

Antezza, Arianna et al.

Working Paper

The Ukraine Support Tracker: Which countries help Ukraine and how?

Kiel Working Paper, No. 2218

Provided in Cooperation with:

Kiel Institute for the World Economy – Leibniz Center for Research on Global Economic Challenges

Suggested Citation: Antezza, Arianna et al. (2022) : The Ukraine Support Tracker: Which countries help Ukraine and how?, Kiel Working Paper, No. 2218, Kiel Institute for the World Economy (IfW Kiel), Kiel

This Version is available at:

<https://hdl.handle.net/10419/262746>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

KIEL WORKING PAPER

**The Ukraine Support
Tracker:**

**Which countries help
Ukraine and how?**



No. 2218 August 2022

Arianna Antezza, André Frank, Pascal Frank, Lukas Franz, Ivan Kharitonov, Bharath Kumar, Ekaterina Rebinskaya and Christoph Trebesch

ABSTRACT

THE UKRAINE SUPPORT TRACKER: WHICH COUNTRIES HELP UKRAINE AND HOW?

*Arianna Antezza, André Frank, Pascal Frank, Lukas Franz,
Ivan Kharitonov, Bharath Kumar, Ekaterina Rebinskaya and Christoph Trebesch¹*

NOTE: This is the sixth version of the paper and database. We are continuously expanding, correcting, and improving this project and welcome any feedback and comments to ukrainetracker@ifw-kiel.de. We are greatly indebted to dozens of readers around the world who have sent us helpful comments and suggestions.

This paper presents the “Ukraine Support Tracker”, which lists and quantifies military, financial and humanitarian aid to Ukraine in the context of the Russia-Ukraine war. This sixth version covers government commitments made between January 24 and August 3, 2022 and has a new detailed overview on weapon deliveries. We track support by 40 governments, including all G7 and European Union member countries, plus by EU institutions (thus including 41 donors). Private donations and aid through non-governmental organizations are not included due to a lack of systematic data, but we do show estimates on government costs of hosting Ukrainian refugees. To value in-kind support like military equipment or foodstuff, we rely on government statements as well as own calculations using market prices. We find significant differences in the scale of support across countries, both in absolute terms and as percent of donor country GDP. In billions of Euros, by far the largest bilateral supporter of Ukraine is the United States, followed by the EU institutions and the United Kingdom. In percent of donor GDP, Eastern European countries stand out as particularly generous, and this is even more so once we account for refugee costs. In the past months (June and July), new commitments have fallen notably, thus further widening the gap between what Ukraine demands and the foreign aid it receives.

Keywords: International aid, military aid, war, geoeconomics

JEL classification: F35, F51, H56, H63, H84, H81

Arianna Antezza

Kiel Institute and Humboldt University
arianna.antezza@ifw-kiel.de

André Frank

Kiel Institute and Kiel University
andre.frank@ifw-kiel.de

Pascal Frank*

University of Notre Dame
pfrank@nd.edu

Lukas Franz

Kiel Institute
lukas.franz@ifw-kiel.de

Ivan Kharitonov

Kiel Institute and University of Bayreuth
ivan.kharitonov@ifw-kiel.de

Bharath Kumar

Kiel Institute and Graduate Institute
bharath.kumar@ifw-kiel.de

Ekaterina Rebinskaya

Kiel Institute
ekaterina.rebinskaya@ifw-kiel.de

Christoph Trebesch

Kiel Institute for the World Economy
Kiellinie 66, D-24105 Kiel; Germany
christoph.trebesch@ifw-kiel.de
www.ifw-kiel.de

The responsibility for the contents of this publication rests with the author, not the Institute. Since working papers are of a preliminary nature, it may be useful to contact the author of a particular issue about results or caveats before referring to, or quoting, a paper. Any comments should be sent directly to the author.

¹Corresponding author: Christoph Trebesch (christoph.trebesch@ifw-kiel.de), but ideally contact us at ukrainetracker@ifw-kiel.de. Further contact details: arianna.antezza@ifw-kiel.de; andre.frank@ifw-kiel.de; pfrank@nd.edu (*core team member until June 30); lukas.franz@ifw-kiel.de; ivan.kharitonov@ifw-kiel.de; bharath.kumar@ifw-kiel.de; ekaterina.rebinskaya@ifw-kiel.de.

1. Introduction

Russia's attack on Ukraine is causing staggering human suffering and destruction. Many Western leaders have pledged to "stand with Ukraine" and announced major military and humanitarian support. This paper asks: What do the numbers say? How large is the support for Ukraine? Who are the most supportive governments? And what type of support do countries offer – military, humanitarian, and/or financial aid? To address these questions, we create a new database, the "Ukraine Support Tracker", which lists and quantifies the support of Western governments to Ukraine. In this, sixth, version we trace aid commitments between January 24, 2022 (the day NATO put some of its troops on standby), and August 3, 2022.

This project fills a gap in the economic discussion on the Russia-Ukraine war. Thus far, the debate has focused on sanctions and other measures to hurt Russia (e.g., Bachmann et al. 2022). Less attention has been devoted to measures to support Ukraine (one notable exception being Becker et al. 2022). Indeed, prior to the publication of this piece, most of the discussion on aid to Ukraine had been anecdotal, while systematic data and rigor had been missing.

The paper can be seen as an extension of the 200-year panorama in Horn, Reinhart and Trebesch (2020), which traces international support via government-to-government loans and grants in major wars, financial crises and natural disasters back to 1790 and worldwide. Indeed, in future versions of this paper, we plan to add historical comparisons to place the current international support for Ukraine into a bigger picture.

The main aim of our database is to quantify the scale of aid to Ukraine and to make the support measures comparable across donor countries. We quantify the support flows by Western governments to Ukraine in millions of Euros, accounting for both financial and in-kind transfers. To do so, we set up a comprehensive database that brings together information from official government sources, existing lists of Ukraine aid, and media reports. Whenever possible, we also compare the scale of aid committed to what was actually disbursed.

An important challenge is to quantify non-financial transfers, such as in-kind shipments of military equipment, weapons, medicines, or foodstuff. In many cases, governments report the value of their in-kind donations in their national currency, which we can use as the baseline value. In other cases, however, governments do not report the value of aid but only mention the items supplied, such as specific weapons or several "tons of foodstuff". We assign a monetary value to in-kind aid using market prices and data on previous instances of international aid deliveries, thus facilitating the comparison of assistance provided across countries.

We mainly focus on bilateral (government-to-government) commitments that are intended to flow towards Ukraine, not remain in the committing country. This means that not all types of support are covered. In our baseline figures, we, therefore, do not quantify the large-scale effort and expenses to help refugees having fled Ukraine, especially by neighboring countries like Poland or Moldova (see Section 8). Quantifying the cost of supporting refugees is hard, since there is no internationally comparable data, much of the help for refugees is in-kind and incurred by private households rather than governments, and the available statistics on Ukrainian refugees are noisy and incomplete. We also do not count private donations, commitments by international financial organizations, or those by non-governmental organizations (NGOs). The

available evidence suggests that private donations are sizable in some countries and can surpass the scale of support by governments.²

We also cannot provide a complete picture of bilateral aid, because some governments do not share details on their support to Ukraine, especially when it comes to sending military equipment and weapons. However, we did our best to meticulously list and quantify all support measures that have become publicly known. This means that we also evaluate leaks of official documents, which list the type and value of military aid in detail, e.g. by Germany or Italy. Moreover, in many cases, weapon deliveries ultimately become public once they have been made, which allows tracking them ex-post, e.g. in the case of Poland.

In total, we trace €84.2 billion in government-to-government commitments³ from January 24, 2022, until August 3, 2022. This sum includes commitments by 40 countries, including 31 G7 and EU member countries, plus commitments by the European Union institutions (EU Commission and EU Council and the European Investment Bank), as well as nine countries which we added in the third and sixth version of the paper: Australia, New Zealand, Norway, South Korea, Switzerland, Turkey, India, China and Taiwan.

The United States (US) is by far the largest bilateral supporter of Ukraine having committed €44.5 billion, or 56% of total commitments in our 40-donor database. All EU country governments combined committed €11.52 billion, plus €14.24 billion from the EU Commission, and a further €2 billion from the European Investment Bank. This brings total EU country commitments to €27.76 billion. It is remarkable that the US alone has committed considerably more than all EU countries combined, in whose immediate neighborhood the war is raging.

Our main dataset does not include multilateral loans and grants by the International Monetary Fund (IMF) and the World Bank, but we add these flows in a separate sheet and find additional commitments worth €4.5 billion (see Section 3).⁴ In comparison, the commitments by other international organizations like the United Nations or the Red Cross appear minor. We could trace only ca. €57 million of aid to Ukraine from these organizations, but data is scattered and incomplete and therefore not included.

The remainder of the paper is structured as follows. Section 2 gives an overview of how we construct the database, focusing on bilateral (government-to-government) support. Section 3 discusses multilateral and European-level aid. Section 4 summarizes data on aid to Ukraine prior to January 24, 2022. Section 5 presents the main insights from our new database, in particular the country rankings. Section 6 presents an overview on weapons committed and delivered to Ukraine. Section 7 discusses the gap between commitments and disbursements and documents long delays in delivering aid to Ukraine. Section 8 shows (rough) estimates on the government cost of hosting Ukrainian refugees. The last section concludes.

² In Germany, for example, private donations for humanitarian aid to Ukraine exceed €631 million as of March 25 (according to DZI 2022, which gathers data on donations to 67 aid organizations and foundations). This sum is higher than the total amount of humanitarian aid promised by the government at that point in time.

³ Bilateral commitments include bilateral commitments made through the World Bank and the International Monetary Fund (IMF).

⁴ Note that we include *bilateral* loan and grant commitments that are made via the World Bank and IMF. Bilateral commitments via other organizations, such as the International Red Cross and the UNHCR are not (yet) included, because they do not report systematic information or data and because the aid is mainly in-kind and, thus, much hard to quantify.

2. Bilateral Support for Ukraine - Data Construction, Definitions and Challenges

This section provides an overview of definitions, sources, and measurement of assistance included in our new database. First, we discuss the types of aid considered. We then describe the data collection process, the primary sources, and the value estimation procedure for in-kind aid like military equipment, medicines, or food aid. Lastly, we discuss coding challenges and “tricky” cases, including “hidden flows”, weapon reimbursement schemes (“circle exchanges”) and the specifics of US aid.

Country sample: We focus on government commitments from 40 countries, plus the EU institutions. The largest country group are the 27 EU members: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, and Sweden. In addition, we include member countries of the Group of 7 (G7), meaning that we also code support by Canada, Great Britain, Japan, and the United States. Since the third version, we have included nine additional countries, namely Norway, Switzerland, Australia, New Zealand, South Korea, Turkey, India, China and Taiwan.

What type of assistance do we track? Government-to-government support: This version of the database focuses on government commitments made to the government of Ukraine. We only consider flows going into Ukraine, but not the support to neighboring countries such as Moldova or Poland, which welcomed record refugee numbers. Accordingly, we also do not include support extended between fellow NATO members.⁵

Since we focus on flows directed to Ukraine, *this version of the database does not include other types of support, in particular, not domestic spending for Ukrainian refugees that have fled the country*. Given the very large number of refugees, the costs and efforts for hosting them can be substantial and likely surpass the value of total commitments to the government of Ukraine for a number of donor countries. This is especially true for neighboring countries like Poland, which has reportedly admitted 3 million Ukrainian refugees, but also Moldova, where Ukrainian refugees exceeded 15% of the population in May. Section 8 presents more details on the support for Ukrainian refugees.

Similarly, we do not count donations by private individuals, companies, churches, or non-governmental organizations (NGOs). Providing a systematic overview of these types of donations remains challenging as there is no standardized reporting or data on these types of aid, and press reporting is unsystematic.⁶

We have also *not* (yet) systematically collected support from international organizations like the Red Cross or the United Nations, mainly because of the lack of data and reporting by most of them. We plan to include estimates on these flows in one of the next updates of the database. In this version of the paper, we provide a short overview on easily identifiable commitments by

⁵ Whenever we were unable to disentangle the aid sent directly to Ukraine’s government from aid sent to neighboring countries, we assumed upper bounds and reported the total value of the aid for Ukraine. One example is the US commitment of \$647 million for an “Economic Support Fund” that allocates resources not only to Ukraine, but also to other countries affected by the Russia-Ukraine war (dataset ID: USH3).

⁶ Some private donations are also channeled through international organizations. For example, UNHCR’s Ukraine emergency response received more than \$200 million from companies, foundations, and individuals (UNHCR 2022c; reported on March 14). Furthermore, there are in-kind donations that are hard to evaluate. Private firm SpaceX reported to have sent “thousands” of Starlink satellite internet kits to Ukraine following the Russian invasion (Sheetz 2022), although these donations seem to have been financed by the US government (Lima 2022).

international organizations in Section 3. This includes information on commitments by international financial institutions like the IMF, the World Bank, and the European Bank for Reconstruction and Development (EBRD). Commitments by the European Investment Bank (EIB) are counted as EU aid, because the “EIB is the bank of the European Union”, according to their website and statutes.

Moreover, *we include bilateral grants and loans made through the IMF or World Bank as bilateral aid in our core dataset.* Examples include grants and loans made to a multi-donor support fund for Ukraine set up by the World Bank, or a Canadian bilateral loan worth €730 million made through the IMF. The reason we count these contributions is that they are “top up” bilateral commitments that are merely channeled through these organizations and thus equivalent to a direct bilateral transfer. These cases are highlighted in the main database and can be easily dropped by users of the data (“Main Database”, column Y).

Defining humanitarian, financial, and military support: We distinguish between military, humanitarian, and financial assistance. Military support includes all types of weapons and military equipment alongside items explicitly donated to the Ukrainian army (such as bottled water, gasoline, or foodstuff). Humanitarian aid refers to assistance supporting the civilian population, mainly food, medicines, and other relief items.

Financial support includes grants, loans and loan guarantees made to the government of Ukraine.⁷ We also consider currency swap lines extended to the Ukrainian central bank, since these are standing credit lines allowing Ukraine to pay for imports and urgent war necessities in foreign currency (Poland extended a \$1 billion line on February 24). *Financial support that is tied to military purposes is counted as military aid.* This includes Sweden’s grant to the Ukrainian Armed Forces (of kr 500 million or €48.3 million on February 27) or Germany’s more recent €1.2 billion financial commitments for weapon purchases by Ukraine. Other important examples are the United States’ “Foreign Military Financing Program” for Ukraine, which provides loans and grants for the purchase of weapons and defence equipment, as well as the European Union’s €2 billion European Peace Facility (EPF) which is set up to reimburse the cost of military weapons and equipment to EU member countries who deliver military material to Ukraine.

Commitments vs. disbursements: We generally report commitments instead of actual deliveries, as information on deliveries is typically scarce. We may thus overestimate the actual amount of aid delivered in some cases.

