectively reducing opportunities for corruption and enhancing administrative efficiency.

A. Historical Comparison: Afghanistan

This high standard of accountability in aid provision to Ukraine contrasts starkly with previous U.S. foreign assistance efforts, such as the Afghanistan reconstruction initiative, which often color public opinion. Between 2002 and 2022, approximately $143 billion was allocated solely for reconstruction efforts in Afghanistan–alongside more than $2 trillion in military deployment and related costs (Watson Institute for International and Public Affairs 2022). This is more than 50 times the amount spent in Ukraine from 2014-2024. Unlike Ukraine aid, these funds were consistently subject to significant fraud, mismanagement, and corruption. Reports from the Special Inspector General for Afghanistan Reconstruction (SIGAR) regularly documented widespread misuse of funds, including ghost workers, fraudulent contracting, and billions of dollars in unaccounted or misdirected aid (Special Inspector General for Afghanistan Reconstruction 2022).

The corruption uncovered during the Afghan reconstruction effort was staggering, representing a significant proportion of the aid provided. In comparison, the aid provided to Ukraine—approximately $33 billion in direct federal budget impact—is modest and effectively safeguarded. To date, the rigorous monitoring and accountability systems in Ukraine have prevented any analogous misuse or corruption of these resources.

While these stringent reform and accountability measures have undeniably enhanced transparency and prevented corruption, they also represent an implicit cost to Ukraine. Compliance with reform conditions required substantial investment in institutional capacity, diverting critical administrative resources, time, and attention away from immediate wartime priorities. This effectively discounts the immediate practical value of the aid provided. Ukraine's obligatory commitments to strengthening governance and accountability structures—though beneficial in the long term—have thus imposed additional short-term costs, making the effective economic value of U.S. aid somewhat less than its nominal amount. We do not account for this implicit cost in our modeling, but it is important to note that such constraints carry economic weight.

In conclusion, the transparency and accountability mechanisms associated with U.S. aid to Ukraine since the full-scale Russian invasion in 2022 have set a new standard in foreign aid management. No significant instances of corruption or misuse have been documented, underscoring the effectiveness of robust oversight structures. Furthermore, the overall scale of U.S. financial support to Ukraine is comparatively small and fiscally manageable, imposing a negligible burden on the federal budget. However, the rigorous conditions attached to this aid have implicitly reduced its immediate value, emphasizing the seriousness of Ukraine's commitment to meeting stringent international standards for governance and transparency.

The next section explores a critical fiscal question in greater depth, examining empirically whether the financial support extended to Ukraine led to trade-offs with other U.S. government expenditures or had a measurable effect on broader

economic indicators.

VII. Budgetary Impact and Trade-Offs

An important policy question is whether aid to Ukraine has come at the expense of other U.S. government spending or materially affected the U.S. economy (for example, by driving up deficits or inflation). Given the modest scale of the spending, our hypothesis is that the macroeconomic and budgetary impact is negligible. We test this by analyzing federal spending patterns and fiscal indicators over the 2022–2024 period.

A. Impact on U.S. Defense Budget

We find no statistically significant impact of U.S. aid to Ukraine on the overall U.S. defense budget. Difference-in-differences estimates indicate that the trajectory of U.S. defense spending from 2022 to 2024 was not detectably different from pre-existing trends once global defense spending increases are taken into account. In other words, the $51.2 billion of aid delivered to Ukraine had no perceptible effect on the level or growth rate of U.S. defense expenditures, which continued to follow prior trends (although they rose modestly due to broader strategic and inflationary factors). This is perhaps unsurprising: even over three years, the fiscally impacting portion of Ukraine aid equates to only about 0.15% of the federal budget - a nearly imperceptible share.

Methodology and Data

To rigorously test whether U.S. aid provided to Ukraine had any perceptible impact on federal spending priorities, we employ a Difference-in-Differences (DiD) econometric framework. Specifically, we estimate separate models for U.S. defense and domestic non-defense discretionary spending growth, comparing pre- and post-Ukraine aid periods while controlling for global defense trends and relevant macroeconomic conditions.

Our dataset includes quarterly U.S. Department of Defense (DoD) expenditure data and real federal domestic spending figures from fiscal years 2018 through 2024, sourced from official Congressional Budget Office (CBO), U.S. Treasury, and Bureau of Economic Analysis (BEA) records. We define the pre-intervention period as 2018–2021 to establish baseline spending dynamics. The intervention period begins in Q2 2022, corresponding to the enactment of the first major Ukraine aid package.

For the defense specification, we estimate:

$$\Delta DefenseSpending_t = \beta_0 + \beta_1 \cdot UkraineAidShock_t + \beta_2 \cdot NATOTrend_t + \beta_3 \cdot IRAOutlay_t + \epsilon_t$$

For the domestic non-defense model, we estimate:

$$\Delta DomesticSpending_t = \alpha_0 + \alpha_1 \cdot UkraineAidShock_t + \alpha_2 \cdot GDPGrowth_t + \alpha_3 \cdot Unemployment_t + \nu_t$$

where:

- $\Delta DefenseSpending_t$ and $\Delta DomesticSpending_t$ denote quarterly real percentage growth in defense and non-defense federal outlays, respectively.
- $UkraineAidShock_t$ is a binary indicator equal to 1 beginning in 2022Q2, capturing the onset of substantial aid commitments.
- $NATOTrend_t$ is the quarter-over-quarter growth rate in NATO (non-U.S.) defense expenditures, constructed from country-level SIPRI data.
- $IRAOutlay_t$ is the quarterly Inflation Reduction Act (IRA) disbursement, included only in the defense regression.
- $GDPGrowth_t$ and $Unemployment_t$ are macroeconomic controls for real GDP growth and labor market conditions.
- ϵ_t and ν_t are idiosyncratic error terms.

All models are estimated via Ordinary Least Squares (OLS) using robust standard errors clustered by quarter. Results are presented in Table 2, with robustness checks using alternative controls yielding consistent conclusions.

The detailed regression results are presented in Table 2:

Interpretation of Results

The estimated coefficient for the Ukraine Aid Shock indicator is –0.0030, with a clustered standard error of 0.014, and is statistically indistinguishable from zero. Thus, we find no evidence supporting the notion that U.S. defense spending was materially affected by Ukraine aid disbursements during the analyzed period.

The coefficient on the NATO Defense Spending Trend (excluding the U.S.) is positive (0.191) and approaches statistical significance, suggesting that U.S. defense outlays were modestly aligned with allied defense expansion but not in a mechanically proportional way. The IRA outlay variable remains negligible and statistically insignificant, further indicating that U.S. defense budgetary growth was not influenced by domestic fiscal policy unrelated to national security.

In summary, these econometric results reaffirm that the sizable U.S. commitment of aid to Ukraine did not alter the trajectory of federal defense spending. Instead, defense budgets appear to have evolved independently of Ukraine-specific shocks, driven more by structural defense planning and broader alliance posture than by any fiscal crowd-in effect from emergency aid packages.

Table 2—Difference-in-Differences Estimates: Impact of Ukraine Aid on U.S. Defense and Domestic Spending Growth (2018–2024)

	Defense Spending Growth	**Domestic Non-Defense Spending Growth**
Ukraine Aid Shock (post-2022Q1)	-0.0030	0.0069
	(0.0140)	(0.0074)
NATO Defense Trend (ex-US)	0.191	—
	(0.108)	—
IRA Outlay (B USD)	-0.0001	—
	(0.0003)	—
GDP Growth (%)	—	-0.0214
	—	(0.0236)
Unemployment Rate (%)	—	0.1455
	—	(0.1417)
Quarter-Year Fixed Effects	No	No
Standard Errors	Clustered by Quarter	Clustered by Quarter
Observations	28	28
R^2	0.11	0.17

Notes: OLS regressions of quarterly federal spending growth on policy indicators and macroeconomic controls, 2018–2024. Dependent variables are real quarterly growth rates in U.S. federal defense spending and domestic non-defense discretionary outlays, respectively. "Ukraine Aid Shock" is a post-2022Q1 indicator. "NATO Defense Trend" is the quarter-over-quarter growth rate in NATO (non-U.S.) defense spending constructed from government reports and SIPRI data. "IRA Outlay" reflects disbursements under the Inflation Reduction Act. The domestic spending model includes macroeconomic controls: real GDP growth and unemployment. Robust standard errors clustered by quarter in parentheses. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

B. Domestic Spending Priorities and Crowding-Out

We next examine whether the Ukraine aid effort crowded out U.S. federal spending on domestic priorities. Our findings show no evidence of crowding-out: domestic non-defense expenditures continued to grow on their own trajectory, unaffected by the aid disbursements. In fact, during the 2022–2024 period, the U.S. enacted substantial new domestic spending initiatives (such as the 2022 Inflation Reduction Act's $391 billion in energy and climate investments, and the 2021 Infrastructure Investment and Jobs Act) in parallel with Ukraine assistance, indicating ample fiscal space for both. The regression results in Table 2 (Column 2) use the Ukraine Aid Shock indicator, alongside macroeconomic controls, to estimate the impact on domestic discretionary spending growth (education, healthcare, infrastructure, etc.). The point estimate is modestly positive (0.0069) with a clustered standard error of 0.0074, showing no statistically significant change in domestic outlays during the aid period.

We reject the notion of a guns-vs-butter tradeoff in this case—there is no statistically significant reduction in domestic spending attributable to Ukraine aid. If anything, point estimates are slightly positive when controlling for macroeconomic conditions, suggesting domestic programs may have grown modestly more than trend (though not significantly so). This aligns with qualitative evidence that Ukraine supplemental appropriations were funded as emergency spending, not by reallocating or cutting domestic budgets. In sum, the counterfactual analysis shows no crowding-out effect on social or public investment programs from the

Ukraine aid. Robustness checks using alternative control groups (e.g., comparing categories of domestic spending with low vs. high political priority) confirm that domestic spending in areas like healthcare, education, and infrastructure was unaffected by the aid packages (the interaction term of aid shock $\times$ domestic category is indistinguishable from zero).

In summary, the evidence from Table 2 underscores that U.S. domestic priorities were not sacrificed in order to finance aid to Ukraine. In fact, the period saw simultaneous increases in both defense and non-defense spending. This is consistent with public budget data showing that Ukraine aid was very small relative to the federal budget. Our findings directly counter the "opportunity cost" argument that aid to Ukraine came at the expense of domestic programs. Instead, the federal government expanded support on both fronts, and the statistical results are consistent with no crowding-out of other spending priorities.

C. Federal Deficit and Debt Dynamics

We now examine the potential impact of U.S. aid to Ukraine on federal deficit and debt dynamics. Given the relatively modest scale of U.S. support to Ukraine compared to the broader context of U.S. government finances, one might anticipate negligible effects. Our updated econometric analysis, now based on actual quarterly outlays rather than binary treatment dummies, substantiates this expectation.

The federal budget deficits between fiscal years 2022 and 2024 ranged approximately from \$1.4 to \$1.7 trillion annually, primarily driven by ongoing pandemic recovery expenditures, cyclical variations in revenues, and new large-scale domestic policy initiatives. By comparison, the fiscally impacting portion of aid delivered to Ukraine $(33 billion) over these three years constitutes roughly 0.7\% of the cumulative deficits during th$

To formally investigate this, we use quarterly data from 2018 to 2024, integrating verified federal macroeconomic indicators and newly constructed fiscal outlay series for both Ukraine and the Inflation Reduction Act (IRA). This approach provides a more precise assessment of aid-related spending effects.

The econometric specifications are:

1) **Federal Deficit as Percentage of GDP**:

$$Deficit_t = \alpha_0 + \alpha_1 \cdot \text{UkraineOutlay}_t + \alpha_2 \cdot \text{IRAOutlay}_t + \text{Controls}_t + \varepsilon_t$$

2) **Federal Debt as Percentage of GDP**:

$$Debt_t = \beta_0 + \beta_1 \cdot \text{UkraineOutlay}_t + \beta_2 \cdot \text{IRAOutlay}_t + \text{Controls}_t + \eta_t$$

where `UkraineOutlay` and `IRAOutlay` are measured in billions of USD per quarter. Control variables include real GDP growth, unemployment rate, interest payments as a share of GDP, total outlays, and receipts as a share of GDP. The results are summarized in Table 3.

Table 3—Impact of Ukraine and IRA Outlays on U.S. Federal Deficit and Debt (2018–2024)

	Federal Deficit (% GDP)	**Federal Debt (% GDP)**
GDP Growth (%)	-0.074	-0.147***
	(0.064)	(0.048)
Unemployment Rate (%)	0.138	0.244*
	(0.166)	(0.124)
Interest Payments (% GDP)	0.178	0.387**
	(0.205)	(0.163)
Outlays (% GDP)	0.891***	0.585**
	(0.279)	(0.211)
Receipts (% GDP)	-0.857***	-0.542**
	(0.272)	(0.193)
Ukraine Outlay (B USD)	-0.025	-0.034
	(0.077)	(0.058)
IRA Outlay (B USD)	0.022	0.029**
	(0.014)	(0.010)
Constant	-4.093*	95.529***
	(2.052)	(1.553)
Observations	28	28
R^2	0.81	0.94

Notes: OLS regressions with robust standard errors using quarterly data (2018Q1–2024Q4). Dependent variables are the federal deficit and debt as a share of GDP. "Ukraine Outlay" and "IRA Outlay" represent actual disbursements per quarter in billions of USD. Control variables include GDP growth, unemployment, net interest payments, total outlays, and total receipts. Robust standard errors in parentheses. ***, **, * indicate significance at the 1%, 5%, and 10% levels respectively.

The regression results highlight the negligible nature of Ukraine aid's fiscal impact. The coefficient on Ukraine outlays for the deficit regression (Column 1) is –0.025 (i.e., a 1 billion USD increase in aid is associated with a 0.025 percentage point decrease in the deficit-to-GDP ratio), and is statistically insignificant with a robust standard error of 0.077. Even an extreme upper-bound estimate—assuming the entire $51.2 billion were deficit-financed in a single year—would represent only about 0.2% of GDP. This contribution remains trivial compared to far larger macroeconomic drivers affecting the deficit, such as COVID-19 pandemic recovery efforts, cyclical revenue fluctuations, and large domestic legislative initiatives (e.g., the Inflation Reduction Act).

Similarly, the analysis of federal debt as a percentage of GDP (Column 2) yields a Ukraine outlay coefficient of –0.034 (standard error 0.058), again statistically insignificant. The U.S. debt-to-GDP ratio rose from approximately 97% in early 2022 to around 100% by 2024, driven predominantly by pandemic relief programs and ongoing structural deficits. Our estimates indicate that Ukraine aid was responsible for at most a negligible fraction (well under 0.2 percentage points) of this modest increase, rendering it statistically indistinguishable from zero.

Event studies conducted around key legislative dates (March 2022, May 2022, December 2022) confirmed that neither U.S. Treasury yields nor debt issuance patterns exhibited meaningful changes attributable specifically to Ukraine aid. Financial markets clearly did not perceive the aid as a significant fiscal strain, further corroborating our empirical findings.

From a taxpayer perspective, amortizing the $33 billion non-equipment fiscal aid cost over a 10-year horizon among approximately 150 million U.S. taxpayers equates to roughly $22 per taxpayer per year in additional income taxes—a minuscule amount relative to overall federal spending and taxpayer burdens. Even under more pessimistic assumptions, the per-taxpayer total cost over 10 years would remain below $150, an inconsequential sum in fiscal terms.

Policy Implications

Our updated analysis, now grounded in actual fiscal outlays rather than binary treatment indicators, demonstrates that U.S. financial support to Ukraine has imposed virtually no measurable strain on public finances. Indeed, other factors—such as domestic legislation and macroeconomic dynamics—entirely dominate the federal deficit and debt trajectory. These findings strongly refute arguments that U.S. aid to Ukraine significantly worsens fiscal imbalances or meaningfully constrains domestic policy flexibility. Rather, the modest scale of the aid and its negligible fiscal footprint highlight the affordability and sustainability of continued support, given its significant geopolitical and security benefits.

As previous research has similarly concluded, aid to Ukraine represents "only a negligible impact on both total federal spending and the U.S. economy" (Cancian and Park 2022). Our detailed empirical evidence robustly confirms this perspective, underscoring that the aid's economic costs to the U.S. taxpayer are negligible

and entirely justified relative to the strategic and security interests at stake.

D. U.S. Industrial Activity and Labor Market Effects

In contrast to the negligible fiscal impacts detailed previously, we identify notable positive effects of Ukraine aid on particular sectors within the U.S. industrial base and labor markets. A substantial proportion (approximately 90%) of the so-called "Ukraine aid" directed toward procurement of military equipment and supplies remains within the U.S. economy, effectively serving as a targeted stimulus for domestic manufacturing of defense equipment, munitions, and related supplies (Time Staff 2023). Notably, none of it is spent in Ukraine. This stimulus serves both as an uplifting force on employment and industrial capacity, while accelerating the modernization of the U.S. Armed Forces and increasing the battle-readiness of units.

Leading defense contractors, along with numerous small and mid-sized suppliers across at least 38 states, have ramped up production significantly to meet increased demand driven by Russia's full-scale invasion of Ukraine, resulting in the opening of new production lines and creating thousands of jobs (Time Staff 2023). To formally quantify these effects, we once again employ a difference-in-differences (DiD) regression framework, comparing growth in defense-related manufacturing output and employment to overall manufacturing, pre- and post-initiation of significant Ukraine aid packages (starting March 2022).

Methodology and Data

Our econometric specification for industrial production is:

$$\begin{aligned} DefenseOutput_{it} = \gamma_0 + \gamma_1 UkraineAidShock_t + \gamma_2 OverallManufacturing_t \\ + \delta_t + \mu_i + \epsilon_{it} \end{aligned}$$

where $DefenseOutput_{it}$ is the monthly industrial production index specifically for defense and aerospace manufacturing, and $OverallManufacturing_t$ is the industrial production index for the broader U.S. manufacturing sector. The dummy $UkraineAidShock_t$ equals 1 from March 2022 onward, capturing the period of major Ukraine aid legislation. δ_t represents month fixed effects, and μ_i captures industry-specific fixed effects.

For labor market effects, we use:

$$\begin{aligned} DefenseJobs_{it} = \theta_0 + \theta_1 UkraineAidShock_t + \theta_2 OverallManufacturingJobs_t \\ + \lambda_t + \phi_i + \eta_{it} \end{aligned}$$

where $DefenseJobs_{it}$ measures employment growth in manufacturing sectors heavily involved in defense-related production, and $OverallManufacturingJobs_t$

is employment growth in the total manufacturing sector. Similar fixed effects controls apply.

We utilize monthly panel data (2019–2024) sourced from the Federal Reserve's industrial production indices and the U.S. Bureau of Labor Statistics (BLS) for manufacturing employment statistics.

E. Regression Results

Table 4 summarizes our key results.

Table 4—Real Economy Effects of Ukraine Aid on Defense-Industry Output and Employment (2019–2024)

	(1) Defense Industrial Output	**(2) Defense Manufacturing Jobs**
Ukraine Aid Shock (post-2022Q1)	0.102***	0.024**
	(0.025)	(0.011)
Overall Manufacturing Trend Control	Yes	Yes
Month Fixed Effects	Yes	Yes
Industry Fixed Effects	Yes	Yes
Observations	72	72
R^2	0.85	0.77

Notes: Estimates from DiD regressions with monthly data. Column (1) compares the defense and aerospace industrial output index to overall industrial production. Column (2) uses BLS employment data comparing manufacturing industries heavily engaged in defense production to all other manufacturing industries. Ukraine Aid Shock equals 1 starting March 2022. Both specifications include month and industry fixed effects. Robust standard errors are provided in parentheses. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Our results reveal that Ukraine aid has significantly stimulated U.S. defense-related manufacturing output. Column (1) shows that the Ukraine aid shock is associated with a statistically significant 10.2% higher industrial production index in defense-related industries (p¡0.01), relative to the overall manufacturing baseline. This corresponds with the Federal Reserve's index for defense and aerospace manufacturing rising sharply from approximately 125 at the beginning of 2022 to over 140 by late 2024, marking an increase of roughly 12% after a period of relative stagnation from 2019 to 2021 (**?**, **?**).

Employment gains in defense-linked manufacturing sectors are also notable. Column (2) indicates a 2.4% statistically significant (p¡0.05) employment increase in defense manufacturing industries relative to the rest of manufacturing following the start of aid. This translates into tens of thousands of new manufacturing jobs nationwide—consistent with industry reporting highlighting increased shifts, expansions, and workforce additions at major defense suppliers producing systems such as Javelin missiles, HIMARS rocket systems, and artillery shells (Time Staff 2023).

Broader Economic and Regional Implications

Although national-level employment impacts remain modest against an overall labor market of approximately 150 million workers, regionally focused anal-

yses reveal considerable localized benefits. Southern states hosting missile and rocket system plants, as well as Midwestern states producing armored vehicles and artillery, experienced measurable reductions in unemployment rates relative to regions less exposed to defense contracts. A robustness check using state-level data confirmed that states with above-median defense industry presence saw unemployment reductions of approximately 0.2 percentage points attributable to Ukraine aid, even when accounting for broader macroeconomic recovery trends post-COVID-19.

Moreover, because initial military aid drew substantially from existing inventory stocks, current trends indicate a sustained industrial stimulus from subsequent new procurement aimed at replenishing these depleted inventories. Thus, the positive effects documented here likely represent the early stages of a continuing demand-driven industrial expansion cycle.

F. Longer-Term Considerations

Our analysis captures primarily short- to medium-term responses (2022-2024). The long-term sustainability of employment and output gains depends on the duration and intensity of continued aid. If Ukraine aid winds down, some job contractions may occur in specialized manufacturing plants unless alternative defense procurement can sustain current levels of demand. Nevertheless, Ukraine aid has effectively revitalized critical segments of the U.S. defense industrial base, supporting national security and economic objectives simultaneously.

Overall, the empirical results robustly confirm significant positive microeconomic impacts from Ukraine aid spending, specifically within U.S. defense manufacturing and associated labor markets, providing targeted stimulus precisely when broader manufacturing sectors have faced challenges.

VIII. Public Perceptions and Communication Challenges

Despite the modest scale of U.S. aid to Ukraine relative to the overall budget, public opinion in the United States has been sharply divided on the issue of assistance to Ukraine. A significant factor in this divide is the misperception and politicization of the aid figures. In this section, we explore how the narrative around "$100 billion+" aid may have skewed public understanding, contributing to "Ukraine fatigue" and being weaponized in domestic politics (Baker 2024, Navigator Research 2023, AP-NORC Center for Public Affairs Research 2023).

It is instructive to compare the observed trends in the first three years of Russia's full-scale invasion with historical examples. In other foreign conflicts—such as those in Iraq and Afghanistan—public support eroded over many years as U.S. casualties mounted and costs accumulated (Watson Institute for International and Public Affairs 2022). In the case of Ukraine, by contrast, the United States did not suffer battlefield casualties, and the fiscal burden was modest: by the end of 2024, only $33 billion of the $51.2 billion delivered aid had any direct impact on the

federal budget. Yet support for continued assistance eroded far more rapidly. The difference appears to lie not in cost or consequence, but in *communication*. From the earliest days of the full-scale invasion, a highly coordinated campaign of domestic political messaging, foreign disinformation, and algorithmically amplified media coverage converged to distort Americans' understanding of what Ukraine aid was, what it cost, and what it achieved. This manufactured skepticism frontloaded the "war fatigue" effect, creating a perception of over-extension before the effort had matured. Only one year after the full-scale invasion, a notable segment of Americans was already "war-weary"— despite no U.S. troops being involved in the fighting—underscoring the efficiency of the messaging ecosystem that shaped their views.

Our timeline analysis (Table I1) reveals a consistent pattern: strategically timed misinformation and politically convenient distortions converged to shift public perceptions, especially within Republican constituencies. In March 2022, before the ink had dried on the first aid package, Russian troll farms were already amplifying the slogan "secure our border, not Ukraine's"—a Kremlin-crafted talking point later echoed nearly verbatim by members of the U.S. Congress (Belton 2024, U.S. Government Accountability Office 2024*b*). In subsequent months, public figures such as Tucker Carlson, Marjorie Taylor Greene, Matt Gaetz, and Donald Trump repeatedly portrayed Ukraine as unworthy, corrupt, or over-funded. Falsehoods gained traction: Zelenskyy's supposed purchase of yachts (entirely fabricated), the claim that $300–$500 billion had been "sent to Ukraine", and the notion that Ukraine aid diverted money from border security (false: no such trade-off exists in the budget structure) (Voice of America News 2024, Baker 2024).

Each distortion was magnified by a supporting ecosystem: conservative cable networks aired the slogans; right-leaning think tanks like The Heritage Foundation published polls or policy briefs reinforcing them (Navigator Research 2023); and social media algorithms spread emotionally resonant memes equating foreign aid with domestic neglect. At key moments, such as ahead of midterm elections or during legislative aid votes, misinformation surged: new claims appeared, bot activity increased, and polls showed spikes in opposition. For example, October 2023 marked a peak in "too much aid" sentiment (41% nationally, including nearly 60% of Republicans) (AP-NORC Center for Public Affairs Research 2023), coinciding with weeks of media saturation portraying Ukraine aid as uncontrolled, excessive, or corrupt. Crucially, many of these messages mirrored or directly recycled themes from Russian state media and intelligence-guided disinformation campaigns, as later confirmed by investigative reporting and intelligence community warnings.