Sources: To create our new database, we follow the approach of existing trackers such as the “United Nations COVID-19 Vaccine Market Dashboard” and combine official government sources with information from international news media and existing overviews on aid to Ukraine. Specifically, we follow three steps consulting different types of sources:

- Our starting point consists of several helpful ***cross-country overview lists on military and humanitarian aid to Ukraine***. Two such lists are assembled and regularly updated by the British House of Commons Library (Curtis and Mills 2022; Brien and Loft 2022). We also

⁷ These include, for example, Italy’s grant of €110 million (approved on February 27); France’s loan of €300 million with a 1.04% interest rate and maturity of 15 years (committed in early March, approved on March 28) and Japan’s loan of \$100 million (committed on March 25), which is channelled as “parallel financing” by the World Bank.

draw on the Wikipedia page “List of foreign aid to Ukraine during the Russo-Ukrainian War”⁸, and a factsheet of EU aid by the European Civil Protection and Humanitarian Aid Operations⁹. Furthermore, there exists data collected by The Forum on Arms Trade¹⁰, Politico¹¹, and Aljazeera¹². Neither of these lists is complete, and a systematic comparison revealed errors and inconsistencies. Moreover, these lists state individual aid announcements without systematically quantifying the *value* of assistance, making comparisons across donors challenging.

- The main sources for coding were ***government press releases and government statements***, mainly published on websites of the central governments (prime ministers or governments) and by key ministries (foreign office, defense, economics, and finance). Besides searching through these websites, we also considered the Twitter accounts of governments, their departments, and ministers, which often contain detailed announcements.
- To supplement the government sources and gather additional details, we also conducted a ***systematic media search*** using Google News. For this purpose, we used the following keywords in various combinations: “[donor country name]”, “Ukraine”, “aid”, “military aid”, “humanitarian aid”, “solidarity”, “weapons”, “support”.

Coding procedure: We use official sources, when available, as the main source. At least two separate people coded each entry. In case of inconsistencies between coding entries or sources, we made an in-depth inquiry based on additional sources, which solved the issue in all but a few cases. For almost any transaction, we can draw on more than one serious source to confirm the data entries. We evaluated and ranked the sources by their reliability, taking governmental press releases and government websites as the most reliable source, followed by governments’ statements on social media and news articles reported in renowned international media outlets.

Quantifying in-kind donations – how we measure the value of weapons or foodstuff: Our aim is to move beyond anecdotal evidence and instead quantify the value of support to Ukraine in millions of Euros. Whenever governments report the value of their donations in their national currency, we use these numbers as the baseline value. In many cases, however, governments do not report the value of aid, but only the items supplied like specific weapons or several “tons of foodstuff”.

Valuing these types of in-kind donations is challenging and requires some element of judgment. We plan to continuously improve our estimates and appreciate feedback on individual items to ukrainetracker@ifw-kiel.de.

To summarize, we value in-kind donations by drawing on government sources whenever possible but also resort to price information available from online marketplaces and stores when unavoidable. Moreover, as a general rule, we use upper bounds of prices to avoid underestimating the true scale of support. Furthermore, we use the same unit price for identical items across donors.

To estimate the value of everyday items with no fixed prices like “pair of shoes” or “bottled water”, we approximate a reasonable value using information from online stores. When

⁸ See https://en.wikipedia.org/wiki/List_of_foreign_aid_to_Ukraine_during_the_Russo-Ukrainian_War.

⁹ See https://ec.europa.eu/echo/where/europe/ukraine_en.

¹⁰ See <https://www.forumarmstrade.org/ukrainearms.html>.

¹¹ See <https://www.politico.com/news/2022/03/22/ukraine-weapons-military-aid-00019104>.

¹² See <https://www.aljazeera.com/news/2022/2/28/which-countries-are-sending-military-aid-to-ukraine>.

possible, we draw on prices and unit costs listed by NGOs or private firms which have donated a specific type of item in this or past crises (for example, sleeping mats).

To estimate the value of medical supplies or “tons of medicines”, we use an average of prices listed by NGO sources.¹³ As for “tons of food” delivered, we consult the literature and government info on the value of wasted food, while accounting for luxury and perishable items which would not have been donated (Buzby et al. 2014). “Tons of necessities” are valued at the average price of medical and food deliveries.

For military equipment and weapons our aim is to find reasonable prices for as many items as possible. Throughout, we stick to our “upper bound” rule, so as to avoid underestimating the true value of support. We are aware that this can lead to criticism of us using inflated prices, but we prefer overestimating rather than underestimating aid flows. Old Soviet weapons, for example, likely have very low prices on the global market, but having access to these weapons is of major relevance in this war, so it seems reasonable to assume some value.

We generally search for the most reliable pricing source available to us. Preferably, we use prices given in official statement made by the manufacturer, or official government purchase reports. If these are unavailable, we rely on current retail prices in the case of military equipment and light armaments and on military contracts in case of heavy weaponry. Retail prices come from online marketplaces and stores. Information regarding military contracts comes from media sources or the SIPRI Arms Trade database (especially if we cannot find any military contract covered by media).

In case the exact weapon designation or type is known, we search for and use prices for that exact item. For ammunition prices, we consult online stores and use single cartridge costs, ignoring bulk discounts, thus again choosing upper bound values. When the type of ammunition is not specified, we assume that they refer to the kind of weaponry delivered with the ammunition. In case of weapon systems with multiple units like missile batteries or multiple launch rocket systems (MLRS), we decompose the item so as to calculate or approximate the cost of a single ground unit and missile. This allows us to find single unit prices with more precision. When the price of a specific weapon type is not available, we approximate prices with those of similar weapon systems or models. Similarly, we infer information from the country’s military stocks, in case only the weapon category is named, e.g. “anti-armor system” or “anti-armor weapon”. Specifically, we assume the donor government to send the kind of item it has in stock or which it regularly uses/purchases. For this purpose, we use information from the Military Balance studies published by the International Institute for Strategic Studies (see IISS 2022).

Taken together, we found prices or price approximations for about 85 % of the more than 400 military items in our dataset. The items with missing prices fall under three main categories. First, no price exists due to a lack of marketability or standardization, such as the cost of refitting or repairing weapons. Second, weapons or other military services that are highly specialized or customized, such as satellite or radar imagery. Third, a lack of detail in the sources, e.g. very broad categories such as “tank”, “military ammunition”, “other military equipment”, which cannot be quantified convincingly.

¹³ This follows the valuation approach by Doctors Without Borders during the Bosnia war, see Annex 5 B: Value Estimation here: <https://www.aerzte-ohne-grenzen.de/sites/default/files/mediathek/entity/document/1998-01-bosnia-report-donation-practices.pdf>.

For increased consistency and comparability, we use an official "GDP Chain Price index" deflator for national defence issued by the Bureau of Economic Analysis (BEA) to adjust all prices of military items to a constant 2021\$ value.

We are grateful for the feedback we received on sources and details of weapon prices, or helping us find weapon specifications and welcome further feedback in the future.

Checking for errors – benchmarking our valuation of in-kind donations: To check the reliability of our quantification approach, we have made a number of sensitivity checks. Most importantly, we benchmark our valuation results for in-kind donations for those cases in which we know both the full list of donated items as well as the official value of the package. For those cases, we can use our coding approach and put a monetary value on the arms and other military equipment in the package and then benchmark our estimated total value against the official value given by the donor government itself. Below are five examples for which this type of benchmarking was possible. The comparison is overall reassuring.

- United States: On March 16, President Biden announced an additional security assistance package to Ukraine valued at \$800 million, including various anti-armor and infantry weapons, drones, and ammunition (The White House 2022a).¹⁴ Following our assumptions, we estimate a total value of \$773.3 million¹⁵ for the package, which is close to the \$800 million reported by the US government.
- Germany: Arguably the best benchmarking test for the reliability of our data and approach is the case of Germany. On June 21, the German government published a very detailed list of military items sent or committed to Ukraine since January 1, 2022.¹⁶ Prior to the release of this list, the government refused to share this information pointing to security concerns. We had therefore counted and quantified Germany's military commitments using the approach described above, i.e. by pulling together political statements, media reports or press leaks, such as the detailed list published by Der Spiegel of March 24 (Gebauer 2022). The comparison as of mid-June showed that our database covered 85.9% of the items already sent to Ukraine as well as 75.1% of the items that had been committed. Most importantly, our dataset included all infantry weapons and heavy weapons promised or sent to Ukraine, meaning that we had covered those items of most relevance.¹⁷ Among the items we missed are vehicles such as pick-ups as well as a range of smaller or low-value items such as personal equipment, tents or OP-lights.

¹⁴ According to the New York Times, the included 100 Tactical Unmanned Aerial Systems are of the type AeroVironment Switchblade (Barnes and Ismay 2022). These kinds of drones, also known as suicide drones, are cheaper compared to other models and are evaluated at \$6000 per piece according to our source (Rationalinsurgent 2022). Moreover, we value the 20 million rounds of ammunition at \$5 per round according to our sources. This was done to account for rounds sent for grenade launchers and mortars.

¹⁵ Specifically, we assign the following values to the contents of the package: 800 Stinger anti-aircraft systems (our per-unit price assumption: \$119,000 per unit), 2000 Javelins (\$256,000), 1000 light anti-armor weapons (\$2,000), 6,000 AT-4 anti-armor systems (\$1,480), 100 Tactical Unmanned Aerial Systems (\$6,000), 100 grenade launchers (\$2,291), 5,000 rifles (\$700), 1,000 pistols (\$800), 400 machine guns (\$5,300), 400 shotguns (\$1,100), 20,000,000 rounds of small arms ammunitions, grenade launchers and mortar rounds (\$5 per round), 25,000 sets of body armor (\$500), 25,000 helmets (\$1,400).

¹⁶ See <https://www.bundesregierung.de/breg-de/suche/bundesregierung-veroeffentlicht-liste-mit-militaerischen-unterstuetzungsleistungen-fuer-die-ukraine-2054546>.

¹⁷ The only exception are 700 out of 2700 units of Strela surface-to-air missiles. We had only counted 2000 because Der Spiegel reported that 700 units were in a deplorable state and not ready to be sent (see Gebauer and von Hammerstein (2022)).

- *Czech Republic*: According to Czech media reports, the Czech government provided Kč 750 million (€30.3 million) worth of military assistance to Ukraine between the end of February and mid-March (Fraňková 2022). Using our valuation approach, we get to a total value of military assistance of Kč 753.46 million (€30.65 million) for the same time frame, which is almost identical to the sum reported in the press.¹⁸ In these calculations we do not include the aid delivered in April, since it follows the aforementioned announcement of the Czech government.
- *Canada*: According to Chapter 5.1 of the Canadian budget for the year 2022, Canada committed more than CA\$1.2 billion in direct aid to Ukraine and CA\$1.6 billion in loan support for the Ukrainian government (Government of Canada 2022a). The entries in our dataset match these numbers closely. Based on our valuation approach for in-kind commitments, we got to a total of CA\$1.56 billion in military and humanitarian assistance by Canada. If we subtract from this sum the CA\$75 million of indirect aid provided to organizations working in Ukraine, we arrive to a total of CA\$1.49 billion in direct aid. This is close to the number of direct aid now revealed by Canada (more than CA\$1.2 billion). On financial aid, we get to a total of CA\$1.15 billion¹⁹, compared to CA\$1.6 billion listed by the government. Part of the discrepancy is explained by a CA\$120 million loan, which we do not include because it was committed on January 21 and thus three days before we start coding commitments (January 24).
- *G7 statement*: According to a May 20 press release published by the G7 Finance Ministers and Central Bank Governors, the G7 countries had committed \$19.8 billion (€18.9 billion) in financial support to Ukraine in the year 2022 (G7 Germany 2022). We used this sum for benchmarking with our country-by-country data on financial commitments and got to a total of \$19.126 billion for the G7 countries, which comes close. Specifically, as of May 20, we counted \$11.153 billion in financial aid by the United States, \$2.334 billion by the United Kingdom, \$1.89 billion by France, \$1.456 by Canada, \$1.365 billion by Germany, \$602.3 million by Japan and \$325.5 million by Italy. Section 7 contains a more granular overview on financial aid, focusing on budgetary support and comparing commitments and disbursements.

Cases of “hidden support” and missing information: In February, some governments announced not to share further details on their military support for Ukraine. In our database, that is true for six countries, in particular, namely Finland, France, Italy, Japan, Spain and Portugal. In recent weeks, however, many of these countries ultimately revealed the value of most of their military aid. The concern of “hidden support” is becoming less acute in recent releases.

For *Finland*, we faced an almost complete lack of information on military aid until recently, especially regarding the two military packages committed on March 24 and April 19. However, on May 4, the Ministry of Defense said that total military aid sent up until that date amounted

¹⁸ Specifically, we get to a total value of Kč 224.7 million (€9.1 million) for the first two military shipments and an additional supply of weapons and equipment worth Kč 400 million (€16.3 million) approved on February 27. Adding Kč 17 million (€691,197) in weapons donated by private arm manufacturers, Kč 24 million (€975,808) in additional material and Kč 53.26 million (€2.2 million) in equipment, Kč 30 million (€1.2 million) in fuel and petrol for the Ukrainian Armed Forces, Kč 4.5 million (€182,964) in fire engines, we arrive to a total of Kč 753.46 million (€30.65 million).

¹⁹ We do not include in the computation of the CA\$1.5 billion the CA\$1 billion and CA\$250 million loans announced through IMF’s Administered Account.

to €29.3 million. This information allows us to quantify the previously unquantified commitments and include their overall value starting from our third release. However, two newly announced military aid packages of May 5 and June 10 remain unquantified and are not counted.

In *France*, Thierry Burkhard, chief of staff of the French army, in February explained that France will provide no details on the kind of weapons it intends to send to Ukraine to avoid provoking Russia (Dalton 2022). Accordingly, in the first release of the paper, the only available information on military aid was a vague press statement by the Élysée on February 26. On April 13, however, a tweet by Florence Parley, the French Minister of Defence, revealed that, until that date, France had sent weapons and military equipment worth €100 million since the invasion on February 24. This announcement, along with the commitment of 12 Caesar artillery howitzers made public on April 23 (valued at \$5.5 million each), helped to further quantify the French military assistance. What we still cannot quantify, however, is the additional military equipment announced by President Macron on April 30 (Reuters 2022a) and by the Ministry of Defence on May 31. We were also unable to fully quantify the military package announced on June 30, containing 6 CAESAR artillery howitzers and an undisclosed number of armored vehicles.

Italy's military commitments and deliveries to Ukraine have been kept largely secret. Despite a lack of official statements, we found a few sources reporting the total monetary value of the first package, consisting of 100 million EUR in weapons and 50 million EUR in personal equipment. Unfortunately, we could not find any information regarding the following three military packages. Nonetheless, we could track that Italy sent an undisclosed amount of Browning machine guns, M113 armored vehicles and FH70 howitzers.

Japan's government provides no official sources of the military aid offered to Ukraine. However, media reports and press leaks provide lists of items contained in the two packages announced on March 4 and April 19. The packages contain undisclosed numbers of ballistic vests, helmets, power generators, food rations, protective masks with filters, chemical, biological, radiological and nuclear protective equipment, drones. Since there is no source for the numbers of items, we are unable to quantify Japan's military aid, which mainly consists of protective equipment that is comparatively easy and cheap to procure.

Spain's government initially shared information on military shipments but stopped doing so. Specifically, on March 2, it announced that it will be sending 1,370 anti-tank grenade launchers as well as 700,000 rifles, plus light machine guns and ammunition. On March 11, the government then announced an additional shipment of weapons for which the Spanish Foreign Minister Jose Manuel Albares refused to specify any detail. In this version of the database, we could however track three additional packages of military aid. The first, a minor one, was announced on March 29 and estimated to be worth €644,000. The second and third packages were committed on April 21 and June 5 and could be valued at €21 million and €12 million, respectively, based on information from news media.