Another aspect of these communication challenges was the framing of equipment transfers. The U.S. decision to send advanced systems like Patriot missiles or Abrams tanks garnered huge media attention, sometimes leading the public to think Ukraine was being given an entire modern arsenal at U.S. expense. In

reality, such high-profile transfers were infrequent and often delayed. Yet public perceptions may have been "we gave them Patriots, what else does Ukraine want?" without recognizing that, for instance, only two Patriot batteries were delivered by the US (with components donated from allies too) (U.S. Department of State 2025). Without clear communication, the public might incorrectly assume Ukraine got dozens of Patriots costing billions of dollars, feeding a perception of overspending.

Unlike historical misperceptions, this was not a slow drift but a rapid narrative coup. What began as fringe talking points quickly saturated mainstream discourse—broadcasted from Fox News, memed on Facebook, debated in Congress, and quoted in op-eds. The result was measurable: polling support for Ukraine aid dropped substantially from 2022 to 2024, and congressional action followed suit. By late 2023, funding was delayed, and by 2024, it became an open wedge issue in a presidential election year.

Interestingly, when the context is properly explained, public support can be bolstered. A Navigator poll in 2023 found that when respondents were reminded of facts—such as that foreign aid comprises $< 1\%$ of the budget (Navigator Research 2023, Baker 2024) and that Ukraine is fighting a defensive war against Russian aggression—support for aiding Ukraine increased significantly (Navigator, 2023). This suggests that a transparent accounting, like the one we provide, could improve public understanding. For instance, telling voters "actually, only about $50 billion of aid (roughly $17 billion per year) has gone to Ukraine, mostly in the form of old military gear and carefully monitored financial support, which is less than 0.2% of our budget" might defuse some of the argument that "we're spending too much."

The economic cost of this narrative shift is profound, albeit indirect. By reducing the timeliness and consistency of aid, political obstruction increased Ukraine's vulnerability and prolonged the conflict, raising not only human costs but also financial ones. With every delay, the destruction and associated reconstruction costs, supply chain shocks, and regional instability only rise. The U.S., which benefits strategically and economically from Ukraine's defense, has therefore paradoxically incurred greater long-term costs by letting short-term misinformation override its long-term interests.

Finally, this episode illustrates the vulnerability of democratic publics to narrative warfare. A combination of adversarial propaganda, domestic political incentives, and fragmented media can rapidly turn an economically minor and strategically vital aid program into a political liability. The Kremlin didn't invent these talking points, but it cultivated and amplified them with precision—and U.S. actors, knowingly or not, carried them into the American bloodstream. Future security assistance programs must learn from this episode: transparency, rapid debunking, and factual communication are not just virtues—they are strategic imperatives.

This paper's contribution, we hope, is not only analytical but also communica-

tive: by setting the record straight on the numbers, we provide a foundation for a more informed public discussion on the U.S.–Ukraine aid program.

IX. Conclusion

This paper's findings reveal a strikingly different picture of U.S. aid to Ukraine than the headline numbers suggest. By our comprehensive accounting, the total economic value of aid delivered to Ukraine from 2022 through 2024 is approximately $51.2 billion. Of this, about $33 billion interfaced with U.S. budgetary mechanisms or debt, corresponding to about $11 billion per year, and raising U.S. total obligations by roughly $120 per tax-payer over 2022-2032, a relatively trivial amount for each American when spread across the population. To put it in perspective, this annual aid is only about 0.15% of the U.S. federal budget, a rounding error in fiscal terms. It is less than what the government spends on maintaining federal buildings in a year. Another way to view it: over three years of war, all U.S. aid to Ukraine has cost each American roughly the price of two cups of coffee per year. These findings decisively debunk the notion that support for Ukraine is a major drain on U.S. finances. Our comprehensive estimate ($51.2 billion delivered) is multiples below the often-cited $120–$175 billion figures, and roughly one-seventh of the fantastical $350 billion claim that has surfaced in political rhetoric. In short, U.S. support to Ukraine, while crucial for Ukraine's survival, has been financially negligible and efficiently allocated in the context of America's $6–7 trillion annual federal budget.

Crucially, we find no evidence of significant trade-offs or sacrifices of domestic priorities due to Ukraine aid. Congress funded the aid largely through emergency supplemental packages, without cutting social programs or investments. The negligible fiscal footprint of the aid means it has neither driven up inflation nor crowded out other spending – it constitutes less than 0.2% of U.S. GDP, too small to crowd out domestic needs. In fact, our analysis suggests the opposite: supporting Ukraine has yielded economic spillovers benefiting the U.S. economy. A large portion of the appropriated aid dollars never left American shores – they paid U.S. workers to manufacture arms and munitions, spurring industrial activity in dozens of states. From St. Louis to Scranton, orders to replenish stocks (Javelins, HIMARS rockets, artillery shells, and more) have sustained jobs and prompted new investments in expanded defense production. This mobilization is effectively a mini-stimulus for the manufacturing sector and has prompted upgrades to U.S. military infrastructure (as old equipment is sent to Ukraine and replaced with newer models and capabilities). In strategic terms, the aid has also modernized U.S. inventories—for instance, retiring older systems like M113 APCs and legacy munitions in favor of next-generation platforms—at a modest cost. These indirect benefits, while difficult to precisely quantify, mean that the net economic cost to the U.S. of aid to Ukraine is even lower than the raw $51 billion figure suggests. Accounting for the counter-factual fall of Ukraine to Russia (imposing monumental strategic and economic costs on the United States),

the net cost of aid would likely be hugely positive. From a macro-budgetary standpoint, the impact of Ukraine aid on U.S. federal outlays is negligible, and its opportunity cost in terms of forgone domestic programs is essentially zero.

While the fiscal and economic burden on the United States has been minimal, the humanitarian and geopolitical stakes of sustaining Ukraine are enormous. Our findings underscore that the U.S. can continue to robustly support Ukraine without straining its finances or short-changing priorities at home. However, one of the biggest risks going forward is not economic – it is the risk of misinformation and politicization undermining public support. Polling data indicate that many Americans believe the U.S. is overspending on Ukraine: as of late 2023, about 45% of Americans thought the U.S. was giving "too much" aid to Ukraine. This perception is fueled by exaggerated claims and the lack of clarity about what has actually been spent. Moreover, a significant portion of the American public wildly overestimates foreign aid spending in general—nearly half believe foreign aid consumes $> 1\%$ of the federal budget, and a quarter even think it's over 20% (Navigator Research 2023). Such misconceptions create fertile ground for politically motivated narratives that U.S. assistance to Ukraine comes at the expense of domestic well-being. Indeed, some commentators have seized on eye-popping figures to argue that "we should be spending that money at home instead," framing it as an either-or choice. Our analysis refutes this false dichotomy emphatically: the scale of Ukraine aid is so small relative to the U.S. economy that there has been no practical trade-off between funding Ukrainian resistance and funding American communities. Every objective audit to date (including extensive oversight by State and Defense Department inspectors general and the GAO) also confirms that the aid has been used as intended, with no notable fraud or waste reported in Ukraine. This should further reassure the public that their money is being spent diligently on a worthy cause.

In light of these findings, we conclude with a clear policy implication: the United States can and should sustain its support to Ukraine for as long as needed, without sacrificing its domestic goals. The data show that helping Ukraine defend its democracy is a high-impact, low-cost investment in global stability and American security interests. It yields outsized returns in the form of a weakened aggressor (Russia), a strengthened international norms regime, and a message of deterrence to other potential aggressors—all at a tiny fraction of U.S. resources. Going forward, it is imperative that U.S. leaders across the political spectrum communicate these facts honestly. Bipartisan and ethical communication is needed to dispel myths about aid spending and highlight the reality that aiding Ukraine and tending to U.S. domestic needs are not in conflict. By improving transparency and public understanding—for example, regularly reporting not just how much aid has been *committed*, but also how much was *delivered* and its outcomes—policymakers can build and maintain the domestic consensus required to see this effort through. In sum, our analysis finds that a HIMARS in the hand is worth two in the bush: the tangible aid delivered to Ukraine ($51 billion) has provided

immense strategic value, and the U.S. can well afford to keep it up. With facts in hand and accountability in place, America can both "put America first" and stand resolutely with Ukraine—a false choice no longer, but a dual imperative that advances our values and interests alike.

REFERENCES

Amentum. 2023*a*. "Maintenance and Spare Parts Support for Ukraine."

Amentum. 2023*b*. "U.S. Army Remote Maintenance for Ukraine."

AP-NORC Center for Public Affairs Research. 2023. "Public Opinion on U.S. Aid to Ukraine, November 2023 Poll." Associated Press and NORC.

Army Recognition. 2023. "NATO Repair Hub in Poland."

Associated Press. 2023. "US offers Poland rare loan of $2 billion to modernize its military." Accessed May 2025.

Baker, Dean. 2024. "People Are Completely Clueless on How Much We're Spending on Ukraine." *Center for Economic and Policy Research*. Accessed April 2025.

Beinart, Matthew. n.d.. "U.S. Approves $2.85 Billion Arms Package For Ukraine, $907 Million In Military Aid For European Partners." *Defense Daily*.

Belton, Catherine. 2024. "Russian trolls target U.S. support for Ukraine, Kremlin documents show." *The Washington Post*. Accessed May 2025.

BlackRock Inc. 2025. "BlackRock Reports Fourth Quarter 2024 Earnings."

Breaking Defense. 2023*a*. "Patriot Sustainment Challenges in Ukraine."

Breaking Defense. 2023*b*. "Ukraine to Face Maintenance Shortfall Beyond 2024: DoD Inspector General."

Breaking Defense. 2024. "Ukraine Faces Long-Term Challenges in Maintaining U.S.-Provided Armor."

Cancian, Mark F., and Chris H. Park. 2022. "United States Aid to Ukraine: An Investment Whose Benefits Greatly Exceed Its Cost." *https://www.csis.org/analysis/united-states-aid-ukraine-investment-whose-benefits-greatly-exceed-its-cost*.

Congressional Budget Office. 2024. "The Budget and Economic Outlook: 2024 to 2034." CBO, Washington, DC.

Defence UA. 2023. "NASAMS Spare Parts Provided by US."

Defence-UA. 2024. "Ukraine Using Damaged Artillery as Parts Donors."

Defense News. 2023. "U.S. Army Establishes RDC-U in Poland."

Demarest, Colin. n.d.. "US sending Ukraine electronic jamming gear in $150M package." *C4ISRNET*.

DSCA. 2024. "F-16 Sustainment Services and Parts Notification."

ESSA News. 2024. "Ukrainian soldier innovates reusable battery for aged Javelin anti-tank missile." Accessed May 2025.

Export-Import Bank of the United States. 2024. "Export-Import Bank Chair Lewis Announces Historic Financing for Ukrainian Railways During Visit to Ukraine." Accessed May 2025.

Gould, Joe. n.d.. "US, Netherlands go Dutch to refurbish Czech tanks for Ukraine." *Army Times*.

Gould, Joe, and Howard Altman. n.d.. "Pentagon reveals info on $200M military aid to Ukraine, including more Javelins." *Defense News*.

Graff, Peter, Tomasz Janowski, and Costas Pitas. n.d.. "U.S. to reopen Kyiv embassy soon, says Russia has failed in war aims." *Reuters*.

Kyiv Independent. 2023. "NATO to Establish Logistics and Repair Center near Rzeszów."

Lopez, C. Todd. n.d.. "Precision Artillery Rounds Included in Latest Security Assistance Package to Ukraine." *DOD News*.

Manuel, Rojoef. n.d.. "Poland Buys 116 Used M1A1 Abrams Tanks From US." *The Defense Post*.

Masters, Jonathan, and Will Merrow. 2025. "Here's How Much Aid the United States Has Sent Ukraine." Council on Foreign Relations Backgrounder, updated March 11, 2025.

Mehta, Aaron. n.d.. "US gives $2B loan to Poland to help buy US-made weapons." *Breaking Defense*.

MIL.IN.UA. 2023*a*. "Germany and Slovakia Heavy Equipment Repair Center for Ukraine."

Mil.in.ua. 2023*b*. "Germany and Slovakia Open Repair Hub for Ukraine."

Military Aerospace. 2023. "Puma UAVs and Spare Parts in Aid Packages."

Motkin, Adrian. 2023. "Ukraine's Diia platform sets the global gold standard for e-government." Atlantic Council, July 7, 2023.

Navigator Research. 2023. "Misinformation Persists on U.S. Budget and Foreign Aid: Survey Report."

Pravda Ukraine. 2023*a*. "Bradleys Sent to Poland for Repairs."

Pravda Ukraine. 2023*b*. "Ukrainian Soldiers Report Critical Shortages of Bradley Spare Parts."

Reuters. 2023*a*. "Canada Donates 10 M777 Barrels Worth 6.9M."

Reuters. 2023*b*. "Pentagon Accounting Error Frees 6.2$BillionforUkraineAid$."

Reuters. n.d.*a*. "First part of $200 million U.S. defense aid arrives in Ukraine." *Reuters*.

Reuters. n.d.*b*. "Ukraine fires US-provided long-range missiles on Russian forces - reports." *Reuters*.

Reuters. n.d.*c*. "US announces second $2 billion military loan deal for Poland." *Reuters*.

Ruitenberg, Rudy. 2024. "Netherlands budgets over $4 billion military aid for Ukraine." *Defense News*. Accessed May 2025.

Saballa, Joe. n.d.. "US Compensates Czech Republic for Military Aid to Ukraine." *The Defense Post*.

Special Inspector General for Afghanistan Reconstruction. 2022. "Quarterly Report to the United States Congress." SIGAR. Accessed May 2025.

Stone, Mike, and Humeyra Pamuk. n.d.. "Biden endorses plan to train Ukrainian pilots on F-16 fighter jets." *Reuters*.

Stone, Mike, and Nandita Bose. n.d.. "US to give Ukraine cluster munitions in $800 million aid package." *Reuters*.

Strategy Page. 2023. "M777 Barrel Life and Replacement Frequency."

Strzelecki, Marek. n.d.. "Poland gets $4 billion US loan for defence purchases, minister says." *Reuters*.

Technology.org. 2023. "Additional Mi-17s Donated as Parts."

The FM Extra. 2022. "Battery Coolant Units for Stinger Missiles."

The War Zone. 2024. "US Army Ramping Up M777 Barrel Production for Ukraine."

Time Staff. 2023. "U.S. Military Spending on AI Surges." *Time*. Accessed May 2025.

Trebesch, Christoph, Andreas Antezza, Tilman Brück, et al. 2023. "The Ukraine Support Tracker: Which countries help Ukraine and how?" Kiel Institute for the World Economy Kiel Working Paper 2218.

TWZ. 2023*a*. "Global shortage of Mi-17 helicopter spare parts."

TWZ. 2023*b*. "Maintenance Challenges for Mi-17 Helicopters."

TWZ. 2024. "U.S. Army Accelerates M777 Barrel Production for Ukraine."

U.S. Department of Defense. 2023*a*. "Air Defense System Components Provided."

U.S. Department of Defense. 2023*b*. "Fact Sheet: U.S. Security Assistance to Ukraine."

U.S. Department of Defense. 2023*c*. "List of UAVs Delivered to Ukraine."

U.S. Department of Defense. 2023*d*. "Stinger Missiles Delivered to Ukraine."

U.S. Department of Defense. 2023*e*. "UAVs Sent to Ukraine."

U.S. Department of Defense. 2023*f*. "U.S. Funding for Sustainment and Training for Ukraine."

U.S. Department of Defense. 2023*g*. "U.S. PDA Logistics Support to Ukraine."

U.S. Department of Defense. 2024*a*. "December 2024 Ukraine Security Assistance Drawdown."

U.S. Department of Defense. 2024*b*. "DoD Financial Management Regulation (FMR) 7000.14-R." Office of the Under Secretary of Defense (Comptroller), Volumes 4 and 6 provide depreciation and military equipment accounting guidance.

U.S. Department of Defense. 2024*c*. "Presidential Drawdown Authority Announcements for Ukraine."

U.S. Department of Defense. 2024*d*. "Total Security Assistance Provided to Ukraine (2024)."

U.S. Department of Defense. n.d.*a*. "$600 Million in Additional Security Assistance for Ukraine." *Press Release*.

U.S. Department of Defense. n.d.*b*. "Biden Administration Announces Additional Security Assistance for Ukraine." *Press Release*.

U.S. Department of Defense. n.d.*c*. "Fact Sheet on U.S. Security Assistance for Ukraine (Roll Up) as of April 21, 2022." *Press Release*.

U.S. Department of Defense. n.d.*d*. "More Than $3 Billion in Additional Security Assistance for Ukraine." *Press Release*.

U.S. Department of Defense News. n.d.. "Advanced Rocket Launcher System Heads to Ukraine." *DOD News*.

U.S. Department of State. 2023. "Congressional Budget Justification: Foreign Operations, FY 2024." U.S. Department of State. Accessed May 2025.

U.S. Department of State. 2025. "Fact Sheet: U.S. Security Assistance to Ukraine (2022–2024)." Retrieved from State.gov, January 2025.

U.S. Department of State, Office of Inspector General. 2024. "Operation Atlantic Resolve Including U.S. Government Activities Related to Ukraine." U.S. Department of State, Washington, DC. Report to the U.S. Congress, October 1 – December 31, 2024.

U.S. Government Accountability Office. 2024*a*. "Ukraine Assistance: Actions Needed to Properly Value Defense Articles Provided Under Presidential Drawdown Authority." GAO GAO-24-106934, Washington, DC.

U.S. Government Accountability Office. 2024*b*. "Ukraine: Status and Use of Supplemental U.S. Funding, as of First Quarter Fiscal Year 2024." GAO GAO-24-107232, Washington, DC.

Vergun, David. n.d.*a*. "Additional Defensive Weapons to be Shipped to Ukraine, Official Says." *DOD News*.

Vergun, David. n.d.*b*. "Slovakia to Supply S-300 Air Defense System to Ukraine." *DoD News (U.S. Department of Defense)*.

Voice of America News. 2024. "US Oversight of Ukraine Aid Undergoes Scrutiny as Billions Are Sent." Accessed April 2025.

War on the Rocks. 2023*a*. "Maintenance Costs for MRAP Vehicles in Combat."

War on the Rocks. 2023*b*. "The MRAP Boondoggle."

Watson Institute for International and Public Affairs. 2022. "Human and Budgetary Costs to Date of the U.S. War in Afghanistan, 2001–2022." Accessed: May 2024.

Weaver, Natalie. n.d.. "Remote maintenance Soldiers establish personal ties with Ukraine Armed Forces." *DVIDS News*.

Yellen, Janet L. 2024. "Statement on the Disbursement of U.S. Direct Budget Support for Ukraine." U.S. Department of the Treasury Press Release, December 30, 2024.

Appendix A: Timeline of Direct Non-Military Budget Assistance

Table A1—: US Non-military Grants to Ukraine – 2022 (Millions US$)

Month	Grant Approp.	Transfers to WB	Disbursed	WB Overhead	Audit Costs	US Share of Aid	Fund Balance	Notes
2022-02	0	0	0	0	0	0	0	War begins (Feb 24)
2022-03	1,000	1,000	0	0	0	0	1,000	Initial $1B tranche to WB
2022-04	0	0	500	5	0	480	495	First reimbursement (March expenses)
2022-05	7,500	7,500	500	5	0	480	7,490	April expenses reimbursed
2022-06	0	0	1,300	13	0	1,248	6,177	May expenses, PEACE salaries/pensions
2022-07	0	0	1,700	17	1.6	1,633	4,458	Deloitte audit starts
2022-08	0	0	3,000	30	1.7	2,881	1,427	August major civil support tranche
2022-09	0	0	1,400	14	1.7	1,344	11	Partial tranche (balance nearly exhausted)
2022-10	0	0	0	0	0	0	11	Awaiting further funding
2022-11	5,000	5,000	0	0	0	0	5,011	November appropriation transferred
2022-12	9,900	3,500	3,500	35	1.7	3,361	4,974	Large tranche (1.5B + 2.0B) winter peak
Total	**23,400**	**17,000**	**11,900**	**119**	**6.7**	**11,428**	**4,974**	

Table A2—: US Non-military Grants to Ukraine – 2023 (Millions US$)

Month	Grant Approp.	Transfers to WB	Disbursed	WB Overhead	Audit Costs	US Share of Aid	Fund Balance	Notes
2023-01	0	6,400	1,000	10	1.7	960.3	10,362.7	Jan disbursement (Dec expenses)
2023-02	0	0	1,350	13.5	1.7	1,296.4	8,997.5	
2023-03	0	0	1,000	10	1.7	960.3	7,985.8	
2023-04	0	0	1,000	10	1.7	960.3	6,974.2	
2023-05	0	0	0	0	0	0	6,974.2	
2023-06	0	0	1,250	12.5	1.7	1,200.4	5,710	
2023-07	0	0	0	0	0	0	5,710	
2023-08	0	0	1,200	12	1.7	1,152.4	4,496.3	
2023-09	0	0	1,000	10	1.7	960.3	3,484.7	
2023-10	0	0	1,150	11.5	3.5	1,104.3	2,319.7	KPMG audit begins
2023-11	0	0	1,000	10	1.7	960.3	1,308	
2023-12	0	0	1,000	10	1.7	960.3	296.3	
Total	**0**	**6,400**	**10,950**	**109.5**	**18.5**	**10,515.3**	**296.3**	

Table A3—: US Non-military Grants to Ukraine – 2024 (Millions US$)

Month	Grant Approp.	Transfers to WB	Disbursed	WB Overhead	Audit Costs	US Share of Aid	Fund Balance	Notes
2024-01	0	0	200	2	3.5	192.1	90.8	US budget uncertainty delays aid
2024-02	0	0	0	0	0	0	90.8	Minimal funds, awaiting next tranche
2024-03	0	0	0	0	0	0	90.8	Temporary halt, awaiting appropriation
2024-04	7,850	7,850	100	1	1.7	96	7,838.2	
2024-05	0	0	0	0	0	0	7,838.2	
2024-06	0	0	100	1	3.5	96	7,733.7	
2024-07	0	0	0	0	0	0	7,733.7	
2024-08	0	0	3,900	39	1.7	3,745.2	3,793	Largest tranche (Aug expenses): PEACE/SPUR forgiven loan portion
2024-09	0	0	0	0	0	0	3,793	
2024-10	0	0	0	0	0	0	3,793	
2024-11	0	0	1,350	13.5	3.5	1,296.4	2,426	PEACE/SPUR forgiven loan portion
2024-12	0	0	2,400	24	2	2,304.7	0	
Total	**7,850**	**7,850**	**8,050**	**80.5**	**15.8**	**7,730.4**	**0**	

Appendix B: Timeline of Direct Humanitarian Aid and Service Provision

Table B1—: US Direct Humanitarian Aid to Ukraine (2022–2024), with Annual Totals Highlighted

Date	Type	Description	Value (USD)	Notes
2022-04-01	Communications	1,333 Starlink terminals procured by USAID	3,000,000	Starlink (SpaceX); Ukrainian ministries controlled deployment.
2022-05-01	Healthcare	20 fully-equipped ambulances delivered to Ministry of Health	2,000,000	WHO coordinated procurement (funded by USAID); direct government use.
2022-07-01	Energy	Initial batch (200 units) of power generators delivered for infrastructure	20,000,000	Tetra Tech (USAID); municipal and utility deployment.
2022-08-01	Energy	High-capacity generators (500 units) for hospitals & heating utilities	50,000,000	General Electric, Tetra Tech (USAID); municipal authorities deployed equipment.
2022-09-01	Governance (e-Government)	Support for Diia eGovernment digital infrastructure development	25,000,000	EPAM Systems contracted via USAID; Ministry of Digital Transformation as direct beneficiary.
2022-10-01	Energy	Transformers, switchgear, and grid repair equipment	53,000,000	Delivered by DOE and USAID; installed by Ukrenergo and regional utilities.
2022-11-01	Emergency Response	Firefighting/rescue equipment for State Emergency Service	5,000,000	USAID direct transfer to Ukraine State Emergency Service.
2022-12-01	Energy (Utility repair)	30 excavators for heat network emergency repairs	2,000,000	USAID Energy Security Project (Tetra Tech contract); municipal heating operators received directly.
2022 Total			**160,000,000**	

Continued on next page

Table B1—: US Direct Humanitarian Aid to Ukraine (2022–2024), with Annual Totals Highlighted

Date	Type	Description	Value (USD)	Notes
2023-01-01	Energy	High-voltage transformers and grid components	18,000,000	DOE and USAID; direct handover to Ukrenergo.
2023-02-01	Energy	GE TM2500 (28 MW) mobile gas-turbine generator	20,000,000	General Electric; direct deployment by Ukrenergo.
2023-02-01	Energy (Utility repair)	Additional 30 excavators for municipal heat infrastructure	2,000,000	Tetra Tech (USAID); municipal heating companies controlled deployment.
2023-03-01	Healthcare	33 ambulances (13 ICU, 20 basic life support)	3,800,000	WHO (USAID funded); Ministry of Health controlled distribution.
2023-04-01	Energy	High-voltage transformers, mobile substations, and emergency trucks	25,000,000	DOE & USAID procurement; Ukrenergo and regional utilities directly managed installations.
2023-05-01	Transport	105 diesel generators for Ukrainian Railways (Ukrzaliznytsia)	2,700,000	Tetra Tech (USAID); direct transfer to Ukrzaliznytsia.
2023-06-01	Emergency Response	Boats, water pumps, purification units (Kakhovka Dam disaster)	500,000	USAID procurement; Ukraine's State Emergency Service deployment.
2023-06-01	Energy	Grid replacement equipment (control panels, relays)	8,000,000	DOE procurement; Ukrenergo managed distribution.
2023-07-01	Economic Resilience (SMEs)	SME support grants and economic stabilization programs	100,000,000	USAID-managed direct SME grant program in coordination with Ukraine's Ministry of Economy.
2023-08-01	Healthcare	Cold-chain medical storage units & vaccine fridges	3,000,000	USAID; Ministry of Health managed distribution.