Portugal does not officially release details on the value of its military assistance. However, based on media reports, we were able to estimate the cost of two out of the five packages the country committed to Ukraine. The first package, committed on April 30, contains 4 units of Iveco M 40.12 WM/P 4x4 armored vehicle and is worth more than €2 million. The second package was committed on May 8, contains 15 units of M113 armored personnel carriers and 5 units of M114 155mm Howitzers, and is worth more than €8 million. In sum, our dataset

quantifies two out of five military aid commitments by Portugal, with those of February 26, April 12 and May 18 remaining unquantified.

Replacement or “circle exchange” arrangements for weapons: In the previous months, several governments have announced weapon replacement and reimbursement arrangements. In the German public debate, these have become known as “Ringtausch” or “circle exchange”. In essence, these schemes envisage countries delivering weapons to Ukraine to receive replacement weapons for their shipments from either another Western country or through a designated reimbursement fund like the European Peace Facility (EPF). In the context of the Russia-Ukraine war, this typically means that old, Soviet-era weapons shipped to Ukraine are replaced with new, Western weapons systems worth much more than the old weapons. This raises the incentives to deliver military aid to Ukraine, while providing the Ukrainian army with Soviet weapon systems they are experienced with.

The usage and financing of these schemes still remain largely opaque. Weapon replacements and monetary flows are not made transparent by governments and some of the “circle exchanges” may never become public. As a result, it is impossible for us to quantify these flows systematically.

The EPF, for example, is an off-budget funding mechanism not bound to transparency or control by the European Parliament, even though it is financed by member states’ contributions. As a result, we do not know which countries received funds from the EPF, for what type and number or replacement weapons this occurred, and when financial reimbursements via the EPF are made. Adding EPF commitments is thus likely to lead to bias and double counting. For this reason, when adding EU aid shares country by country, we do not count the EPF funds. However, we do count and show the EPF commitments as a contribution from the EU institutions in the rankings below.

From public sources, we could so far identify six cases of weapon replacement schemes:

- *US-Slovakia exchange (S-300 air defense system)*: In early April, Slovakia announced to send its S-300 air weapon defense system to Ukraine (a Soviet/Russian system worth \$68 million, ID: SKM5). In parallel, the United States announced to replace it with one battery of their Patriot systems.²⁰ If we were to attribute the delivery of the air defense system to the United States rather than Slovakia, this would negatively affect Slovakia’s position in the donor rankings of Section 5.
- *British-Poland exchange (T-72 tanks)*: On April 22, it was reported that the British government intends to send Challenger 2 tanks to Poland in exchange for T-72 tanks sent from Poland to Ukraine (Grylls and Swinford 2022). The British prime minister confirmed that the UK is going to reimburse Poland, however, without revealing further details, e.g. on the number of tanks (Adamowski 2022).
- *Germany-Slovakia exchange (T-72 tanks)*: At the end of April, Germany announced a weapon swap with Slovakia, according to which Slovakia would have received 15 German Leopard 2A4 as a replacement of the 30 T-72 tanks to be sent to Ukraine. Already in the end of June (Petersen 2022), the Slovak government complained and counteroffered, asking

²⁰ A few weeks earlier, NATO allies Germany and Netherlands had already agreed to temporarily station three batteries of their Patriot systems in Slovakia.

for a least 30 Leopard 2A4. As claimed by the German Chancellor Olaf Scholz on August 11, negotiations with Slovakia are still ongoing.

- *Germany-Slovenia exchange (T-72 tanks)*: On May 6, the Slovenian government announced to send 30 T-72 tanks and 35 BMP-1 tanks to Ukraine in exchange for adequate replacements provided by Germany (Gebauer and von Hammerstein 2022). Since then, Germany and Slovakia have not (yet) been able to agree on what replacement tanks will be sent, so that the deal has not moved forward. On July 12, the Slovenian prime minister Robert Golob declared that the delay on negotiations was due to the change of government in Ljubljana and that Germany should not be held accountable for it. According to Golob, both governments are still willing to cooperate (Dahm 2022).
- *Germany-Poland exchange (T-72 tanks)*: At the beginning of April, the German Chancellor Olaf Scholz announced the willingness to negotiate a weapon swap with Poland, the country that sent the highest number tanks to Ukraine since the beginning of the conflict. To re-fill the Polish stocks, Germany offered to send 20 Leopard A24 immediately and then one Leopard 2A4 per month starting from April 2023 and one Leopard 2A4 every three months starting from October 2023. As of July 28, the Polish government refused the German offer, calling it inadequate (Von der Burchard 2022) and asked for at least 44 Leopard 2A4, a counteroffer that Germany subsequently refused (Chazan and Minder 2022). German Chancellor Olaf Scholz explained on August 11 that Germany is still willing to negotiate on the deal.
- *Germany-Czech Republic (T-72 tanks and BMP-1)*: In May, the Czech Republic sent 12 T-72 tanks and 5 BMP-1 infantry vehicles to Ukraine. As a replacement, Germany offered 15 Leopard 2A4 tanks, that Czech Republic agreed on receiving. However, the weapon swap from the German side has not yet materialized. No German tanks have been shipped to Czech Republic (Hauk and Küstner 2022).
- *Germany-Greece exchange (BMP-1)*: On May 31, it was announced that Greece would send Soviet-style weapons in exchange of German infantry fighting vehicles (Reuters 2022b). More information was disclosed a couple of days later, with the media specifying that Greece will send 122 BMP-1 Soviet tanks in exchange of an undisclosed number of German Marder tanks (Kaul 2022). As of August 3, no further details were available, with Greek sources highlighting that Germany has not yet agreed or specified how many Marder tanks will be sent (Spyropoulou and Tsakiris 2022). Apart of the announcements made in May and June, no additional information on the negotiations was made publicly available.

Next to the cases mentioned above, the US provides significant assistance to the Baltic states within the US Security Assistance framework, which, however, are not to be confused with direct reimbursement.²¹

²¹ Specifically, the US intends to provide \$180 million to Estonia, Latvia, and Lithuania through the Baltic Security Initiative in 2022, which represents an increase of \$10 million compared to 2021 (Ministry of Defence of Estonia 2022).

Details on US aid commitments and the Ukraine Supplemental Acts: The United States is a large and transparent donor, but the timing and size of US commitments can be confusing, resulting in sometimes contradictory press coverage. According to the available data, the US committed \$9.38 billion in humanitarian aid, \$25.45 billion in military assistance and \$10.51 billion in financial assistance in the period covered here.

To provide major amounts of military aid, the US President needs an act from US Congress, which in the case of Ukraine took the form of the *Ukraine Supplemental Act* that passed on March 10, 2022. The act enabled the president to transfer military equipment and weapons to Ukraine up to a total value of \$3.5 billion. Specifically, it expanded the scope of the so-called presidential drawdown authority, which allows military items to be sent directly from US stocks at the direction of the President (Congressional Research Service 2022, see also US Foreign Assistance Act of 1961).

US military aid to Ukraine, therefore, mostly takes the form of successive drawdowns, as documented in Table 1 of the report by the Congressional Research Service (2022) as well as by the US Department of Defense (2022). During February and March 2022, the Biden Administration announced three such drawdowns: \$350 million on February 25, \$200 million on March 12 and \$800 million on March 16. More recently, it announced drawdowns of \$100 million on April 5, \$800 million on April 13, \$800 million on April 21 and another \$150 million on May 6. A drawdown of \$200 million was already announced in December 2021. Because we consider commitments throughout this paper, we added the entire sum of all drawdowns available after January 24 (\$3.3 bn) to the database, and already did so in the previous versions. This means that the drawdowns of April and May did not increase the aggregate support for the US in the previous update. In addition, the United States committed \$650 million to Ukraine through the Foreign Military Financing Program (Congressional Research Service 2022), \$100 million as a provision to the Civil Security Assistance (US Department of State 2022) and up to \$300 million provided by the Ukraine Security Assistance Initiative (US Department of Defense 2022), a mechanism that differs from the presidential drawdown authority (Congressional Research Service 2022).

Taken together, in the second release of the dataset, we arrived at a total of \$4.35 billion of US military aid committed to Ukraine between January 24 and April 23, 2022. With the May 6 and May 19 drawdowns of a further \$150 million and \$100 million total drawdown had reached \$3.5 billion, thus exhausting the \$3.5 billion drawdowns allowed by the Ukraine Supplemental Act.

In end-April, President Biden requested an additional \$33 billion assistance package (The White House 2022b), which we first covered in the third database version. Following this request, the US House of Representatives passed the *Additional Ukraine Supplemental Act* on May 10, which focuses on the financing side and is paired with the *Ukraine Lend-Lease Act*, which facilitates weapon deliveries to Ukraine and neighboring countries via a lend and lease scheme. During the negotiation in Congress, the total size of the Supplemental Act was further increased, to a total of \$ 40 billion, plus \$11 billion in additional funds for presidential drawdowns for Ukraine, bringing this package to a whopping \$51 billion. The Act finally came into force on May 21, after the Presidential signature which followed the Senate's approval of May 19 (House Committee on Appropriations 2022; The White House 2022c).

Out of the \$40 billion in the bill, \$25.14 billion represent military support, of which \$10.1 billion are directed to Ukraine proper,²² while \$15.04 billion of the bill will go to other military purposes, in particular U.S. defence and strategic resilience.²³ On top of that, the act stipulates a sum of \$11 billion for presidential drawdowns for Ukraine, which brings the total sum of new military aid commitments directed to Ukraine to \$21.1 billion, which we added to the third and following versions of the database.

Besides military support, the Ukrainian Supplemental Appropriations Act also includes \$5.825 billion in direct humanitarian aid, as well as \$8.506 billion in direct financial assistance. Of the \$5.825 billion is in humanitarian support, \$4.502 is directed to Ukraine (and thus added to our database)²⁴, while \$1.324 billion is mainly directed to refugees outside Ukraine.²⁵ Out of the \$10.05 billion in financial support, a total of \$8.506 billion is directed to the Ukrainian government²⁶, while \$1.544 billion is directed to other countries and institutions (and thus not included here).

Since the Additional Ukrainian Supplemental Act came into force in May, a total of \$2.675 billion was approved through several presidential drawdowns.²⁷ Specifically, \$1.515 billion was approved for the *Ukraine Security Assistance Initiative* providing military support, logistics and equipment for Ukraine²⁸ and \$600 million was approved for the Foreign Military Financing program. Since our dataset records commitments, we already counted the entire value of the second US package in the third release and any new drawdowns do not change the total sums of US assistance (no change since the third release).

²² In more detail, the \$10.1 direct military aid to Ukraine consists of \$6 billion for the Ukraine Security Assistance Initiative, \$4 billion for the Foreign Military Financing Program and \$100 million for nonproliferation, anti-terrorism, demining and related programs.

²³ In more detail, the military aid parts not include are the following: \$9.04 billion intended for the purchase of US military stocks (replenishments); \$3.9 billion dedicated for mission support, intelligence support, and hardship pay to American troops deployed to the region; up to \$950 million for assistance to friendly foreign nations other than Ukraine; \$500 million to procure munitions for the Department of Defence stocks; \$50 million aimed at developing program protection strategies for systems identified for possible future export; and \$600 million for faster missile production and expanded domestic capacity of strategic and critical minerals. None of these items are aid flows to Ukraine proper, so they are not considered in our tracker.

²⁴ Specifically, we include \$4.35 billion intended for International Disaster Assistance to provide emergency food to people impacted by the Ukrainian conflict, \$2 million for technical and regulatory support to the Ukrainian nuclear regulatory agency and \$150 million for the Global Agriculture and Food Security Program to help countries (including Ukraine) fighting the impacts of a rise in food prices.

²⁵ The sums not included consist of \$350 million for refugees outside Ukraine, \$900 million to provide housing and education to Ukrainian refugees in the United States, \$54 million for medical support to Ukrainian refugees in the United States and \$20 million to reimburse the Bill Emerson Humanitarian Trust.

²⁶ This includes \$8.006 billion for the Economic Support Fund to respond to emergent needs in Ukraine and \$500 million to support specialized facilities of the EBRD aimed at helping Ukraine.

²⁷ \$100 million on June 1, \$350 million on June 15, \$450 million on June 23, \$50 million on July 1, \$400 million on July 9, \$175 million on July 22 and \$550 million on August 1.

²⁸ \$650 million on June 17, \$770 million on July 1, \$95 million on July 22.

3. Multilateral and European-Level Support

3.1 Mechanisms of European Union Support

Our main dataset tracks *bilateral commitments* worth €84.2 billion of the European Union and 40 countries to Ukraine since January 24, 2022 until August 3, 2022. To adequately capture European support for Ukraine, we also account for aid provided through the European Union (Commission and Council) and its various foreign assistance mechanism.

- The **European Peace Facility (EPF)**: In late February 2022, the Council of the European Union approved the creation of a new fund to finance arms and equipment for the Ukrainian army, initially worth €500 million, then doubled to €1 billion on March 23 (European Council 2022a) and further increase to €2.5 billion with further commitments on April 13, May 13 and July 22, amounting to €500 million each (European Council 2022b; European Council 2022c, European Council 2022d). Out of the €2.5 billion total, €2.33 billion are intended for the procurement of lethal weapons, with the remaining €170 million for non-lethal assistance (Alhas 2022; European Parliament 2022; European Council 2022d).²⁹ The funds, financed by member state contributions, will not flow directly to the Ukrainian government, but will instead be used over a longer time period to reimburse EU member countries for the expenses of sending military aid to Ukraine. The exact workings of this fund remain vague and little official details have been published. A recent analysis by Fotidiadis and Schmidt (2022) provides the most detailed analysis, suggesting that there is little agreement on details between EU governments, no systematic data collection, and that “decisions on reimbursement are made unanimously by member states” on a case-by-case basis. In line with this, we found little evidence of how and when this facility has been used in practice, with only Ireland revealing some details.³⁰ Some announcements can be confusing. For example, in April the German government announced the provision of €400 million to the EPF, which sounded like an add-on commitment. However, this amount roughly corresponded to Germany’s share in financing the total EPF fund (€387 million out of a total of €1.5 bn at the time), so that we did not count this commitment twice, and attributed it to the EU rather than to Germany in Section 5 (Tagesschau 2022).³¹
- The European Union’s **Macro-Financial Assistance (MFA)** program is a vehicle to support non-EU countries that face a balance of payment crisis via loans and grants. On February 1, before the start of the war, the European Commission agreed to a new emergency MFA program for Ukraine of up to €1.2 billion in concessional loans (the sixth

²⁹ The non-lethal assistance option allows countries like Austria, Ireland and Malta to contribute to the EPF despite the fact that their domestic laws prevent them from sending lethal weapons (Fotidiadis and Schmidt 2022).

³⁰ Ireland announced to commit €33 million of its EPF contribution in-kind and directly to Ukraine, specifically for the provision of at least 10 tons of ready-to-eat meals and 200 units of body armor (See <https://www.rferl.org/a/ukraine-ireland-visit-coveney/31803832.html> and <https://www.gov.ie/en/press-release/d6856-minister-for-defence-approves-the-provision-of-specific-additional-support-to-ukraine-including-body-armor-and-meals/>). To avoid double counting we do not attribute this contribution to Ireland but rather count it as EU aid. 200 units of body armor.

³¹ Note that similar cases are reported for Portugal and Latvia. Latvia announced on March 1 to provide 1.2 million EUR to the European Peace Facility to support Ukraine, which corresponds to its calculated share of the EPF volume at that time, 500 million EUR (see https://www.mfa.gov.lv/en/article/latvian-foreign-ministry-channel-eur-24000000-towards-assistance-ukraine?utm_source=https%3A%2F%2Fwww.google.com%2F). Similarly, Portugal announced on February 28 to provide between 8 to 10 million EUR to the EPF, which corresponds to its share to the EPF of 7.34 million EUR (see https://www.euractiv.com/section/politics/short_news/portugals-to-contribute-e8-10-million-to-eus-arms-package-to-ukraine/).

MFA operation in Ukraine since 2014). In response to the war, payouts were fast-tracked, with the first loan instalment of €600 million disbursed in two tranches on March 11 and 18 (European Commission 2022a). The remaining €600 million of low-interest rate loans were disbursed on May 20 (European Commission 2022b). Moreover, on May 18 the Commission announced an additional MFA loan of up to €9 billion, which considerably increases total EU commitments (European Commission 2022c). We report the MFA position as part of *the EU* commitments in the main dataset.

- The **EU Civil Protection Mechanism** is an instrument aimed to improve the prevention, preparedness, and response to disasters. For Ukraine, our data show that about €171 million have been committed through this vehicle since the start of the war. Since this is a coordinating mechanism rather than a fund of its own, we attribute the aid through this instrument to the country providing aid and not to the European Commission.
- The **European Investment Bank (EIB)** presents itself as “the Bank of the European Union”, but legally a separate entity from the European Commission, with its own funding and decision-making process. In March 2022, the EIB announced an emergency solidarity loan for Ukraine of €2 billion plus a small humanitarian package worth €2.5 million. The €2 billion commitment includes the immediate provision of €668 million as liquidity assistance to the Ukrainian authorities, plus €1.3 billion EUR of commitments made for infrastructure projects and reconstruction to be paid out “as soon as conditions allow”. Part of the emergency funding seems to have been committed already before the war (“originally granted to support SMEs and the agricultural sector in Ukraine”), but details are hard to find (European Union 2022). In the first two releases, the EIB commitments were listed in the non-bilateral part of the dataset. However, in the third release we moved it to the bilateral commitments next to the European Union (Commission and Council). EIB aid is since then, treated as aid from an “EU Institution”.

3.2 Support by International Organizations

This section offers a brief overview of support to Ukraine by major international organizations. Support by other multilaterals such as the United Nations or the Red Cross will be added in future versions (details on aid amounts by these organizations are not easy to find or not published at all).

- **IMF programs:** On March 9, the International Monetary Fund announced and disbursed an emergency assistance loan of \$1.4 billion to Ukraine under the umbrella of its Rapid Financing Instrument. The purpose is “to help meeting urgent financing needs including to mitigate the economic impact of the war” (IMF 2022a). Moreover, Canada provided on April 8 around €726 million through the Administration Account (IMF 2022b). This account enables countries to provide financial assistance to Ukraine (IMF 2022b). According to the Ministry of Finance of Ukraine, the IMF has disbursed \$1.41 billion as of August 3, thus releasing its commitment under the umbrella of its Rapid Financing Instrument (Ministry of Finance of Ukraine 2022).
- The **World Bank** mobilized a \$723 million emergency package for Ukraine in early March (World Bank 2022a). The package consists of a \$350 million concessional loan by the World Bank, grant financing of \$134 million (\$100 million by Great Britain, the rest from Denmark, Latvia, Lithuania, and Iceland), as well as loan guarantees by the Netherlands (\$89 million) and Sweden (\$50 million) and \$100 million of “parallel financing” in form of

a loan by Japan. On March 14, the World Bank provided an additional amount of \$200 million to bolster social services in Ukraine for vulnerable people (World Bank 2022b). Finally, on April 12 the World Bank announced additional assistance amounting to \$1.49 billion (Lawder and Shalal 2022), but this package was approved only on June 7 (World Bank 2022c). According to the data provided by the Ministry of Finance of Ukraine, out of the \$2.467 billion \$929 million have been disbursed so far, a share of 37.66% (Ministry of Finance of Ukraine 2022).

- On March 9, the **European Bank for Reconstruction and Development (EBRD)**, an international organization half-owned by European countries, announced a support package for Ukraine and neighboring countries totaling \$2 billion. The package includes deferred loans, liquidity support, and trade finance (Porter 2022), but there are few further details available. During the G7 meeting in Petersberg, on May 20, \$3.4 billion in “additional planned support” was announced for the EBRD and the International Finance Corporation (G7 Germany 2022). Since no new aid has been officially announced by the EBRD, it is unclear whether this aid includes the \$2 billion committed on March 9, or whether it corresponded to a new package which will be committed in the future. For now, we do not include the sum of \$3.4 billion in our dataset. However, we expect it to be part of a longer-term reconstruction plan presented by the European Commission on May 18, and will record it then (European Commission 2022d)

3.3 “Stand up for Ukraine” Event

On April 9, Ursula von der Leyen, President of the European Commission, and Justin Trudeau, Prime Minister of Canada, convened the “Stand Up for Ukraine” event in Warsaw. Its aim was to raise money for refugees fleeing Ukraine and internally displaced people. The organizers state that €10.1 billion in donations was raised for Ukraine. Some of the funds, however, had already been pledged in earlier announcements and by far the biggest chunk will not flow to Ukraine proper, but is intended to support European countries welcoming Ukrainian refugees. In line with our approach explained above, we count those commitments that are intended to go directly to Ukraine, mainly to support internally displaced people. These Ukraine-directed commitments account for €806 million of the €10.1 billion total (less than 10%). Specifically, we count €600 million by the European Commission, €83 million by Belgium, €70 million by Germany, and €53 million by Ireland.

The remaining €9.3 billion are not part of our main database, since they are going to European countries receiving refugees having fled Ukraine, but not to Ukraine itself (European Commission 2022e). For example, the EIB’s loan of €4 billion is intended for European countries to “finance the development of key social infrastructure for the provision of public services to refugees, including housing, schools, hospitals and kindergartens.” Another loan of €1 billion was pledged by the EBRD to countries welcoming Ukrainian refugees. However, this loan had already been announced as part of the EBRD’s “resilience package” on March 9 (see ID: EBF1) and is therefore neither a new commitment nor going to Ukraine. Also, the €1 billion grant by the Council of Europe Development Bank (CEB) is not included, since it appears to be aimed exclusively to support refugees outside Ukraine. The EU Commission pledged €1 billion but of these €400 million are intended to support other countries, so that only €600 million enter our dataset. Finally, there are 13 pledges by individual countries to support Ukrainian refugees at home or in other European countries, but not in Ukraine itself (€3 billion

total). These are again excluded. Appendix Figure A2 shows an overview of the pledges made in this event.

A second, follow-up international donors' conference for Ukraine was arranged on May 5, but no longer under the "Stand Up for Ukraine" header. This event was co-hosted by the Prime Minister of Sweden and the Prime Minister of Poland in partnership with the Presidents of the European Council and the European Commission (Republic of Poland 2022). The conference reportedly raised around \$6.5 billion (€6 billion), as stated by the Polish Prime Minister in his concluding statement (Ministry of Foreign Affairs Republic of Poland 2022). Having gone through all individual commitments, we include a total of €2.33 billion pledged by individual countries and €200 million by the European Union.³² We do not include the remaining commitments of €3.74 billion because they are not directed to Ukraine but for hosting refugees outside Ukraine or to international organizations. For consistency, we also exclude aid by private corporations.³³

3.4 Ukraine Recovery Conference

Following the "Ukraine Reform Conference" (URC) in London (2017), Copenhagen (2018), Toronto (2019) and Vilnius (2021), the fifth URC took place in Lugano, Switzerland, on July 4 and 5, 2022. This year's conference was initially supposed to focus on *Stability and Prosperity*, but was redesigned as a conference on *Reconstruction* and renamed "Ukraine Recovery Conference" (Ukraine Recovery Conference 2022a). The conference resulted in a so-called "Ukraine's National Recovery Plan", an agenda for a post-war reconstruction that will be coordinated by the National Recovery Council, an organ established by Ukrainian President Zelensky for this specific purpose (National Recovery Council 2022).

During the conference, all 58 participating governments and international organizations reiterated their public support to Ukraine. But the new aid sums pledged fell short, at least when compared to the previous two donor conferences. Taken together, governments announced €1.58 billion in new commitments, of which we include €1.46 billion in our dataset (Ukraine Recovery Conference 2022b).³⁴

³² Specifically, for individual countries, we include €366.2 million pledged by the U.S. Agency for International Development, €415 million by Germany, €300 million by France, €283.88 million by Japan, €256.11 million by the United Kingdom, €200 million by Italy, €100 million by Poland, €73.69 million by Canada, €70 million by Romania and Finland, €41.96 million by Austria, €37 million by Hungary, €29.77 million by Belgium, €21.76 million by Sweden, €20.82 million by Denmark, €18 million by the Czech Republic, €8.54 million by the Netherlands (€5 million financial aid and the remainder through an in-kind donation consisting of 17 ambulances), €5 million by Croatia, €2.9 million by Estonia, €2 million by Lithuania, €1.89 million by New Zealand, €1.1 million by Portugal, €1 million by Slovenia and €1 million by Luxembourg.

³³ Specifically, we omit €3.4 billion pledged by Poland for Ukrainian refugees in Poland, €300 million by Italy for Ukrainian refugees in Italy, €20 million by Google, €10 million by Latvia committed to the EBRD, €7 million by Georgia, €3 million by Iceland, Serbia and Astra Zeneca, €1 million by Albania, €1 million by Portugal to the United Nations, €946,000 by the International Business Machine Corporation, €389,000 by Liechtenstein and €189,000 by Colombia.

³⁴ We do not report the €50 million promised by Switzerland, since this constituted the announcement of a future commitment which was to be made by the end of the year 2023, and not a commitment in itself. We also do not report the €71 million promised by Iceland, since the country is not included in our sample.

3.5 Copenhagen Conference

On August 11, 2022, the Copenhagen donors conference took place, organized by Denmark, the Minister of Defence of Ukraine and the United Kingdom. The aim of the meeting consisted in strengthening the military cooperation between the European countries and Ukraine and to support the country in its defence against Russia (Danish Ministry of Defence 2022). Taken together, 26 countries attended the conference, which raised €1.5 billion in military aid, with a €300 million contribution of the United Kingdom (Gronholt-Pedersen 2022; UK Ministry of Defence 2022). We have no further information at hand on the composition or type of this newly pledged military assistance to Ukraine. As the current version of our database includes commitments until August 3, 2022, our data does not include these amounts at this time but will be added in future releases.

4. Aid to Ukraine prior to January 24, 2022

This section offers a brief overview of international assistance to Ukraine prior to the time frame covered by our dataset, which starts on January 24, 2022, the day several NATO members put their troops on alert and the US started to evacuate its embassy staff. We start by summarizing the aggregate support between 2014 and 2021 and then highlight individual commitments made in early January 2022.

4.1 Support to Ukraine between 2014 and 2021

Since its independence in 1991, Ukraine has been a regular recipient of bilateral and multilateral support. Russia's occupation of Crimea in 2014 and its subsequent invasion of the Donbass motivated a new wave of commitments by Western governments, with the United States, the IMF, and EU institutions standing out (Mills 2022).

The EU institutions have been by far the largest financial supporters of Ukraine in the years 2014-2021. EU aid took the form of grants and loans for financial and humanitarian support, but little to no military aid. The EU's scope of support was increased drastically after March 2014, following Russia's occupation of Crimea. Specifically, the EU announced a major new financial aid package of up to €11 billion to Ukraine, which was partly motivated to counter Russia's \$15 billion financial aid offer to President Yanukovich in December of 2013. That package contained €1.6 billion in MFA loans, €1.4 billion of grants, up to €8 billion in loans from the EBRD and the EIB, and potentially another €3.5 billion through the "Neighborhood Investment Facility" (European Commission 2022f). Since then, total aid was further increased to a volume of €17 billion, mostly in the form of loans and including several more MFA programs (European Parliament 2022; European Commission 2022g).

With a view to international financial institutions, the IMF approved several major support packages, starting with a March 2014 announcement of up to \$18 billion in new financial aid (Giucci and Zachmann 2014) and a renewed IMF program in 2015 (the disbursements were ultimately much smaller, however). Also, the World Bank and the EBRD offered major packages.

Turning to individual countries, the US has been by far the largest bilateral supporter, including large amounts of military aid (see King 2019 for country comparison until 2019). According to the United States' Congressional Research Service (2021), the US government has provided

more than \$2.5 billion in security assistance to Ukraine between 2014 and 2021, mainly through the Ukraine Security Assistance Initiative and Foreign Military Financing. In addition, the US Department of State and USAID provided more than \$3 billion in bilateral, non-military aid since 2014.

The next most important bilateral supporters are Germany followed by Canada. Since 2014, Germany provided more than €1.8 billion in financial support to Ukraine. This support included €750 million in development assistance (mostly GIZ, KfW and PTB projects), €150 million in humanitarian aid (“for clearance and the disposal of explosive remnants of war”) and a loan guarantee facility of €500 million (Federal Foreign Office 2022). Moreover, Canada has provided more than €650 million (890 million Canadian dollars) in aid to Ukraine since January 2014 (Government of Canada 2022b).

4.2 Commitments in January 2022

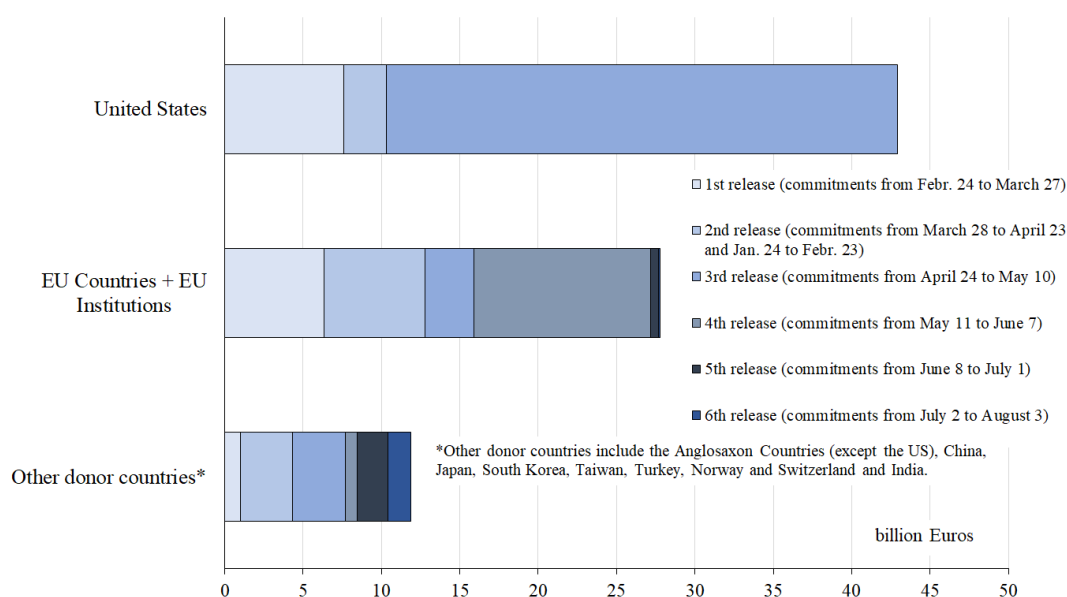
This section lists a few noteworthy commitments made just prior to January 24, the day our data tracking starts. On January 17, the British government announced its intention to supply military equipment and weapon systems to the Ukrainian Armed Forces, including 2,000 new light anti-tank weapons (Allison 2022). Moreover, on January 21, Canada announced a loan of up to 120 million Canadian dollars and a technical assistance grant of up to 6 million Canadian dollars (Government of Canada 2022c).