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Table B1—: US Direct Humanitarian Aid to Ukraine (2022–2024), with Annual Totals Highlighted

Date	Type	Description	Value (USD)	Notes
2023-08-01	Education	Reconstruction of 8 war-damaged schools	8,000,000	World Bank/UNDP, USAID-funded; Ukrainian Ministry of Education supervised projects directly.
2023-09-01	Demining	Explosive ordnance disposal equipment	1,000,000	USAID/NATO CAP; directly delivered to Ukraine's State Emergency Service.
2023-09-01	Governance (Advisory)	Advisory teams for governance reforms (economic/fiscal management)	20,000,000	USAID contracted economic/fiscal management advisors; direct advisory to Ministry of Finance & Economy.
2023-10-01	Energy	Large generators & mobile boilers	9,000,000	USAID via Tetra Tech; direct municipal deployment.
2023-11-01	Demining	Mine-clearing robots and protective gear	4,500,000	USAID procurement; direct State Emergency Service and Civil Protection deployment.
2023-12-01	Healthcare	Dialysis machines, trauma kits, mobile X-ray units	23,000,000	USAID/Health & Human Services; Ministry of Health directly received and distributed equipment.
2023 Total			**248,500,000**	
2024-02-01	Demining	Metal detectors, bomb suits, remote-controlled machines	1,000,000	State Dept; direct transfer to Ukraine's State Special Transport Service.

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Table B1—: US Direct Humanitarian Aid to Ukraine (2022–2024), with Annual Totals Highlighted

Date	Type	Description	Value (USD)	Notes
2024-03-01	Energy	109 generators, 19 cogeneration units, emergency vehicles	3,500,000	USAID procurement; direct municipal and regional utilities deployment.
2024-04-01	Energy	18 industrial generators for frontline towns	4,000,000	USAID; delivered directly to Kherson & Kharkiv regional authorities.
2024-05-01	Transport	Temporary modular bridges delivered to Ukravtodor	2,000,000	U.S. Army Corps of Engineers; Ukravtodor managed installations.
2024-05-01	Healthcare	Two field hospitals & medical generators	1,700,000	USAID/HHS; Ministry of Health controlled facilities directly.
2024-06-01	Governance (Energy Advisory)	Technical advisory teams on energy grid stabilization	15,000,000	USAID/DOE advisory teams; direct assistance to Ministry of Energy and Ukrenergo.
2024-07-01	Demining	Advanced demining equipment (robots, armored vehicles, protective gear)	5,800,000	State Department; directly transferred to Ukraine's State Special Transport Service.
2024-08-01	Energy	19 mobile heat-power cogeneration units delivered	15,000,000	USAID procurement; Ministry of Energy direct management and deployment.
2024-09-01	Healthcare	23 fully-equipped ambulances (Type C)	4,600,000	WHO coordinated (USAID/German co-funded); Ministry of Health distribution.
2024-10-01	Energy	17 high-voltage transformers	13,000,000	USAID/DOE; direct to Ukrenergo and utilities.
2024-11-01	Energy	Two modular CHP plants delivered	8,000,000	USAID; Ukrainian Ministry of Energy controlled installation.

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Table B1—: US Direct Humanitarian Aid to Ukraine (2022–2024), with Annual Totals Highlighted

Date	Type	Description	Value (USD)	Notes
2024-12-01	Energy	8 cogeneration units (Rivne region)	12,000,000	USAID procurement; direct transfer to municipal heating authorities in Rivne region.
2024 Total			**85,600,000**	
Total			**494,100,000**	

Appendix C: Timeline of Non-Military Loans

The United States provided limited direct loan-based financing to Ukraine, including a $156M standard market-rate ExIm bank loan to purchase Wabtec Locomotives from Pennsylvania (creating 300 new jobs in the United States). 50% of the larger loans announced through the PEACE/SPUR program were forgiven (accounted for in our direct budgetary assistance tables), and 50% were never disbursed. This is one particularly acute example of the discrete difference between announcements and actions.

The largest announced loan is the $20 Billion G7 loan, which is backed and guaranteed by the interest on frozen Russian assets. Repayment of this loan carries zero risk from Ukraine's side since the liquid assets needed to repay the loan are already held by the countries that issued the loan. As a result, this loan does not impact the United States' financial position in any way and is therefore not counted as "aid to Ukraine". It is a risk-free financial instrument backed by immobilised Russian assets.

Table C1—: US Non-military Loans to Ukraine – 2022–2024

Loan Name / Instrument	**Date Issued**	**Amount (USD)**	**Interest Rate**	**Maturity / Repayment Terms**	**Purpose & Restrictions**	**U.S. Funding Source**	**Capital at Risk**	**Notes & Explanation**
EXIM Bank – Wabtec Locomotives Loan	2024-04-04	156,600,000	Market-based (standard EXIM Bank export-credit terms)	15-year maturity, periodic (semi-annual installments)	Purchase of 40 Wabtec locomotives (Ukrzaliznytsia)	Export-Import Bank (EXIM), direct U.S. government loan	0	Loan is fully collateralized by assets (locomotives)
PEACE/SPUR Forgivable Budget Support Loan	Authorized Aug 2024	$4.8B disbursed (initial tranche)	Market-based (standard World Bank IBRD terms initially)	20–30 years initially structured; entire disbursement ultimately forgiven	Direct budgetary support: civil servant salaries, pensions, healthcare	U.S. Treasury via USAID through World Bank PEACE/SPUR platform	0	Initially structured as loan; 100% of the disbursed amount was forgiven
	Disbursed Aug 2024; forgiven Nov 2024	($9.6B total authorized, second tranche expected late 2024, never disbursed)	–	–	–	–	–	–
G7 Extraordinary Revenue Acceleration (ERA) Loan Facility	2024-12-10	20,000,000,000	Market-based rate (fully serviced via frozen Russian assets)	15–20 years maturity; repayment structured entirely from immobilized Russian central bank funds	Economic budget support for Ukrainian government	U.S. Treasury via World Bank-administered FORTIFY platform	0	Loan repayment explicitly guaranteed through frozen Russian state reserves

Appendix D: Timeline of Military Procurement and Production

This table captures the flow (by month) of actual deliveries of newly produced equipment from the United States to Ukraine between February 2022 and December 2024.

Table D1—: US Military Procurement for Ukraine – Equipment Funded and Delivered (2022–2024)

Month	**Value of Delivered Equipment (USD)**	**Key Equipment Delivered**	**Funding Instrument**	**Notes/Restrictions**
Feb 2022	0	No new production deliveries. Initial U.S. aid after Russia's invasion came via Presidential Drawdown (transfers from existing U.S. stockpiles).	–	–
Mar 2022	0	No new production deliveries. Aid continued from U.S. stockpiles (e.g., Javelin and Stinger missiles) under drawdown authority, with no new contracts.	–	–
Apr 2022	0	No new production deliveries. The U.S. approved its first Ukraine Security Assistance Initiative (USAI) package ($300 million) to contract new production.	USAI (grant)	Lend-Lease Act authorizing U.S. loans/leases of military equipment was signed in April, but no equipment was delivered under Lend-Lease in 2022.
May 2022	0	No new production deliveries. U.S. aid this month remained limited to drawdowns of existing stocks (no newly built U.S. arms delivered yet).	–	–

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Table D1—: US Military Procurement for Ukraine – Equipment Funded and Delivered (2022–2024)

Month	Value of Delivered Equipment (USD)	Key Equipment Delivered	Funding Instrument	Notes/Restrictions
Jun 2022	19,700,000	RQ-20 Puma drones ($19.7M) (hand-launched ISR UAVs)	USAI (grant)	First new U.S.-procured equipment delivered: AeroVironment Puma AE reconnaissance drones (contract awarded in April for $19.7 million); delivered in June.
Jul 2022	0	No new production deliveries. The U.S. announced additional USAI funds (e.g., a third tranche in July) to procure NASAMS air defense systems.	USAI (grant)	–
Aug 2022	30,000,000	Phoenix Ghost drones – First batches of newly manufactured loitering munitions delivered to Ukraine under USAI.	USAI (grant)	The Phoenix Ghost was a newly developed U.S. drone; deliveries continued in subsequent months until all 580 were delivered by year's end.
Sep 2022	20,000,000	Phoenix Ghost drones – Continued monthly deliveries of the U.S.-funded tactical UAVs (part of the 580-unit package).	USAI (grant)	–
Oct 2022	20,000,000	Phoenix Ghost drones – Ongoing deliveries of U.S.-procured loitering munitions for Ukraine.	USAI (grant)	–

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Table D1—: US Military Procurement for Ukraine – Equipment Funded and Delivered (2022–2024)

Month	Value of Delivered Equipment (USD)	Key Equipment Delivered	Funding Instrument	Notes/Restrictions
Nov 2022	320,000,000	2 NASAMS Air Defense Batteries – First U.S.-procured NASAMS delivered.	USAI (grant)	NASAMS uses 50 km-range AMRAAM missiles. Supplied purely for defensive use.
Dec 2022	30,000,000	Phoenix Ghost drones – Final deliveries completed from the 580-unit drone procurement.	USAI (grant)	–
Jan 2023	450,000,000	Mark VI Patrol Boats (12) – First new-production U.S. heavy platforms delivered.	FMS via FMF (grant)	High-speed boats provided to rebuild Ukraine's navy.
Jan 2023	40,000,000	Excalibur 155mm Guided Artillery Shells (initial 1,000 units)	USAI (grant)	Contracted mid-2022; began delivery January 2023.
Feb 2023	0	No significant new-production deliveries. Continued drawdowns only.	–	–
Mar 2023	0	No significant new-production deliveries. Norwegian-donated NASAMS received.	–	–
Apr 2023	25,000,000	155mm Artillery Ammunition – Large quantity deliveries begin.	USAI / DOD procurement (grant)	Range restrictions applied to U.S. artillery use.
May 2023	20,000,000	155mm Artillery Ammunition – Ongoing deliveries (20,000/month).	DOD/USAI (grant)	Includes some precision-guided shells.
Jun 2023	25,000,000	155mm Artillery Ammunition – High-volume deliveries continue.	DOD/USAI (grant)	–
Jul 2023	40,000,000	VAMPIRE Counter-Drone Systems (first 4 units).	USAI (grant)	Urgent counter-UAS capability.
Aug 2023	30,000,000	155mm shells (30,000 rounds).	USAI (grant)	–

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Table D1—: US Military Procurement for Ukraine – Equipment Funded and Delivered (2022–2024)

Month	Value of Delivered Equipment (USD)	Key Equipment Delivered	Funding Instrument	Notes/Restrictions
Sep 2023	135,000,000	M1 Abrams Tanks (initial batch) – Delivered.	USAI (grant)	Refurbished older M1A1s, restricted use outside Ukraine.
Oct 2023	340,000,000	M1 Abrams Tanks (remaining) – All 31 units delivered.	USAI (grant)	Ukraine agreed not to use U.S.-provided armor for attacks into Russia.
Nov 2023	90,000,000	Patriot/NASAMS interceptors (500 missiles), 155mm shells.	USAI (grant)	NASAMS delivery contract ongoing through 2024–25.
Dec 2023	70,000,000	VAMPIRE Systems (final 10 units), plus APKWS rocket shipments.	USAI (grant)	Last batch of counter-UAS units delivered.
Jan 2024	90,000,000	GMLRS rockets (500 units), 155mm shells (40,000).	USAI (grant)	Sustainment-focused month.
Feb 2024	90,000,000	GMLRS rockets (500 units), 155mm shells (40,000).	USAI (grant)	Production continues.
Mar 2024	90,000,000	GMLRS rockets (500 units), 155mm shells (40,000).	USAI (grant)	–
Apr 2024	90,000,000	GMLRS rockets (500 units), 155mm shells (40,000).	USAI (grant)	NASAMS production nearly complete.
May 2024	140,000,000	NASAMS (2 units), GMLRS, 155mm shells.	USAI (grant)	NASAMS entering delivery phase.
Jun 2024	140,000,000	T-72 tanks (15), GMLRS, 155mm shells.	USAI (grant)	Tank production resumes.
Jul 2024	140,000,000	NASAMS (2 more units), GMLRS, 155mm shells.	USAI (grant)	Air defense systems continue.
Aug 2024	90,000,000	GMLRS, 155mm shells.	USAI (grant)	Ammunition steady.
Sep 2024	90,000,000	GMLRS, 155mm shells.	USAI (grant)	–
Oct 2024	140,000,000	Patriot/NASAMS interceptors, GMLRS, 155mm.	USAI (grant)	Stocks replenished.

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Table D1—: US Military Procurement for Ukraine – Equipment Funded and Delivered (2022–2024)

Month	**Value of Delivered Equipment (USD)**	**Key Equipment Delivered**	**Funding Instrument**	**Notes/Restrictions**
Nov 2024	90,000,000	GMLRS, 155mm shells.	USAI (grant)	–
Dec 2024	145,000,000	APKWS, GMLRS, 155mm shells, T-72s.	USAI (grant)	Final 2024 deliveries.
Total	**3,039,700,000**			

Appendix E: Training, Logistics, and Maintenance

Based on standard defense budget practices and the scope of the USAI and FMF deliveries, the additional wartime costs for training, logistics, and maintenance fall below 15% of the total procurement value for the systems being trained on. These costs include:

- **Training Expenses:** Travel, accommodation, food, and supplies for trainees and trainers. Specialized instruction teams and contracted trainers (often private firms or additional military personnel mobilized specifically for the task). Facilities upgrades or rentals (training ranges, simulation centers).
- **Logistics Costs:** Transportation (airlift, sealift, road, rail) of equipment and munitions to Ukraine and transit countries. Additional personnel and contractor support (e.g., warehouse management, cargo handling). Security and administrative oversight for international transfers.
- Maintenance and Sustainment Costs: Spare parts procurement and shipment to maintain operational readiness. Repair depots and contracted maintenance teams (often private firms contracted under wartime urgency). Establishment of European-based logistics hubs specifically for Ukraine's sustainment.

In total, $500–600 million represents the extra wartime costs incurred specifically to ensure effective operational deployment and sustainment of the provided equipment.

Appendix F: Military Inventory Transfer Under Presidential Drawdown Authority (PDA)

The following table represents the actual deliveries of specific military equipment by month between February 2022 and December 2024. Each row specifies the type of equipment, the number provided, and the current depreciated value at the time of delivery according to United States Department of Defense (DoD) standard accounting guidelines. For each transfer, the authors maintain data on the provenance (brigade, storage facility, deployment), production year, production cost per unit, any upgrades, upgrade costs, and estimated failure rates when deployed in Ukraine. Underlying data may be made available on a case-by-case basis.

Table F1—: US Military Inventory Transfers to Ukraine (PDA Shipments, 2022–2024)

Month	Value (USD, Depreciated)	Weapons and Munitions Delivered (via PDA Shipments)
Feb 2022	75,000,000	≈300 FGM-148 Javelin anti-tank missiles; dozens of launchers and targeting units.
Mar 2022	250,000,000	800 FIM-92 Stinger anti-aircraft missiles; ≈2,000 light weapons; 45,000,000 rounds of small arms ammunition.
Apr 2022	500,000,000	18 M777 155mm howitzers with 40,000 shells; 200 M113 APCs; anti-radar and night vision equipment.
May 2022	200,000,000	24,000 155mm artillery shells; electronic jamming systems; commercial UAVs; counter-battery radars.
Jun 2022	600,000,000	4 M142 HIMARS rocket launchers with munitions; 36,000 more 155mm shells; advanced optics and vehicles.
Jul 2022	400,000,000	4 additional HIMARS (bringing total to 8); 1,000 Guided MLRS rounds; launchers for anti-ship Harpoons.
Aug 2022	1,200,000,000	16 105mm howitzers with 36,000 rounds; 40 MaxxPro MRAP vehicles; 15 ScanEagle ISR drones; secure radios.
Sep 2022	1,000,000,000	Additional HIMARS rocket pods; 1,000 155mm Excalibur GPS-guided shells; 105mm and 120mm mortar rounds.
Oct 2022	1,200,000,000	Tens of thousands of 155mm artillery and mortar shells; 200 armored HMMWVs; 100 UAVs; cold-weather gear.
Nov 2022	400,000,000	(Refurbishment of equipment for later delivery: tracked vehicles, shells, sensors, etc.)
Dec 2022	350,000,000	1 Patriot air-defense battery (MIM-104 Patriot system with radar, control station, missiles, generator).
Jan 2023	1,000,000,000	50 M2A2 Bradley IFVs with 500 TOW missiles and 250,000 rounds of 25mm ammunition.

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Table F1—: US Military Inventory Transfers to Ukraine (PDA Shipments, 2022–2024)

Month	Value (USD, Depreciated)	Weapons and Munitions Delivered (via PDA Shipments)
Feb 2023	600,000,000	Large shipments of 155mm artillery shells and NASAMS interceptors from DoD stocks.
Mar 2023	500,000,000	8 M60 Armored Vehicle Launched Bridge units (tactical engineering support); ammunition deliveries.
Apr 2023	600,000,000	Patriot PAC-3 air-defense interceptor missiles and launchers; electronic warfare gear; 120mm shells.
May 2023	800,000,000	155mm artillery shells (>150,000 rounds); 105mm howitzers; airfield repair equipment; heavy trucks.
Jun 2023	700,000,000	20,000 Hydra-70 unguided 70mm aircraft rockets; anti-radar sensors; night-vision gear.
Jul 2023	500,000,000	Dual-Purpose Improved Conventional Munitions (DPICM) 155mm shells – initial tranche.
Aug 2023	300,000,000	Additional 155mm artillery and HIMARS rocket ammunition; first batch of AIM-9 Sidewinders.
Sep 2023	350,000,000	120mm armor-piercing tank ammunition (including APFSDS); HARM anti-radiation missiles.
Oct 2023	250,000,000	MGM-140 ATACMS long-range missiles (first use of PDA for ATACMS).
Nov 2023	180,000,000	155mm and 105mm artillery ammunition; spare parts and launchers for HAWK air-defense system.
Dec 2023	450,000,000	155mm artillery shells (incl. DPICM cluster rounds); Bradley & Stryker spare parts.
Jan–Feb 2024	200,000,000	(No new drawdowns this period) – Continued arrival of previous deliveries.
Mar 2024	200,000,000	155mm and 105mm artillery ammunition; HARM and Sidewinder missiles.
Apr 2024	600,000,000	Additional Patriot and NASAMS air-defense interceptors and launcher systems.
May 2024	450,000,000	155mm artillery shells (including Excalibur precision rounds); HIMARS rockets.
Jun 2024	180,000,000	105mm and 155mm artillery ammunition; 122mm Grad rockets; Bradley spare parts.
Jul 2024	400,000,000	Additional DPICM cluster artillery munitions; drone countermeasure systems.
Aug 2024	180,000,000	155mm and 105mm artillery rounds; AIM-9M Sidewinders; vehicle upgrades.
Sep 2024	450,000,000	Additional HIMARS guided rockets (GMLRS); 155mm cluster and standard artillery rounds.

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Table F1—: US Military Inventory Transfers to Ukraine (PDA Shipments, 2022–2024)

Month	**Value (USD, Depreciated)**	**Weapons and Munitions Delivered (via PDA Shipments)**
Oct 2024	600,000,000	Another tranche of ATACMS long-range missiles (Block IA); targeting systems.
Nov 2024	500,000,000	155mm and 105mm artillery ammunition; additional tactical vehicles.
Dec 2024	1,500,000,000	Comprehensive support for Ukraine's 2024–25 needs: HIMARS, ATACMS, armor, interceptors, training kits.
Total	**17,665,000,000**	

Appendix G: Indirect Transfers of Military Equipment

The following table comprises month-by-month details of arrangements whereby the United States provided incentives to its allies for the provision of specific equipment (usually older Soviet arms and munitions that Ukraine's Armed Forces had experience with). In general, the United States provided new equipment of NATO standard in exchange for older equipment donated to Ukraine, FMF loans with loan cost reimbursement, and a variety of other arrangements. We count the value of equipment that reaches Ukraine as a result of these arrangements as "Ukraine Aid" from the United States.

Table G1—: US Indirect Military Transfers Supporting Ukraine (2022–2024)

Date	**Support to Ally (facilitating Ukraine aid)**	**Grant Value (USD)**	**Announced Value (USD)**	**Value to Ukraine (USD)**
2022-04	Patriot air-defense deployment to Slovakia: U.S. deployed Patriot system to backfill Slovakia's donation of its S-300 system to Ukraine.	0		
2022-04	FMF backfill grants for Eastern Europe: The State Department allocated funds to allies who donated equipment to Ukraine.	391,000,000		150,000,000
2022-05	Maintenance support hub in Poland: U.S. Army logistics operations set up centralized repair/return system for transferred equipment.	0		25,000,000
2022-07	Replacement tanks for Poland: U.S. approved sale of M1 Abrams tanks to replace Polish T-72s donated to Ukraine.	0	20,000,000	20,000,000
2022-11	Refurbishment of Czech tanks (US–NL–CZ): Under trilateral deal, U.S. and Netherlands funded upgrades to Czech T-72s sent to Ukraine.	45,000,000	20,000,000	20,000,000
2022-12	Incentive FMF for allies' donations: The U.S. appropriated new FMF grants to encourage allied donations from inventory.	682,000,000	80,000,000	220,000,000

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Table G1—: US Indirect Military Transfers Supporting Ukraine (2022–2024)

Date	Support to Ally (facilitating Ukraine aid)	Grant Value (USD)	Announced Value (USD)	Value to Ukraine (USD)
2023-02	Czech Republic reimbursement: The U.S. provided direct FMF support to Czech government for prior inventory shipments to Ukraine.	200,000,000	50,000,000	20,000,000
2023-03	Attack helicopters for Slovakia: After Slovakia donated MiG-29s, U.S. and allies coordinated backfill including AH-1Z attack helicopters.	660,000,000	65,000,000	20,000,000
2023-05	Multinational F-16 training coalition: The U.S. supported joint efforts to train Ukrainian pilots on Western fighter aircraft.	0	55,000,000	20,000,000
2023-08	Approval for allied F-16 donations: Washington cleared Denmark, Netherlands, Norway to send F-16s, triggering support funding.	0	65,000,000	20,000,000
2023-09	Poland FMF loan (1st tranche): The U.S. State Dept disbursed $2B FMF to Poland, partially supporting arms donations to Ukraine.	30,000,000	105,000,000	20,000,000
2024-07	Poland FMF loan (2nd tranche): A second $2 billion tranche signed to accelerate replacements and support export donations.	30,000,000	120,000,000	20,000,000
2024-12	Poland FMF loan (3rd tranche): Poland signed a further $2B agreement to support long-term industrial cooperation and Ukraine backfill.	0	125,000,000	20,000,000
Total		**2,038,000,000**	**705,000,000**	**575,000,000**

Appendix H: Accounting for Maintenance of Military Equipment Transferred

This appendix provides a category-wise breakdown of spare parts and Maintenance requirements under U.S. PDA to Ukraine.

1) **Armored Vehicles (Abrams, Bradleys, M113s, Strykers, Humvees, MRAPs)**

Sustainment Needs:

Heavy armored vehicles require extensive spare parts due to wear-and-tear from hard use and battle damage. Tracked vehicles like Abrams tanks and Bradley IFVs need regular track replacements, suspension repairs, and engine overhauls under combat conditions. For example, mine-resistant vehicles (MRAPs) delivered to Ukraine came from U.S. stocks that originally included a $1.1 million per vehicle maintenance package (War on the Rocks 2023*b*). Even annual upkeep for MRAPs in warzones was about $164,000 each (War on the Rocks 2023*b*). Lighter armored trucks (Humvees) are cheaper to maintain ($5,000 per year, roughly one-tenth the MRAP's cost) (War on the Rocks 2023*b*), yet still about 10× a civilian SUV's maintenance needs (War on the Rocks 2023*b*). This illustrates how all military vehicles—from 70-ton tanks to 5-ton trucks—demand significant logistics and parts.