5. Country Rankings

In this section, we summarize the main results from our dataset. Taken together, our main database tracks almost €84.2 billion of *bilateral* humanitarian, military, and financial support from 41 bilateral donors, made between January 24 and August 3, 2022.

In Figure 1, we compare the size of total commitments to Ukraine across the US, the EU countries and the remaining countries (in billion Euros). The total EU commitments of €27.76 billion include bilateral commitments by all 27 EU member country governments (a total of €11.52 billion), plus commitments of €11.74 billion from the EU Commission and Council (including €10.32 billion of Macro-Financial Assistance (MFA)), the European Peace Facility (EPF) worth €2.5 billion, and €2 billion by the European Investment Bank (EIB). The remaining countries committed a combined total of €11.88 billion.

Figure 1. Overview: Government support to Ukraine, € billion
Commitments January 24 to August 3, 2022

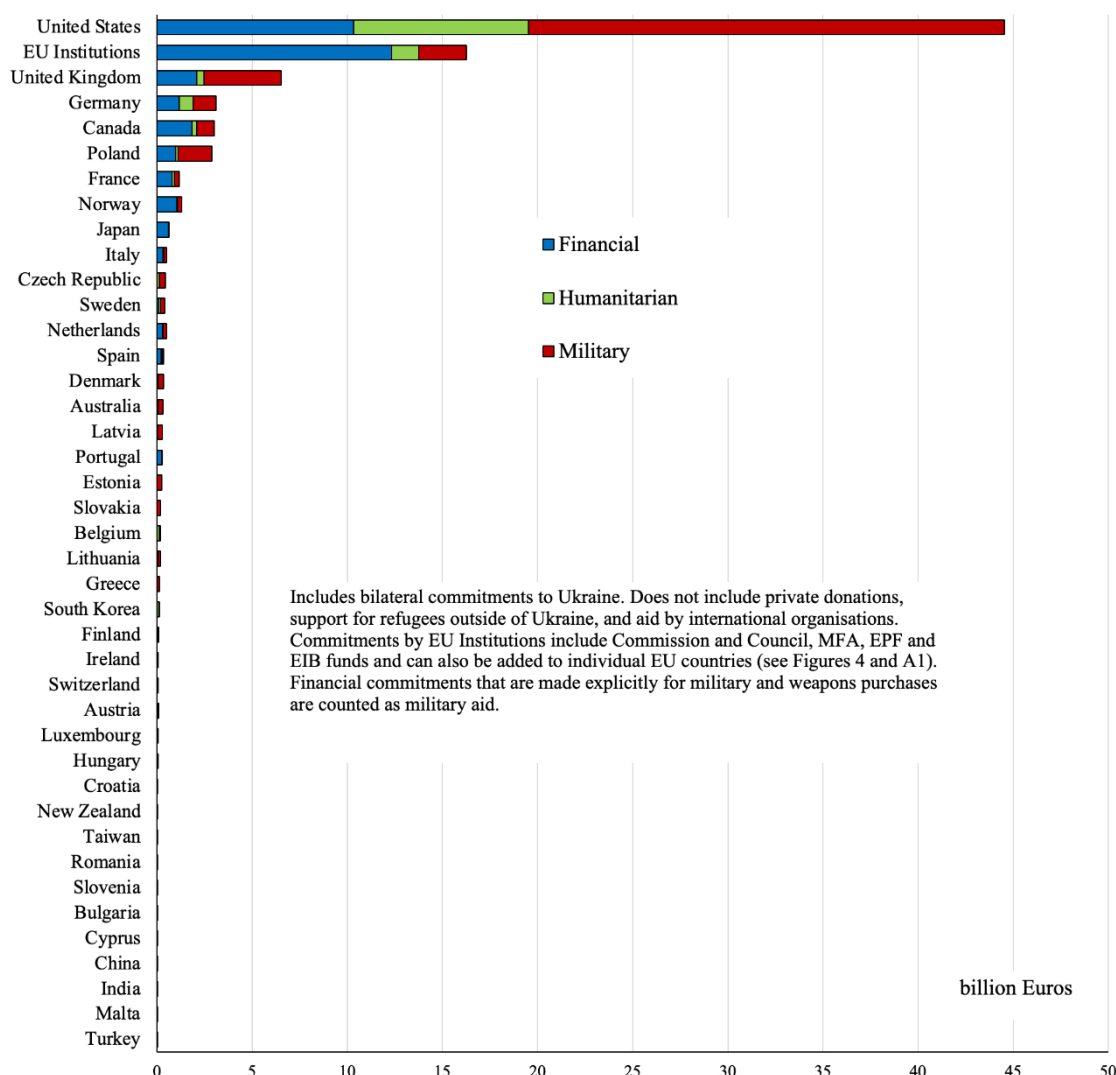


Note: This figure summarizes the support commitments to Ukraine in billion Euros between January 24 and August 3, 2022. EU commitments include bilateral commitments of all 27 EU member countries.

The main insight is that the United States government alone (€44.53 billion) committed almost four times as much to Ukraine than all the individual EU country governments combined (€11.52 billion). However, the large commitments by the EU institutions (€16.24 billion, largely in the form of loans) bring the total European support to a level closer to the US. Outside of the EU and the US, donor countries committed a total of €11.88 billion in assistance, from which most comes from the UK (€6.51 billion) and Germany (€3.1 billion).

In Figure 2, we rank countries by their total *bilateral* commitments since January 24 and differentiate by type of aid. The United States clearly remains the largest donor to Ukraine. Next come the EU institutions (€16.24 billion, mostly MFA, EPF and EIB commitments) and the UK (€6.51 billion). Germany is now the largest EU donor (€3.1 billion) followed by Poland (€2.89 billion), which has delivered large military aid (we show rough estimates on the costs of welcoming Ukrainian refugees in Section 8, adding these would bring Poland to third place in absolute terms, with €6.03 billion).

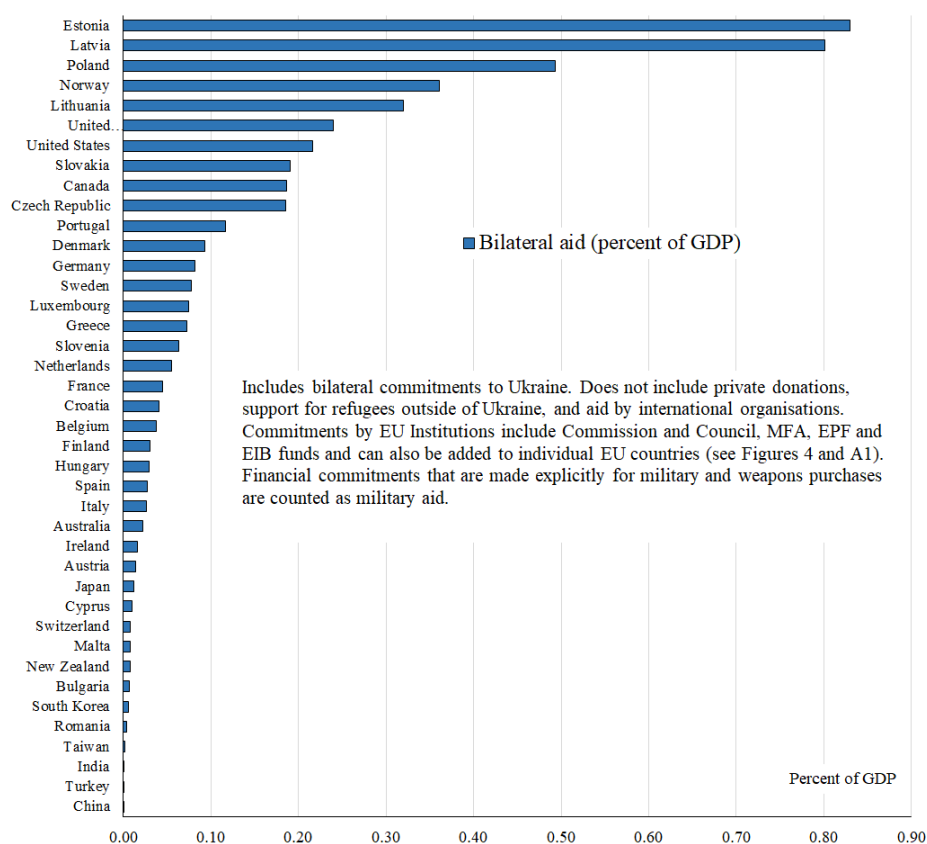
Figure 2. Government support to Ukraine - by type of assistance, € billion
Bilateral commitments January 24 to August 3, 2022



Note: This figure shows total bilateral aid commitments to Ukraine across donor governments in billion Euros (January 24 to August 3, 2022). Each bar besides illustrates the type of assistance, meaning financial assistance (loans, grants, guarantees, and swap lines), humanitarian aid (assistance directed to the civilian population including food and medical items), and military assistance (arms, equipment, and utilities provided to the Ukrainian military). Military aid includes direct financial assistance that is tied to military purposes. Please refer to the main text and our dataset for details on data collection and sources.

As a next step, we scale bilateral aid commitments by each donor country's GDP (in percent). Figure 3 shows that Eastern European countries stand out as particularly generous when considering the size of their economy, with Estonia, Latvia, Poland and Lithuania ranging among the top ten donors. The United States (being the largest donor in absolute terms) comes in 7th, with assistance worth around 0.22 percent of its GDP. As shown in Section 8, Eastern European countries show even higher commitments relative to GDP if one were to account for support by hosting Ukrainian refugees.

Figure 3. Government support to Ukraine - as percent of donor country GDP
Bilateral commitments January 24 to August 3, 2022

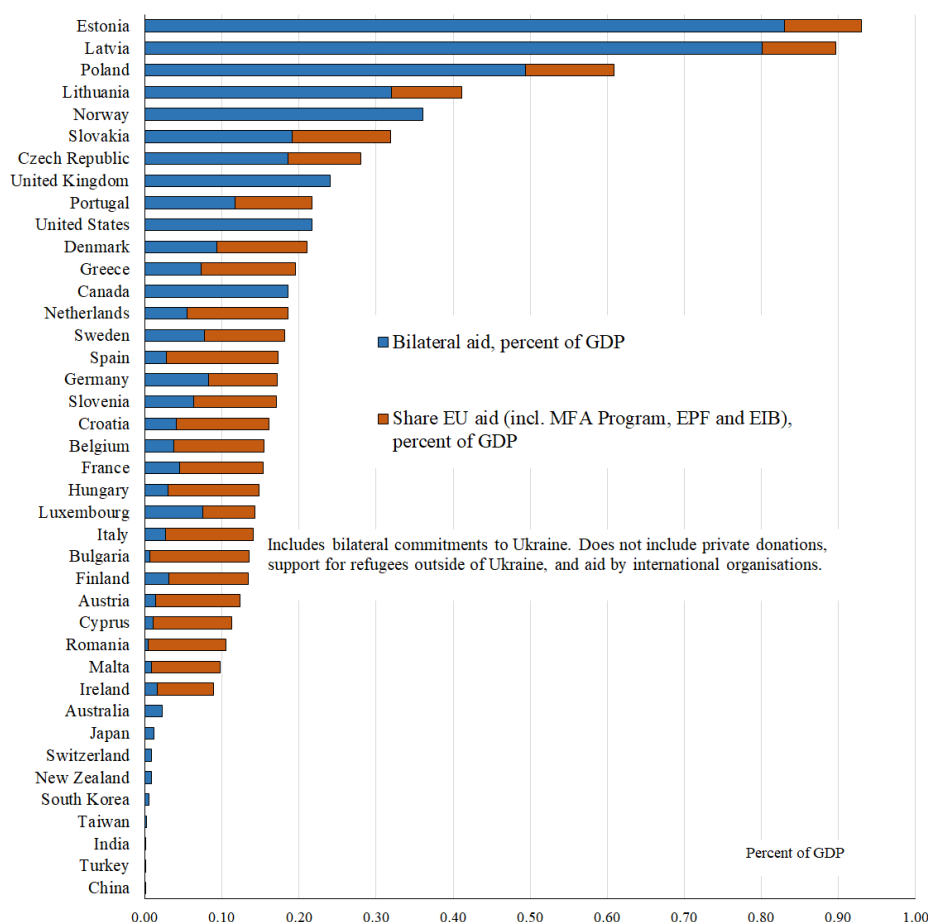


Note: This figure ranks countries by the scale of bilateral aid as percentage share of each donor's GDP. We consider total commitments to Ukraine between January 24 and August 3, 2022. The data on GDP (current US\$) is for 2020 and taken from the World Bank. See the main text for details on data collection and sources.

Figure 4 takes a different perspective than Figure 3 as it assigns EU-level commitments to the individual EU countries (the corresponding graph in billions of Euros is shown in Appendix I).³⁵ The blue bar segments indicate bilateral aid (those of Figure 2), while the brown segments represent each country's share in commitments through the various European institutions and mechanisms, which include the European Commission and Council, the Macro-Financial Assistance program, the European Peace Facility and the European Investment Bank. More specifically, we assign EU-level commitments as follows. EU commitments, the MFA and EPF are allotted based on each member country's relative contribution to the EU budget. Similarly, for the EIB, we assign commitments using each country weight in the EIB's capital subscription shares. The contribution share is transformed from euros into percentage of the donor country's GDP, represented by the orange segments.

³⁵ We map commitments by the EU (European Commission and European Peace Facility) into (additional) bilateral commitments in line with each donor's contribution to the EU's budget in 2020 (Clark 2022). Commitments by the European Investment Bank (EIB) equivalently translate into bilateral assistance following each EU member's relative capital subscription in 2012 (European Union 2012; Protocol (No 5), Article 4). The amount of EIB subscribed capital is based on the economic power of a member country when joining the EU. All commitments are taken as percent of the country's GDP.