Spare Parts Provided:

The U.S. has acknowledged shipping substantial spare parts for these vehicles. The Pentagon's Inspector General noted that initial "spare part packages" were supplied along with U.S. Bradleys, Strykers, and Abrams, plus field maintenance teams, to keep them running through FY2024 (Breaking Defense 2023*b*). These kits likely include tracks, road wheels, engines, and other high-failure components. However, usage in Ukraine has been so intense that spare parts quickly became a limiting factor. By mid-2023, Ukraine had received 190 Bradleys and lost about a dozen in combat, with many more damaged—Ukrainian units reported "not enough spare parts" to rapidly repair them, resorting to cannibalizing some Bradleys as donor hulks for parts (Pravda Ukraine 2023*b*). Similar challenges apply to Abrams tanks (31 provided) and hundreds of M113 APCs and Strykers—all require a constant influx of components like transmissions, electronic parts, and armor sections to replace battlefield losses. U.S. drawdown packages have explicitly included these sustainment items; for instance, one arms tranche listed "spare parts, maintenance and sustainment support" alongside the vehicles and weapons being delivered (U.S. Department of Defense 2024*c*).

Comparative Context:

Past U.S. operations give a benchmark for expected wear. In Iraq, high-tempo use of armored fleets drove billions in repair costs—tracks, engines, and armor were continuously replaced to maintain readiness (War on the Rocks 2023*b*). The initial spare parts allotment for Ukraine's armored vehicles likely amounted to a significant percentage of their value (often 10–20% of procurement cost, based on typical Army "total package" support). Indeed, the DoD Inspector General warns that beyond 2024, Ukraine would struggle without further U.S. sustainment, as no long-term plan (spares, depot maintenance training, etc.) was in place (Breaking Defense 2024). In sum, sustaining armored fleets under PDA has likely required hundreds of millions of dollars worth of parts and repairs—a necessary investment to keep tanks, IFVs, and troop carriers operational on the front lines.

2) **Artillery (M777 155mm Howitzers, 105mm Howitzers, HIMARS)**

High-Wear Components:

Artillery has proven to be a consumable-intensive asset in Ukraine's defense. The barrels ("cannon tubes") of towed howitzers like the M777 are the prime example—they wear out after a finite number of rounds. Under typical conditions, an M777 155mm barrel is rated for about 2,500 full-power shots before needing replacement (Strategy Page 2023). Firing frequent "charge 8" high-range rounds shortens that life to roughly 1,000 rounds (Strategy Page 2023). Ukraine's daily artillery fire has at times reached thousands of shells, meaning each active gun can burn through a barrel in a matter of months. This isn't just theoretical: U.S. Marines in Raqqa (2017) fired 35,000 rounds in 5 months with just six M777 guns, "burning out" two barrels in the process (Strategy Page 2023). Ukraine faces similar or greater usage, so replacement tubes are a constant need. Indeed, Canada already donated 10 new M777 barrels (worth $6.9 million) early in the war (Reuters 2023*a*), and the U.S. Army has scrambled to ramp up production of at least 30 new barrels per month to meet "unprecedented demand" from Ukraine (The War Zone 2024). A Pentagon budget reprogramming in late 2024 shifted $161 million specifically to fund this surge in M777 barrel manufacturing (The War Zone 2024), underlining how costly artillery sustainment has become. Beyond barrels, other howitzer spares are constantly needed: recoil mechanism parts, spare breech blocks, sighting and fire-control electronics, tires and suspension for the towing carriages, etc. Some reports indicate Ukraine keeps a pool of damaged Western artillery pieces (20+ guns) as "donors" for parts at repair bases (Defence-UA 2024).

HIMARS & Rocket Artillery:

The HIMARS launchers (40+ provided) are truck-mounted and require maintenance of both the vehicle (chassis/engine) and the launcher system. While HIMARS units fire rockets (which strain the launcher less than tube artillery), the high operational tempo—constant movement to avoid counter-fire—means extensive vehicle servicing (suspension, engine, tires) and software/electronic upkeep for the fire-control systems. The U.S. has sent spare parts for HIMARS and other rocket systems in multiple drawdowns (U.S. Department of Defense 2024*c*). Additionally, counter-battery radar systems (like the AN/TPQ-36/37) sent to Ukraine have high-use components (transmitters, antenna parts) that require replacement after sustained use in the field; PDA aid has included spare parts for these radars as well (U.S. Department of Defense 2024*c*).

Cost Estimates:

Combining these needs, the artillery category's sustainment value is substantial. Barrel replacements alone run in the tens of millions (e.g. $\tilde{\$}$0.5–0.7 million per tube (Reuters 2023*a*)). If each of the 200 donated 155mm howitzers eventually needs one new barrel, that's on the order of $100 million in barrels. Spare recoil systems, targeting electronics, and repairs for battle-damaged howitzers likely add many tens of millions more. Overall, U.S. shipments of artillery spare parts and maintenance support under PDA likely approach $150–200 million in value to date. This figure aligns with Ukraine's extraordinary artillery consumption—effectively, for every dollar in howitzer hardware given, a significant additional cost in sustainment has followed to keep those guns firing (The War Zone 2024).

3) **Air Defense Systems (Patriot, NASAMS, Stinger, and other SAMs)**

Maintenance Components:

Sophisticated air defense systems combine electronics, launch hardware, and unique consumables—all requiring upkeep. For the three Patriot PAC-3 batteries provided, sustainment is a major effort. Each Patriot battery includes a phased-array radar, control stations, launchers, and generators. Critical spare components include radar transmitter modules, cooling

units, and replacement parts for the launcher mechanisms. The U.S. delivered Patriot units to Ukraine with an initial spare parts package and even set up remote maintenance support via a 12-month contract (Breaking Defense 2023*a*) to help Ukrainians keep them operational. This initial tranche likely covered things like extra radar arrays, circuit boards, and generator parts to handle the high operational tempo (Patriot radars run nearly 24/7 to counter missile threats). The DoD Inspector General flagged that no formal process for ongoing Patriot sustainment (beyond that first year of support) was in place (Breaking Defense 2023*a*)—underscoring that continued provision of Patriot spares will be needed, initially valued in the tens of millions of dollars range (typical Patriot support contracts are sizable due to the system's complexity).

For the 12 NASAMS (National Advanced Surface-to-Air Missile Systems) batteries that were pledged, maintenance revolves around keeping the launchers and AN/MPQ-64 Sentinel radars functional. Key spares include radar electronics (transmit/receive modules, processing units) and launcher parts (hydraulic elevation motors, etc.). While exact figures are not public, support equipment for NASAMS was noted as part of U.S. aid packages (Defence UA 2023). We can infer a moderate spare parts value per battery (several million dollars each), given that NASAMS is less complex than Patriot but still high-tech.

MANPADS and Short-Range SAMs:

The U.S. has supplied over 3,000 FIM-92 Stinger missiles (U.S. Department of Defense 2023*d*) to Ukraine. Each Stinger round requires a Battery Coolant Unit (BCU), a small one-time-use device that provides power and argon gas cooling to the missile's seeker (The FM Extra 2022). These BCUs are consumable parts: once a Stinger is fired (or even powered up without firing), the BCU is spent. Thus, along with missiles, the U.S. needed to send hundreds or thousands of extra BCUs to keep the Stingers usable. This component is inexpensive per unit (on the order of a few thousand dollars each), but in aggregate, the cost of BCUs for a few thousand missiles is a few million dollars. Similarly, other short-range SAMs like Avenger mobile systems (which use Stingers) and older HAWK systems have unique maintenance needs—e.g., HAWK launchers require regular testing and spare wiring, and their tracking radars need replacement vacuum tubes or circuit cards due to age. The PDA packages often mention "air defense system components" and support equipment (U.S. Department of Defense 2023*a*), indicating that spares for these SAMs are included.

Effectiveness & Demands:

Ukraine's air defense effectiveness depends on readiness—a down radar or empty cooling unit can create a gap in coverage. Open-source reporting suggests Ukraine has managed a high success rate against Russian missiles/drones, but only by keeping Western systems at peak readiness. This implies a steady flow of parts: e.g., Patriot launchers require missile canister refresh kits, and generator sets for radar power must be maintained. The U.S. Army's remote maintenance teams in Poland have also been assisting with these complex systems (Amentum 2023*b*); for instance, if a NASAMS radar in Ukraine malfunctions, U.S. technicians can walk the Ukrainians through module replacement using stocked spares. In one early 2023 package, the U.S. listed "support equipment for Patriot" and spare parts for major defense systems as part of a $2 billion aid announcement (Defence UA 2023), highlighting that a portion of funds is earmarked for sustaining air defenses.

Cost Estimates:

We estimate that the total value of air defense-related spare parts and maintenance delivered via PDA is on the order of $100–150 million. This includes Patriot initial spares (likely tens of millions), NASAMS parts, Stinger BCUs, and the upkeep of various other

SAMs. These investments ensure that air defense gear donated to Ukraine stays effective despite heavy use.

4) **Aviation (Mi-17 Helicopters, F-16-related Equipment, Unmanned Aerial Vehicles)**

Helicopters (Mi-17):

The U.S. transferred 20 Russian-designed Mi-17 helicopters that it had available to Ukraine. Keeping these flight-ready has been challenging because of limited spare parts—Russia's own war needs have squeezed the supply of Mi-17 parts globally (TWZ 2023*a*). Nevertheless, the U.S. likely provided whatever spare rotors, engines, and avionics parts it had in stock for these airframes. Critical high-wear components on Mi-17s include rotor blades (which must be replaced periodically or if damaged), turbine engines, and gearbox components. Typically, a helicopter requires an engine overhaul or swap after a certain number of flight hours. Under combat conditions (low-level flying, possible battle damage), these intervals shorten. It's reasonable to assume each delivered Mi-17 came with at least a "fly-away kit" of spare parts (filters, lubricants, minor components) and possibly a couple of spare engines or rotor sets shared among the fleet. Some allies have also donated Mi-17 parts (for example, one country donated additional non-operational Mi-17s just for spare parts (Technology.org 2023)). All told, the U.S.-provided portion of Mi-17 sustainment is relatively modest (a few million dollars), but vital given the difficulty of sourcing Russian-made parts.

F-16 and Western Aircraft Prep:

While U.S.-provided F-16 fighter jets had not yet arrived in Ukraine as of late 2024 (European partners were taking the lead on transfers), the U.S. was heavily involved in the training and logistical groundwork for F-16s. Under PDA or parallel funding, the U.S. has started supplying F-16–related equipment and sustainment gear to Ukraine. A recent Foreign Military Sale notification estimated a cost of $266.4 million for an initial package of F-16 sustainment services and parts (DSCA 2024), including spare engines, repair parts, support equipment, and training. This figure indicates the scale of investment needed to operate modern NATO-standard fighter jets. It's likely that some pre-positioned F-16 spare parts (such as engine components, avionics test gear, and tools) are being financed now via U.S. assistance funds (though formal delivery might occur outside of PDA). For other aircraft, the U.S. has provided parts for Soviet-era planes (like enabling cannibalization of MiG-29s via partners) and aviation fuel and lubricants under aid packages, ensuring the Ukrainian Air Force can keep flying. These fall under general sustainment support rather than a specific platform line item.

Unmanned Aerial Systems (UAS):

The U.S. has delivered numerous drones: e.g., Switchblade loitering munitions, Phoenix Ghost UAVs, RQ-20 Puma recon drones, ScanEagle UAVs, and other types (U.S. Department of Defense 2023*c*). With each system, spare parts are essential: extra propellers, batteries, repair kits for airframes, replacement sensors, etc. PDA announcements have explicitly mentioned "PUMA Unmanned Aerial Systems and spare parts" in combined packages (Military Aerospace 2023). Small UAVs often have high loss rates (shot down or crashed), so sustainment is partly about quantity (replacing whole units) and partly about keeping ground control stations and remaining drones functional. The U.S. likely supplied dozens of spare drone airframes and component kits. While each individual drone is relatively low-cost, collectively, the U.S. may have provided tens of millions of dollars worth of UAV sustainment (e.g., contracts for parts and repairs).

Summary of Aviation Sustainment Value:

Compared to ground equipment, spare parts for aviation under PDA have been a smaller slice, but still significant. The Mi-17 parts and maintenance kits might be valued around $10–20 million. Preparatory F-16 sustainment support and training (though mainly funded via USAI and FMS) could account for another $50–100 million if accounting for associated tools and parts (as indicated by the $266 million potential package (DSCA 2024), of which a portion may be initiated already). UAV spare parts and replacements add perhaps $20 million more. In total, the aviation category's spare parts and maintenance support under U.S. assistance likely falls in the low hundreds of millions ($100–200 million), heavily weighted by the anticipated fighter jet support and training programs.

5) **Logistics & General Support (Generators, Communications Gear, Maintenance Hubs)**

Field Logistics Equipment:

A crucial but less glamorous part of U.S. aid has been the provision of generators, vehicles, and tools to keep the Ukrainian military running. Presidential Drawdown packages have included generators, fuel trucks, recovery vehicles, and communications equipment—all of which have their own sustainment needs. For instance, over 1,000 generators and power units were sent to help Ukraine power command centers and radar sites; these require spare filters, voltage regulators, and maintenance after heavy use. The U.S. has also sent fuel tankers and trailers (239 fuel trucks and 105 fuel trailers according to official lists (U.S. Department of Defense 2023*g*)), plus wreckers and recovery vehicles to tow damaged equipment. Sustainment in this case means tires, hoses, pumps, and engine parts for the fleet of support vehicles. Communications gear (secure radios, satellite link systems) likewise needs spare batteries, encryption modules, and replacement cables. All of these "general support" spares have been part of the drawdown support. In fact, a DoD fact sheet highlights "field equipment, generators, and spare parts" as key components of U.S. assistance (U.S. Department of Defense 2023*g*). While individually each item is low-cost, the sheer number delivered (thousands of radios, trucks, etc.) means the cumulative spare parts value is considerable—likely tens of millions of dollars dedicated to maintaining these support assets.

Maintenance Hubs and Repair Support:

Beyond delivering hardware, the U.S. and allies have invested in maintenance infrastructure to sustain Ukrainian forces. The U.S. Army has established a Remote Maintenance and Distribution Center-Ukraine (RDC-U) with seven support stations in Poland (Defense News 2023). There, U.S. personnel and contractors provide virtual troubleshooting and parts logistics for Ukrainian repair units. American technicians essentially mirror the equipment (from howitzers to tanks) in Polish workshops and guide Ukrainian mechanics via encrypted video chats (Defense News 2023, Amentum 2023*b*). As part of this effort, the U.S. contracted companies like Amentum to manage the ordering, warehousing, and distribution of repair parts for Ukraine's needs (Amentum 2023*a*). In just the first four months of Amentum's contract, they processed 605 repair work orders and handled 4,666 spare part line items for Ukraine (Amentum 2023*a*), a strong indicator of the volume of spare parts flowing. The funding for this remote-maintenance program (covering personnel and spare parts stock) comes from U.S. assistance funds; while exact figures aren't public, it likely runs in the low tens of millions per year for contractor support and spare inventory.

Allies have also set up forward repair hubs: Germany and Slovakia opened a joint heavy equipment repair center for Ukrainian gear (focused on tanks and IFVs), initially in Slovakia and later relocating to Germany (Mil.in.ua 2023*b*). This hub, supported by German funding, services battle-damaged Leopards, Bradleys, and other Western vehicles

outside Ukraine. In Poland, NATO is establishing a logistics and repair center near Rzeszów (Kyiv Independent 2023, Army Recognition 2023), and the U.S. presence in Poland (near Rzeszów/Jasionka) already serves as a staging ground for maintenance and depot work. Additionally, Ukraine sends some heavily damaged equipment out of the country for refurbishment; for example, wrecked Bradleys have been shipped to a Polish facility for depot-level repair (Pravda Ukraine 2023*a*). The U.S. has provided funding and coordination for these efforts, including transportation of damaged equipment (often listed in PDA packages as "transportation services") and sustainment funding for partner facilities. While much of the repair hub financing comes from European allies, the U.S. covers significant logistics costs and provides spare parts to those hubs through drawdown stocks.

Funding Dedicated to Sustainment:

In U.S. budget allocations, specific lines have been dedicated to training and maintenance. For example, the State Department noted about $91.5 million in FY2023 was targeted to help Ukraine with training, maintenance, and sustainment of donated systems (U.S. Department of Defense 2023*b*). Under the Ukraine Security Assistance Initiative (USAI), which complements PDA, there have been contracts for maintenance support worth hundreds of millions (like the $300 million award to maintain and refurbish tanks and other equipment for Ukraine announced in 2023). These indirectly augment PDA efforts by ensuring parts and technicians are available when needed.

In summary, the logistics and general support category—encompassing spare parts for support vehicles, power generators, communication systems, and the establishment of maintenance hubs—likely accounts for value on the order of $100 million (or more). This includes both the physical spare parts delivered (e.g., truck tires, radio batteries) and the contracted services and infrastructure to keep Ukraine's military equipment repaired in the field (Amentum 2023*a*).

6) **Total Value and Depreciation Considerations**

Original Procurement vs. Provided Value

Estimating the total value of spare parts and maintenance supplied via PDA is challenging due to varying accounting methods. Summing the rough estimates from each category above (Armored Vehicles: $300M; Artillery: $150–200M; Air Defense: $100–150M; Aviation: $100M; Logistics/Support: $100M) results in a total of approximately $700–900 million in spare parts, maintenance services, and sustainment support provided.

However, it's critical to acknowledge that much of the equipment and spare parts delivered under PDA consisted of older stocks. Many of the delivered items had already been amortized and held significantly lower book values due to their age (Reuters 2023*b*). For instance, systems initially valued at several million dollars had effectively zero net book value because they had already surpassed their expected service life.

Depreciation Standards:

The Department of Defense uses standard service-life and depreciation schedules for equipment. Armored vehicles, artillery, and aviation components generally have service lives measured in decades, meaning many parts drawn from existing inventories may be partially or fully depreciated. Consequently, the spare parts supplied to Ukraine under PDA, especially older stocks, likely held depreciated values significantly lower than their original procurement cost.

Older supplies and spare parts inherently carry reduced operational reliability, increasing the risk of maintenance issues or equipment failure in combat conditions. It is noteworthy that a portion of equipment and supplies sent to Ukraine, already near or beyond their

intended service lives, was partially unusable or problematic in field conditions, potentially endangering Ukrainian troops and complicating logistics.

Therefore, while the headline replacement value of these spare parts might approach $1 billion, the actual depreciated value—reflecting their diminished operational reliability and limited remaining service life—is likely much lower. We have chosen a 25% depreciation rate, lowering their accounting value to $750 million. This reduced valuation accurately reflects the practical utility and actual conditions of the provided equipment and parts.

While not accounted for in our analysis, the U.S. Army's practice of transferring end-of-life or near-obsolete equipment to Ukraine also minimizes recycling or disposal costs associated with retiring old stocks domestically.

In conclusion, considering depreciation and operational risks associated with older parts, the total value of spare parts and maintenance support provided under PDA to Ukraine is estimated at approximately $750 million. This figure accounts realistically for depreciated values and operational readiness considerations, rather than inflated replacement or procurement costs, providing an accurate reflection of the effective sustainment support Ukraine received.

Appendix I: Timeline of Ukraine Aid Public Misinformation Campaigns

Table I1—: Timeline of Anti-Ukraine-Aid Narratives, Disinformation, and Public Opinion Shifts (2022–2024)

Date	Event/Actor	Narrative or Talking Point	Factual Accuracy	Actual Aid Delivered	Polling Impact	Source
Feb 2022	Start of full-scale invasion	Russia begins broad assault on Ukraine; Western support surges	$75M delivered			
Mar 2022	Russian troll farms amplify 'secure our border' slogans	Kremlin memos direct operatives to use domestic slogans to reduce US support for Ukraine	False equivalency	$14.2B appropriated + PDA, $325M total delivered		Belton and Menn, WaPo (2024)
Apr 2022	Tucker Carlson criticizes Ukraine aid on Fox	Claims US is provoking war, mocks Zelenskyy	Misleading framing	$1.5B total delivered		Guardian (2022)
May 2022	Congress passes first large Ukraine aid package ($40B)	Headlines emphasize dollar amount	No explanation that portion is replenishment or domestic	$56.2B total appropriated + PDA, ~$2.2B total delivered		
Jun 2022	'Blank check' rhetoric begins in House GOP	McCarthy warns against unconditional aid	Misleading: funds were appropriated with oversight	$4B delivered		Public polling shows majority still support aid

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Date	Event/Actor	Narrative or Talking Point	Factual Accuracy	Actual Aid Delivered	Polling Impact	Source
Oct 2022	House GOP midterm messaging	Greene: 'Not another penny to Ukraine'	False implication that money was misused	$14B total delivered	Gallup: 24% say US giving too much	
Nov 2022	Zelenskyy yacht hoax spreads	Shared by Russian bots and Greene	Entirely false	$14.7B total delivered	Narrative goes viral	WaPo, 2024
Feb 2023	'Ukraine Fatigue' resolution (Gaetz)	Calls to halt aid, cites 'managed decline'	Misleading fiscal impact	$109.8B total appropriated + PDA, $23B delivered	Gallup: 31% say too much aid	
Apr 2023	Heritage swing-state poll	Says voters prioritize border over Ukraine	Biased framing	$26.1B delivered		Heritage (2024)
Aug 2023	DeSantis: 'territorial dispute'	Echoes Kremlin framing	False Equivalence between Russia (aggressor) and Ukraine (victim)	$31.1B delivered		ABC News
Oct 2023	Peak anti-aid sentiment	Fox/Newsmax promote waste narrative	Cites inflated $113–350B numbers	$34.3B total delivered	Gallup: 41% say too much	Gallup (2023)
Dec 2023	Trump: 'we gave $300B+'	Repeats false total	False: $37B delivered	$119.8B total appropriated, $37B total delivered		ABC Fact Check (2025)

Table I1 (continued)

Date	Event/Actor	Narrative or Talking Point	Factual Accuracy	Actual Aid Delivered	Polling Impact	Source
Jan 2024	Newsmax 'border first' campaign	Meme push on Facebook	False dichotomy: aid = delayed border funds	$37.3B total delivered		Navigator, Pew (2024)
Feb 2024	Zelenskyy visits Brussels and Munich; aid renewal talks stall in U.S.	Critics claim 'Biden prioritizes Ukraine over Americans' during campaign stops	Misleading: no budget reallocation occurred	$37.4B total delivered	Navigator polling: 48% of GOP voters oppose new Ukraine aid	Pew/Navigator (2024)
Mar 2024	Trump reiterates at rally: '$500B to Ukraine!'	Inflates aid amount 14x	False: $37.7B delivered	$120B total appropriated + PDA, $37.7B total delivered	Public polling remains flat but polarized	ABC Fact Check (2025)
Apr 2024	Heritage Foundation pushes border-for-aid bill	'No more money for Ukraine without securing our border'	Misleading: Ukraine aid unrelated to border funding mechanism	$38.5B total delivered	Heritage poll: swing voters rank Ukraine low vs. inflation/border	Heritage (2024)
May 2024	Fake story resurfaces about Ukrainian corruption tied to agriculture funds	Claim: U.S. funds used to support oligarchs	Unverified and sourced from pseudo-news outlets	$39B total delivered	Minimal polling movement but extensive social media traction	SIGAR-style watchdog alerts (false flag)

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Date	Event/Actor	Narrative or Talking Point	Factual Accuracy	Actual Aid Delivered	Polling Impact	Source
Jun 2024	House vote on supplemental Ukraine aid delayed amid internal GOP rebellion	Framed as 'Americans have had enough' by Gaetz and Greene	Misleading: Previously appropriated funds remained unused	$120.9B total appropriated + PDA, $39.5B total delivered	Fox News and Newsmax surge in mentions of 'America First' vs Ukraine	C-SPAN/Fox archive
Aug 2024	GOP convention adopts platform opposing unconditional Ukraine aid	Language includes calls for 'negotiated peace' and 'accountability'	Frames Ukraine as ungrateful, without evidence	$44.1B total delivered	Gallup: 45% of Republicans support aid with conditions	Gallup (2024)
Oct 2024	Trump campaign ad falsely claims $350B given to Ukraine, $0 to Ohio rail cleanup	Juxtaposition meant to stir populist outrage	False: Ukraine received $45.4B; Ohio cleanup separately funded	$45.4B total delivered	October Gallup: 'Too much aid' belief hits 43%	Gallup, ABC News (2024)
Dec 2024	Congress deadlocks again; no new aid approved before recess	Newsmax, Twitter/X floods with memes: 'Fix America first'	False dichotomy: aid has not delayed or reduced domestic spending	$123.4B total appropriated + PDA, $51.2B total delivered	Pew: Majority of Republicans, minority of independents oppose more aid	Pew (Dec 2024)