Figure 4. Government support to Ukraine including EU share - as percent of donor GDP
Bilateral and EU commitments January 24 to August 3, 2022

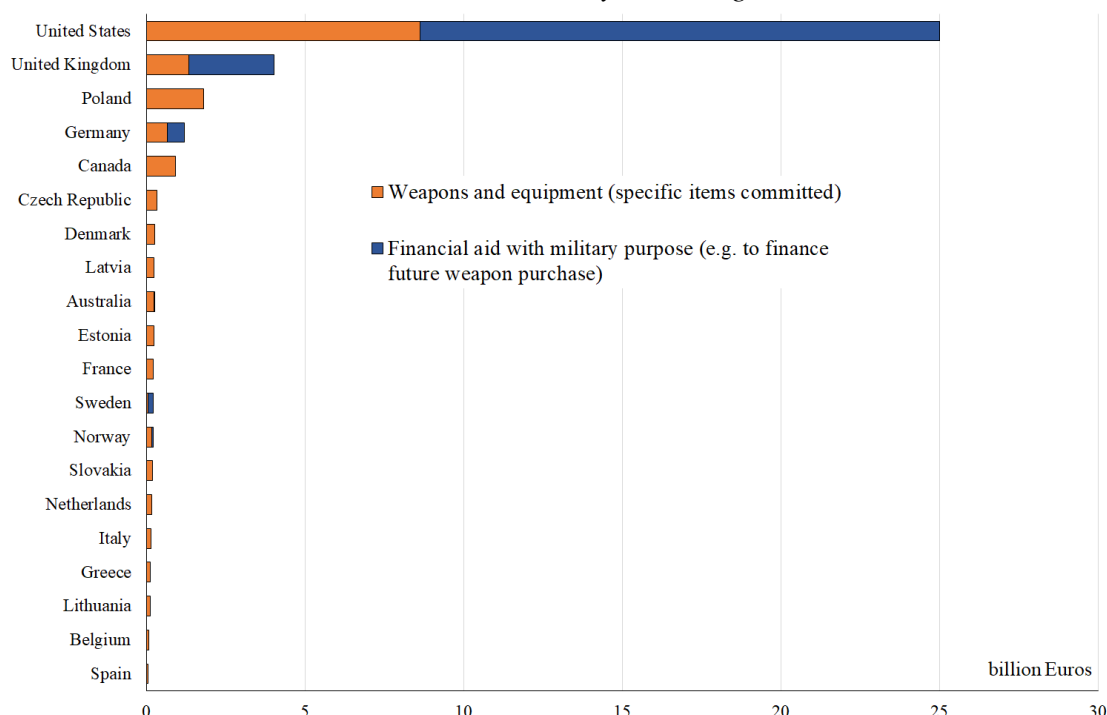


Note: This figure shows a ranking of bilateral commitments after accounting for EU-level aid and financing vehicles. We assign EU-level commitments as follows: EU commitments (Macro-Financial Assistance, EPF, humanitarian aid) are allotted based on each member country's relative contribution to the EU budget. Similarly, we assign EIB commitments using each country weight in the EIB's capital subscription shares. See the main text for details on data collection and sources.

As can be seen, the overall picture does not change much when adding EU support. Estonia remains the largest donor (0.93% of GDP), Latvia remains in second place (0.9%), and Poland is third (0.61%). Overall, the ranking remains very similar to the one presented in Figure 3 (only bilateral assistance).

Turning to the type of aid, we find that the ranking of *military* aid resembles that of total aid in Figure 2. This can be seen in Figure 5, which shows a ranking of total military aid, differentiating between specific weapon and equipment commitments and more vague forms of military support, in particular financial commitments tied to military purposes, e.g. for future weapons purchases. The US again clearly tops the list (€25 billion total military aid, of which €8.63 billion in weapon and equipment commitments and €16.37 billion in financial aid with a military purpose). Next comes the UK (€4.03 billion, of which €1.33 billion in weapon and equipment commitments and €2.70 billion in financial aid for military purposes), Poland (€1.8 billion, all for specific weapons and equipment), Germany (€1.2 billion, of which €661 million in weapon and equipment commitments and €539 million for financial aid with military purpose).

Figure 5. Military aid (including financial) in € billion (top 20 of 40 donors)
Bilateral commitments January 24 to August 3, 2022

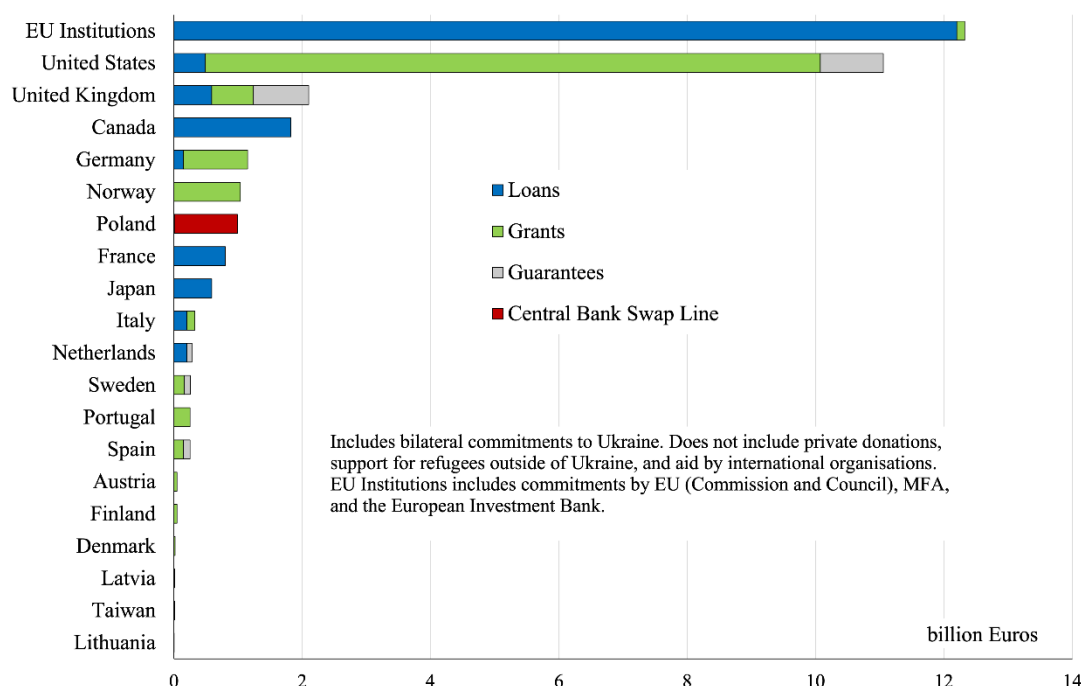


Note: This figure shows a ranking of the top 20 donors (out of 40) that have offered military aid in the form of weapons and equipment and financial aid with military purpose to Ukraine between January 24 and August 3, 2022 (bilateral disclosed military commitments only, in billion Euros). To avoid double counting, we do not include EU (Commission and Council) contributions. Financial commitments that are made explicitly for military purposes and weapons purchases are counted as military aid. See the main text for details on data collection and sources.

Finally, we shed light on the different forms of *financial* aid to Ukraine. Figure 6 shows a ranking of total financial aid, distinguishing between commitments through bilateral loans, grants, central-bank swap lines as well as financial guarantees. The large bulk of financial assistance to Ukraine comes from a small set of donors, in particular, the EU's institutions (€12.32 billion) and the US (€11.06 billion). Next come the UK (€2.1 billion), Canada (€1.82 billion), and Germany (€1.15 billion), followed by Norway (€1.03 billion) and Poland (€989 million) in 6th and 7th place, respectively. France comes in 8th, with €800 million aid committed in loans.

Figure 6 further differentiates by type of financial aid, with large differences across donors. The United States mostly committed grants (unilateral fiscal transfers), while the EU institutions mostly committed loans that are to be repaid and thus add to Ukraine's already high debt burden. Also, the UK, Germany and Norway promised significant grants to Ukraine, while France, Japan and Canada offered repayable loans rather than grants.

Figure 6. Financial aid in € billion (top 20 of 41 donors)
Bilateral commitments January 24 to August 3, 2022



Note: This figure shows a ranking of the top 20 donors (out of 41) that have offered financial assistance in the form of loans (blue segments), grants (green), financial guarantees (gray), central bank swap-lines (red) to Ukraine between January 24 and August 3, 2022 (bilateral disclosed financial commitments only, in billion Euros). See the main text for details on data collection and sources.

6. Weapon Commitments and Deliveries

Since the start of the invasion in late February, Ukraine's president Volodymyr Zelensky repeatedly emphasized the country's need for heavy weapons like tanks, artillery, and rocket launchers. By the end of March, only the United States, Estonia and Poland had sent heavy weapons to Ukraine, while Western and Northern European countries remained more hesitant, sending infantry weapons or portable anti-tank weapons instead (e.g., Javelins, NLAWs, or MILAN launchers). This changed over the course of April, with further governments including Canada, Czech Republic, Australia, France, Belgium, Germany, Netherlands, Denmark, Lithuania, Spain, Portugal, Slovakia and Latvia committing to send heavy weapons to Ukraine. In this section, we provide an overview of the type and amount of weaponry governments have committed and delivered to Ukraine as of August 3, 2022, and based on the publicly available information we could gather (for the full picture see the "Main Dataset" sheet in the accompanying Excel file).

Table 1 adds further weapon types and sums the total number of weapons committed and sent in nine categories. Our aim was to cover the main weapon types emphasized by Ukraine, especially heavy weapons and man-portable defense systems. The list does not include light infantry weapons like machine guns, rifles or hand grenades, and also not general military equipment, like helmets or protective gear, as well as ammunition. In Appendix II, we zoom into every of the main categories and show an item-by-item list of main weapon commitments and deliveries.

Table 1. Aggregate overview: main weapon categories by type
Bilateral commitments and deliveries between January 24 and August 3, 2022

Weapon type	Delivered (our dataset)	Additionally committed (our dataset)	Delivered according to Ukr. Ministry of Defence (June 9)
<i>Artillery (howitzers)</i>			
NATO artillery	191	66	150
Soviet-type artillery	29	-	50
Mortars	100	undisclosed	hundreds
<i>Armored vehicles</i>			
APC (Armoured Personnel Carrier)	408	152	-
PPV (Protected Patrol Vehicle)	120	-	-
IFV (Infantry Fighting Vehicle)	40	-	-
<i>Multiple Launch Rocket Systems (MLRS)</i>			
Soviet-type MLRS	20	-	dozens
NATO-type MLRS	15	4 units at least	-
<i>Tanks and anti-aircraft armoured fighting vehicle</i>			
Soviet-type	252	8	-
NATO-type	8	22	-
<i>Air-defense system</i>			
Air-defense systems	1	3	-
<i>Coastal defense system</i>			
Anti-ship missile systems	1	3	1
Coastal defense vessels	undisclosed	undisclosed	-
Coastal and riverine patrol boats	-	18	-
<i>Man-portable air-defense and anti-tank systems</i>			
MANPADS and anti- tank guided missiles	3,310 units at least	-	thousands
Other missile systems	36,031	8,750	-

Aircraft

Attack helicopters	0	7	-
Transport/Armed capable helicopters	16	4	-
Unspecified type of helicopters	undisclosed	undisclosed	-

Unmanned aerial systems

Combat drones	900	706	several dozens
Others	up to 125	200	-

Note: The data published by the Ministry of Defence of Ukraine (2022) includes deliveries of weapons as of June 9, 2022 (fourth column). Our data on weapon deliveries is as of August 3, 2022 (second column). See Appendix II and our database (sheet “Main dataset”) for further details and sources.

As can be seen in the last column, we benchmark our numbers to the aggregate numbers published on June 9 by the Ministry of Defence of Ukraine (2022). Compared to their list, we show additional weapon types, most importantly tanks and air-defense systems. Overall, our aggregated micro-level data of June and early August is roughly in line with the aggregates reported by the Ukrainian Ministry of Defense.

In a next step, we document weapon commitments and deliveries by country, focusing on the top 15 donor countries with respect to military aid (Tables 2-15). In addition, Appendix II provides a detailed overview of heavy weapon deliveries and commitments *by weapon type* including a documentation of sources on our delivery data.

Table 2. **United States:** committed vs. delivered weapons (main weapon types)

Weapon type	Committed	Delivered	Not (yet) delivered
M777 howitzer	until 15 June	108	18
HIMARS 142 multiple rocket launcher	until 22 July	12	4
National Advanced Surface-to-Air Missile System (NASAMS)	1 July		
Humvee Multipurpose Vehicles	Apr 13	100	-
M113 armored personnel carrier	Apr 13	200	-
Stinger	March 16	800	-
grenade launchers	March 16	100	-
Javelin anti-tank system	March 16	2,000	-
Javelin command launch	June 1	-	50
AT4 Anti-tank weapon	March 16	6000	-
Mi-17 military helicopter	until June 1	11	4
Switchblade drones	Apr 13	900	-
Puma drones	Apr 01	undisclosed	-
Phoenix Ghost drones	Apr 21	121 (partially)	-

Note: See Appendix II and our database (sheet “Main dataset”) for further details and sources. The table shows bilateral commitments and deliveries between January 24 and August 3, 2022.

Table 3. **United Kingdom:** committed vs. delivered weapons (main weapon types)

Weapon type	Committed	Delivered	Not (yet) delivered
M270 multiple rocket launcher	June 6	-	undisclosed
M109 A3GM 155mm howitzer	until June 6	-	40
Mastiff (6x6) protected patrol vehicle	Apr 09	120	-
Stromer armored vehicle	May 19	6	-
Anti-ship missile system	Apr 09	-	undisclosed
Hunt-class mine countermeasures vessel	August 1	-	2
Brimstone-1 missile	May 3	200	undisclosed
NLAW anti-tank system	until June 30	5,965	1,600
Starstreak	March 9	undisclosed	-
Lockheed Martin Desert Hawk	June 30	-	200
Heavy transport drone	May 5	undisclosed	-

Note: See Appendix II and our database (sheet “Main dataset”) for further details and sources. The table shows bilateral commitments and deliveries between January 24 and August 3, 2022.

Table 4. **Poland**: committed vs. delivered weapons (main weapon types)

Weapon type	Committed	Delivered	Not (yet) delivered
LMP-2017 60mm mortar	until April 5	100	-
AHS Krab self-propelled howitzer	May 29	18	-
T-72 tank	until May 5	240	
PT-91 Twardy tank	July 25	undisclosed	undisclosed
Piorun man-portable air-defense system	June 27	undisclosed	undisclosed
Javelin	until May 4	undisclosed	-
FlyEye	prior to Feb 24	undisclosed	-
Warmate	prior to Feb 24	undisclosed	-

Note: See Appendix II and our database (sheet “Main dataset”) for further details and sources. The table shows bilateral commitments and deliveries between January 24 and August 3, 2022.

Table 5. **Germany**: committed vs. delivered weapons (main weapon types)

Weapon type	Committed	Delivered	Not (yet) delivered
Panzerhaubitze 2000	May 4	10	-
Mars II multiple rocket launcher	June 1	3	-
armored vehicle (undisclosed)	until April 19	-	10
Strela missile	until April 19	2,000	-
Panzerfaust 3	until April 19	900	-
Gepard anti-aircraft tank	Apr 26	8	22
IRIS-T SLM air-defense system	June 1	-	1
Stinger missile	until April 19	500	-

Note: See Appendix III and our database (sheet “Main dataset”) for further details and sources. The table shows bilateral commitments and deliveries between January 24 and August 3, 2022.

Table 6. **Canada**: committed vs. delivered weapons (main weapon types)

Weapon type	Committed	Delivered	Not (yet) delivered
M777 howitzer	Apr 22	4	-
M72 rocket launcher	Feb 27	4,500	-
Armoured Combat Support Vehicles (ACSV)	June 30	-	39
Carl Gustaf M2 recoilless rifle	Feb 27	100	-
Roshel Senator (4x4) armored personnel carrier	Apr 21	8	-

Note: See Appendix II and our database (sheet “Main dataset”) for further details and sources. The table shows bilateral commitments and deliveries between January 24 and August 3, 2022.

Table 7. **Norway**: committed vs. delivered weapons (main weapon types)

Weapon type	Committed	Delivered	Not (yet) delivered
M109 A3GM 155mm howitzer	June 7	22	-
M72 rocket launcher	Feb 28 / March 31	4,000	-
IVECO LAV 3	July 29	14	-
Mistral launcher	Apr 20	undisclosed	undisclosed
Mistral missiles	Apr 20	100	-

Note: See Appendix II and our database (sheet “Main dataset”) for further details and sources.
The table shows bilateral commitments and deliveries between January 24 and August 3, 2022.

Table 8. **Estonia**: committed vs. delivered weapons (main weapon types)

Weapon type	Committed	Delivered	Not (yet) delivered
D-30 122 mm howitzer	February	undisclosed	-
Javelin	until June 6	undisclosed	-
Mambas (4x4) armored vehicle	until May 6	undisclosed	-
unspecified type of drone	May 5	dozens	-

Note: See Appendix II and our database (sheet “Main dataset”) for further details and sources.
The table shows bilateral commitments and deliveries between January 24 and August 3, 2022.

Table 9. **Netherlands**: committed vs. delivered weapons (main weapon types)

Weapon type	Committed	Delivered	Not (yet) delivered
Panzerhaubitze 2000	Untill June 28	5	3
YPR-765 infantry vehicle	Until April 19	undisclosed	undisclosed
Panzerfaust 3	Feb 26	50	-
Stinger	Feb 26	50	-

Note: See Appendix II and our database (sheet “Main dataset”) for further details and sources.
The table shows bilateral commitments and deliveries between January 24 and August 3, 2022.

Table 10. **Czech Republic:** committed vs. delivered weapons (main weapon types)

Weapon type	Committed	Delivered	Not (yet) delivered
DANA howitzer	Apr 22	20	-
RM-70	Apr 22	20	-
T-72 tank	until May 5	12	8
BVP-1 infantry fighting vehicle	Apr 05	5	-
Shoulder fired MANPAD	Feb 27	160	-
Mi-24 helicopter	May 23	-	7

Note: See Appendix II and our database (sheet “Main dataset”) for further details and sources.
The table shows bilateral commitments and deliveries between January 24 and August 3, 2022.

Table 11. **Latvia:** committed vs. delivered weapons (main weapon types)

Weapon type	Committed	Delivered	Not (yet) delivered
Stinger	until April 6	undisclosed	-
Unspecified unmanned system	until June 4	undisclosed	-
Unspecified type of helicopter	Apr 06	undisclosed	-

Note: See Appendix II and our database (sheet “Main dataset”) for further details and sources.
The table shows bilateral commitments and deliveries between January 24 and August 3, 2022.

Table 12. **Denmark:** committed vs. delivered weapons (main weapon types)

Weapon type	Committed	Delivered	Not (yet) delivered
M10 mortar	Apr 21	-	undisclosed
M113 armored personnel carrier	Apr 21	-	50
Harpoon anti-ship missile system	May 23	1	-
M72 rocket launcher	Apr 21	2,700	-
Stinger	Apr 22	300	-
Skywatch drone	Apr 22	25	-

Note: See Appendix II and our database (sheet “Main dataset”) for further details and sources.
The table shows bilateral commitments and deliveries between January 24 and August 3, 2022.

Table 13. **Australia:** committed vs. delivered weapons (main weapon types)

Weapon type	Committed	Delivered	Not (yet) delivered
M777 howitzer	April 28	6	-
Bushmaster protected mobility vehicle	until July 4	40	20
M113 armored personnel carrier	until July 4	14	14

Note: See Appendix II and our database (sheet “Main dataset”) for further details and sources.
The table shows bilateral commitments and deliveries between January 24 and August 3, 2022.

Table 14. **Sweden:** committed vs. delivered weapons (main weapon types)

Weapon type	Committed	Delivered	Not (yet) delivered
AT4 anti-tank system	until March 23 / June 2	10,000	5,000
RBS 17 anti-ship missile system	June 2	-	1

Note: See Appendix II and our database (sheet “Main dataset”) for further details and sources.
The table shows bilateral commitments and deliveries between January 24 and August 3, 2022.

Table 15. **France:** committed vs. delivered weapons (main weapon types)

Weapon type	Committed	Delivered	Not (yet) delivered
CAESAR howitzer	April 23	12	-

Note: See Appendix II and our database (sheet “Main dataset”) for further details and sources.
The table shows bilateral commitments and deliveries between January 24 and August 3, 2022.

Table 16. **Slovakia:** committed vs. delivered weapons (main weapon types)

Weapon type	Committed	Delivered	Not (yet) delivered
S-300	April 8	1	-
Mi-17 helicopter	June 16	4	-
Mi-2 helicopter	June 16	1	-

Note: See Appendix II and our database (sheet “Main dataset”) for further details and sources.
The table shows bilateral commitments and deliveries between January 24 and August 3, 2022.

7. Comparing Ukrainian demands to actual support

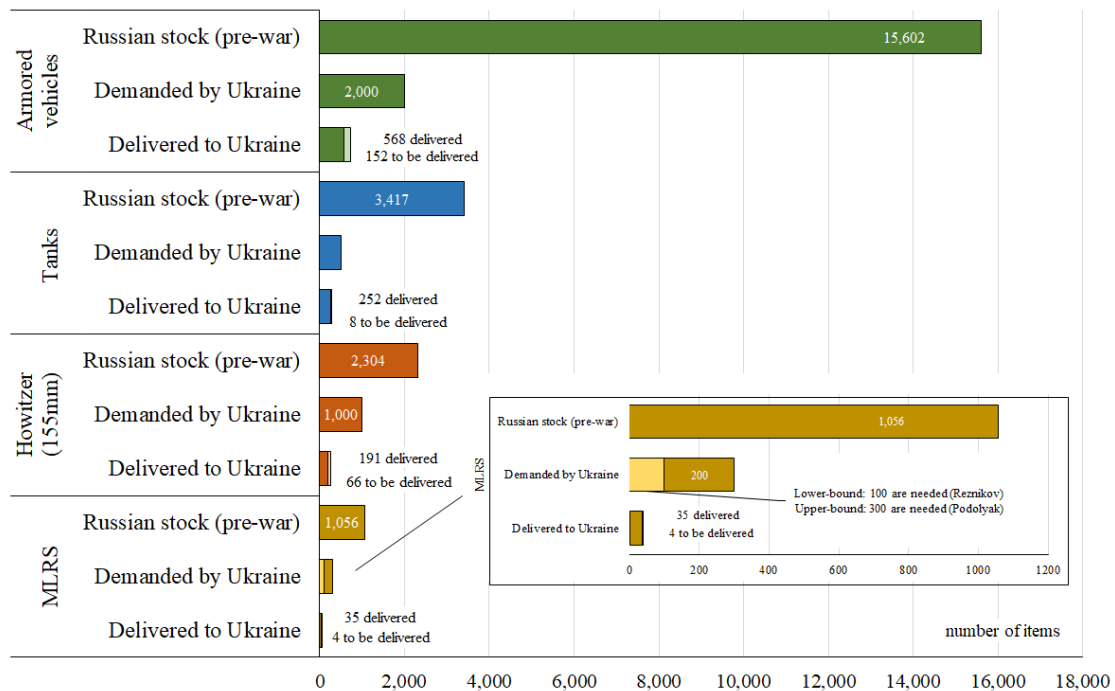
This section compares Ukraine's demands for external support to what has been delivered thus far. To quantify Ukraine's demands we draw on official statements by Ukrainian authorities and politicians.

For military demands, we follow the public debate and focus on four main weapon categories: Armored vehicles, Tanks, Howitzers (155mm) and Multiple Launch Rocket Systems (MLRS). As a first statement, we draw on that made by Mykhailo Podolyak, adviser to the president of Ukraine, who wrote on June 13 that Ukraine needs 1000 155mm howitzers, 300 MLRs, 500 tanks, and 2000 armored vehicles "to end this war" (Podolyak, M. 2022). Moreover, Ukrainian Minister of Defense Oleksii Reznikov, said in July that Ukraine needs at least 100 MLRs (Atlantic Council 2022). We use those numbers as a benchmark for the needs of Ukraine. As an additional benchmark we use Russian stocks of each weapon type (pre-war) as reported by the IISS Military Balance study (IISS 2022).³⁶

Figure 7 shows the resulting comparison. In total, as of August 3, Ukraine received 568 armored vehicles (152 more to be delivered), 252 tanks (8 more to be delivered), 191 155mm howitzer (66 more to be delivered), and 31 MLRs (8 more to be delivered). These numbers are well below those demanded by Ukraine and only a fraction compared to what Russia held in stock pre-war according to the IISS.

³⁶ Please note that we use pre-war military equipment not labelled as "in-store" or "held away from front-line".

Figure 7. Military aid gap: weapon support to Ukraine in comparison with Ukrainian demands and pre-war Russian stocks
Disclosed bilateral commitments and deliveries between January 24 and August 3, 2022



Note: This figure shows deliveries and commitments of in-kind military support alongside Ukrainian demands and pre-war Russian stocks (number of items) across four weapon categories: armored vehicles, tanks, howitzers (155mm), and MLRS (multiple launch rocket systems). The Ukrainian demands are taken from a statement of Mykhailo Podolyak, advisor to President Zelensky, made on June 13, 2022 (Podolyak 2022), and a statement of the Ukrainian Minister of Defense published on July 19, 2022 (Atlantic Council 2022). The data on Russian stocks comes from the “IISS Military Balance Report 2022” (IISS 2022) and refer to pre-war equipment not labeled as “in-store” or “held away from front-line units”. We consider commitments and deliveries to Ukraine between January 24 and August 3, 2022. See the main text for details on data collection and sources on outstanding deliveries.

As a next step, we aim to shed light on the gap between financial demands and needs. We start by looking at the delays in disbursing financial aid, which are substantial. For this purpose, we compared our data on financial commitments with data on the received budget financing during the war from the Ministry of Finance of Ukraine (2022). Their data includes information on the total value of budget financing received during the war through domestic government bonds, assistance from international financial institutions (IFIs) and bilateral loans and grants between February 24 and August 3, 2022.³⁷

One challenge for this comparison lies in different categorizations of assistance. We categorize financial aid depending on whether it is intended for financial, humanitarian or military purposes. In contrast, the Ministry of Finance aims to measure any form of financial assistance for *budgetary support*. For an apples-to-apples comparison, we therefore reclassify our data on financial commitments so as to only consider commitments for budgetary support. For this purpose, we downloaded and coded all press releases issued by the Ukrainian Ministry of

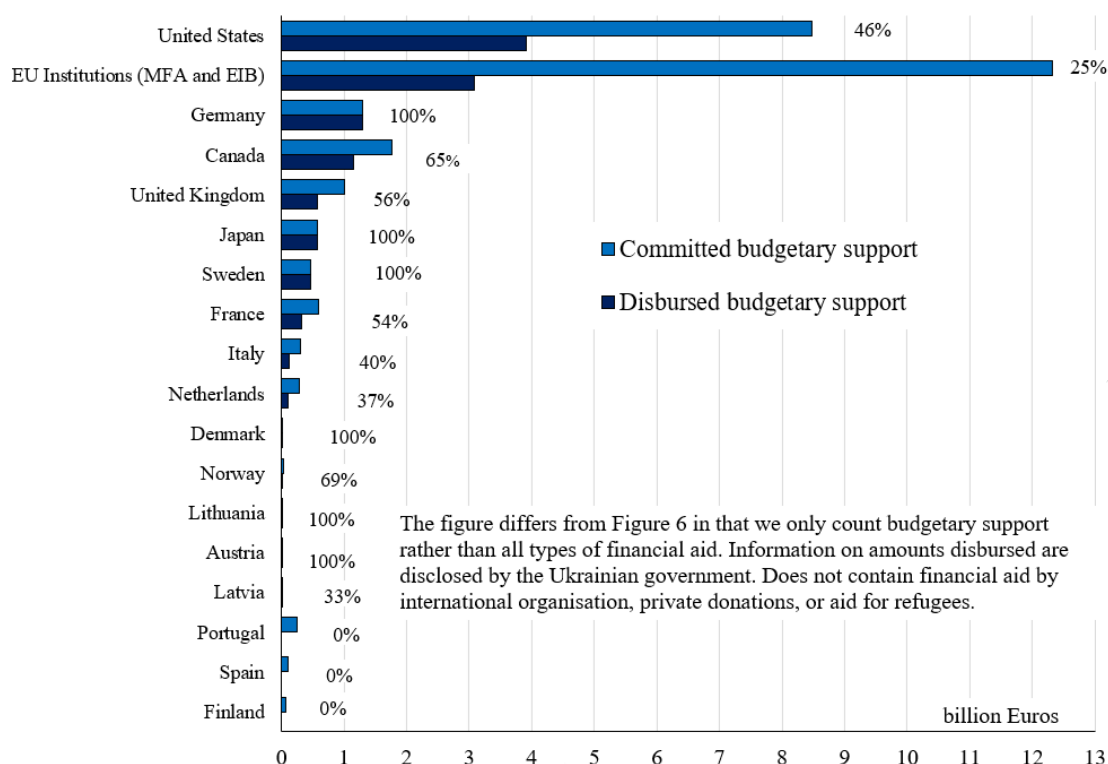
³⁷ [https://mof.gov.ua/en/news/ukraines state budget financing since the beginning of the full-scale war-3435](https://mof.gov.ua/en/news/ukraines%20state%20budget%20financing%20since%20the%20beginning%20of%20the%20full-scale%20war-3435).

Finance and linked that information with our own loan-by-loan and grant-by-grant data. The following comparison between financial commitments and disbursements therefore refers only to the part of commitments that is budgetary support, resulting in different numbers than in previous graphs (e.g. Figure 2).

Figure 8 shows the result of our reclassification of financial aid to Ukraine. For each donor, we compare the amounts of budgetary support committed (light blue bars, from our reclassified data) to the amount disbursed (dark blue bars, from the Ukrainian Ministry of Finance).

In total only 43.5% of the foreign budgetary support that has been promised to Ukraine has actually been disbursed by August 3, namely €13.98 billion out of a total committed sum of €32.12 billion. The gap between disbursement of commitments is large for all of the big donors. In absolute numbers it is largest for the EU Institutions (€3.09 billion disbursed out of €12.32 billion committed, a share of 25%), the United States (€3.92 billion disbursed out of a total of €8.48 billion committed, a share of 46%), Canada (€1.15 billion disbursed out of €1.77 billion committed, a share of 65%), the United Kingdom (€0.57 billion disbursed out of €1.01 billion committed, a share of 53%), France (€0.33 billion disbursed out of €0.6 billion committed, a share of 54%), and Italy (€0.12 billion disbursed out of €0.31 billion committed, a share of 40%).

Figure 8. Foreign budgetary support: commitments vs. disbursements in € billion
Bilateral commitments January 24 to August 3, 2022

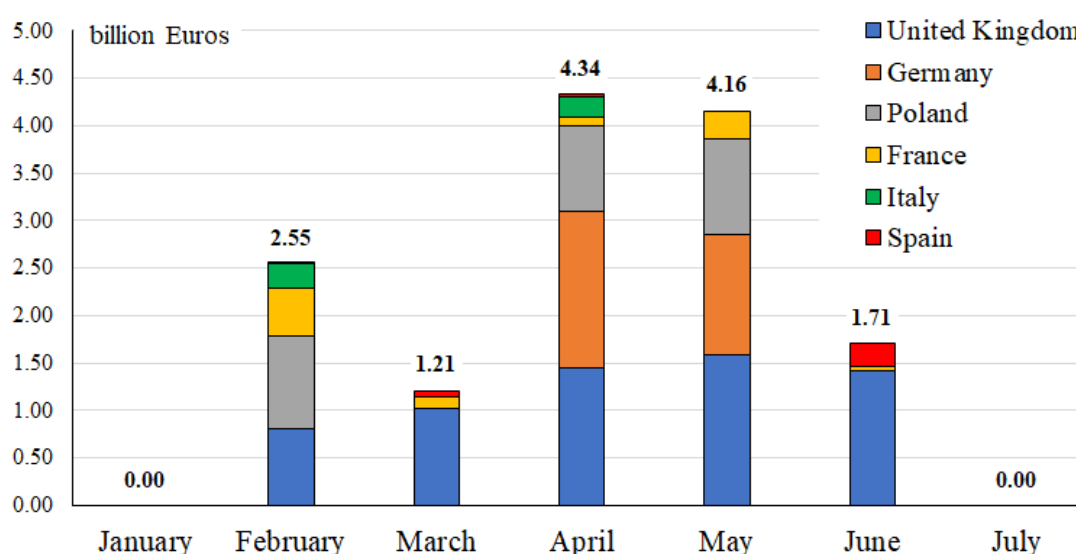


Note: This figure shows a ranking of the 17 bilateral donors that have offered foreign budgetary support to Ukraine between January 24 and August 3, 2022 (bilateral disclosed financial commitments only, in billion Euros). The light blue bars indicate the total value of budget support commitments. The dark blue bars show the value of disbursed budget support. The data for disbursements comes from the Ministry of Finance of Ukraine (2022). See the main text for details on data collection and sources.

We next compare total budgetary aid with Ukraine’s budgetary needs. As a benchmark, we use estimates provided by the National Bank of Ukraine that were also picked up by the IMF. According to them, the Ukrainian government needs at least US\$5 billion per month to cover the high costs of war (e.g. soldiers pay, damage repair, etc.) and the collapse in tax revenues. We then sum this demand over the first five months of the war (March to July), which adds up to 24.6 billion Euros (converted from US\$). In comparison, total budgetary support disbursed from abroad adds up to 14 billion Euros. This gap of more than 10 billion Euros had to be financed with domestic borrowing, thereby adding to inflationary pressures and the decision to drastically increase the central bank’s interest rates to a record rate of 25%.

In recent months, the gap between delivered and demanded aid has only widened further. A main explanation is that new commitments have decreased considerably. This is illustrated in Figure 9, which shows new commitments by six largest European countries in terms of population size (more than 30 million habitants). As can be seen, the total new donations in June had already fallen well below the levels of April and May. In July we record no new bilateral aid at all. This strong decrease in new commitments is also visible in the aggregate data, i.e. when considering all 40 countries in our database.

Figure 9. Support by the Largest European Countries: Total commitments over time
Total bilateral commitments between January 24 to August 3, 2022 by country



Note: This figure shows total (i.e. humanitarian, financial and military) new commitments to Ukraine pledged by the six largest European countries by month. Poland’s €1.8 billion military aid package (donation ID PLM2) is distributed equally across April and May. See the main text for details on data collection and sources.

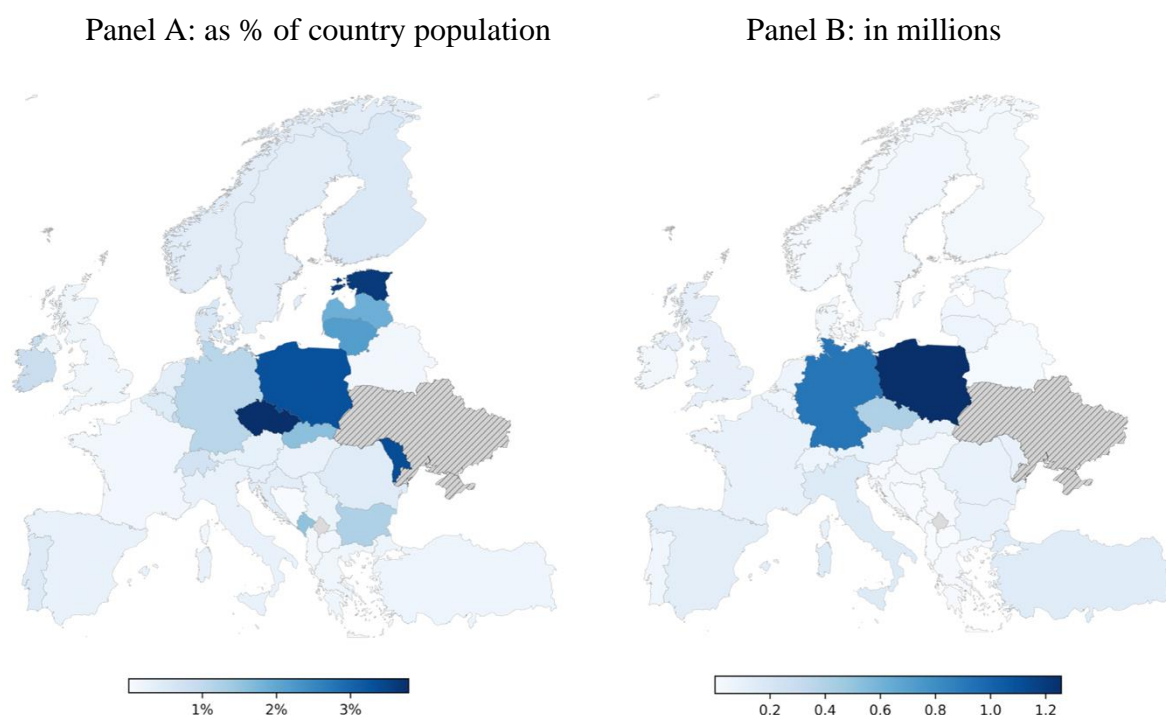
8. Support for Ukrainian Refugees abroad

With over four million people fleeing Ukraine until August 3, 2022, the Russia-Ukraine war has caused the largest European refugee crisis since WWII (Harding 2022). The support of neighboring countries to welcome and host Ukrainian refugees is not to be underestimated, but quantifying and comparing the value of this support is hard.

A first challenge is the data on refugee numbers. The United Nations provides country-level estimates on the number of individual refugees from Ukraine recorded across Europe (UNHCR 2022a).³⁸ However, it provides data for flows until August 3 only for Ukraine’s direct neighbors, meaning Poland, Romania, Moldova, Slovakia, Hungary, and Belarus. The data for the remaining countries is scattered in time, coming at the cost of less consistent estimates of total refugee costs together with free movement within the Schengen area and some refugees returning to Ukraine.

In Figure 10, we show the distribution of Ukrainian refugees across Europe. The left panel shows the number of incoming Ukrainian refugees as a share of total population, while the right panel shows the number of refugees in millions. In absolute numbers, Poland clearly ranks first among European countries, being the only country hosting over one million Ukrainian refugees. Germany follows in 2nd place with 915,000 refugees, while the Czech Republic (404,839), Italy (157,309) and Turkey (145,000) are in 3rd, 4th, and 5th place respectively. When taking into account the population size in each welcoming country, the Czech Republic tops the list (with a share of 3.78%), Estonia comes 2nd (3.63%), followed by Poland (3.31%) and Lithuania (2.17%). Taken together, Eastern European countries tend to stand out in terms of population share of incoming refugees.

Figure 10. Individual refugees from Ukraine recorded across Europe until August 3, 2022



Note: This figure shows the number of incoming individual Ukrainian refugees by country (right panel) and the corresponding population share in welcoming countries (left panel) between February 24 and August 3, 2022. The data comes from UNHCR (2022a).

³⁸ In previous releases, we have used the number of *border crossings* from Ukraine to estimate the total cost of hosting refugees in Ukraine’s *direct neighbor countries*. UNHCR (2022a) now also reports the (typically lower) number of recorded *individual refugees* for these countries, which we now use in this section.

An even greater challenge is to calculate the actual costs incurred by governments. To our knowledge, there is no internationally comparable database or reliable estimates on the cost of hosting refugees, e.g., for schooling, medical expenses or social transfers, especially not for Eastern European countries. Some numbers exist from previous refugee crises, mostly from high income countries in Western Europe. Darvas (2022), for example, explains that annual refugee costs range between €9,000 and €25,000 (converted to 2022 prices), which translates into monthly costs between €750 and €2,083 (see also Ruist 2016 for the case of Sweden). Indeed, the variation across countries is large. Pisani-Ferry (2022) estimates annual refugee costs of €13,500 based on budgetary expenses in Germany for (mostly Afghan and Syrian) refugees in 2016. According to the European Commission (2016), annual refugee costs (converted to 2022 prices) correspond to €20,700 in Sweden, €16,400 in Austria, €15,900 in Germany, €15,100 in Finland, €15,200 in Belgium, €22,500 for the Netherlands and €9,400 for Greece. Finally, the OECD (2015) suggests that the cost of processing and accommodating asylum seekers can range between €8,000 and €12,000 (2015 prices).

These existing estimates are of limited use in the context of the Ukraine-Russia war, for several reasons. First, most Ukrainian refugees are hosted by Eastern European countries, which have lower average incomes and lower average expenses for social security compared to Western European countries. The government expenses for refugees in Lithuania or Romania is likely to be significantly lower than in Sweden or the Netherlands. Second, Ukrainian refugees differ from the average asylum seeker in Western Europe. They reportedly have a high level of education and skills and partly continue to work for their Ukrainian employers remotely (Hofmann 2022). Third, the refugees often have savings and assets and therefore do not apply for state support (Pandey 2022). Fourth, there is anecdotal evidence that a considerable part of the help for Ukrainian refugees in countries like Poland has been in-kind and incurred by private households rather than by the government (Duszczuk 2022). It therefore does not seem adequate to use monthly government costs of up to €2000 per person, but there are no good alternative estimates either.

Given these limitations, we had originally opted not to include estimates on refugee costs in the first versions of this paper and dataset. Indeed, conceptually, our database focuses on support flowing *into* Ukraine, which naturally does not include refugee hosting costs outside of Ukraine. To nevertheless get a rough idea of the scale of support of hosting Ukrainian refugees, we however decided to provide back-of-the-envelope estimates on government costs starting with the third release of the database. In this sixth release, we estimate refugee costs between February 24 and August 3, 2022, and then combine these rough estimates with our data on bilateral commitments to Ukraine.

As a *baseline*, we assume government costs of €500 for hosting one Ukrainian refugee per month. To reiterate, this number is not backed by reliable data or evidence. Instead, we chose this number ad hoc, largely based on anecdotal evidence. For example, the government of Latvia explains that official transfers to refugees range between a minimum of €266 and a

maximum of €881 per month (Republic of Latvia 2022).³⁹ Our ad hoc assumption of €500 per person and month lies roughly between these two bounds. Similarly, the government of Poland, announced monthly support transfers per refugee ranging between PLN 647 and 1,376 per month (equivalent to €140 and €300) and this does not include potential medical costs or school costs.⁴⁰ All included, the maximum monthly *in-cash* allowance given by Poland to Ukrainian refugees corresponds to around €570 according to UNHCR (2022b).

We also compute costs using an *upper and lower bound* of monthly government expenses per refugee. For this purpose, we choose €250 and €750, respectively, again pretty much ad hoc. The lower bound is close to the size of potential cash transfer offered to refugees in Poland and also to the minimum income currently offered to refugees by Latvia. The upper bound is close to Latvia's maximum transfer and corresponds to the lower bound reported for high income countries by the OECD (2015), the European Commission (2016) and Darvas (2022).

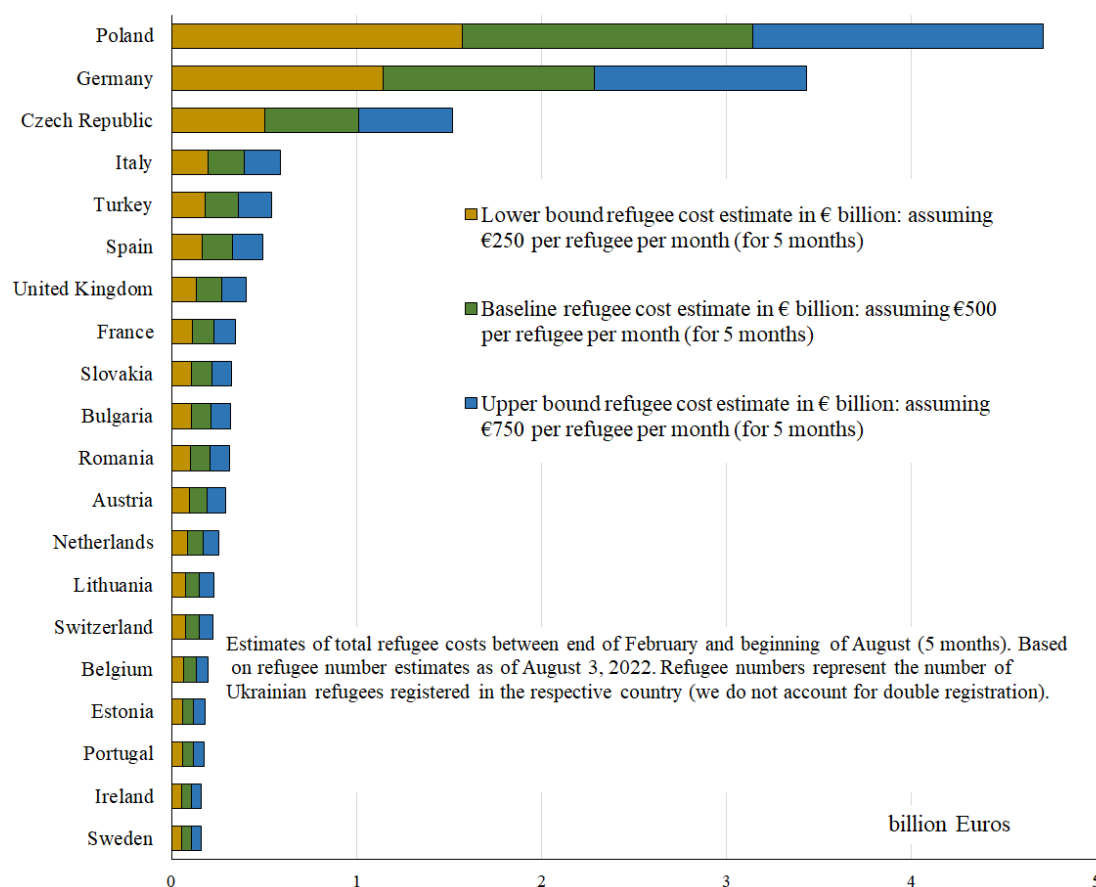
This said, the upper bound of €750 per person/month seems high, not least because the EU has announced large financial transfers for countries hosting Ukrainian refugees. Specifically, on April 4, 2022, the Council of the European Union adopted the Cohesion's Actions for Refugees in Europe (CARE) and also amended the use of 2014-2020 home affairs funds and of the 2021-2027 Asylum, Migration and Integration Fund. Among other aspects, the legislation allows EU members to use up to €9.5 billion under the 2022 tranche of REACT-EU (an EU public investment program in response to the Covid-19 pandemic) for refugee expenses. Effectively, these decisions release more than €17 billion for EU countries to reimburse them for the costs of welcoming and accommodating Ukrainian refugees (European Council 2022e).

With all these caveats in mind, we create Figure 11, which shows our rough cost estimates across countries between February 24 and August 3, using estimates of €250, €500, and €750 for *monthly* refugee cost, respectively. The total refugee cost is computed based on the number of Ukrainian refugees in each country (as of August 3) times 5, which is the number of months since the beginning of the war until August 3. As one can see from the figure, the country estimated to incur by far the highest cost is Poland (€3.14 billion at the baseline cost of €500 per person/month), followed by Germany (€2.28 billion), Czech Republic (€1.02 billion) and Italy (€ 400 million).

³⁹ The minimum is calculated based on the guaranteed minimum income per person, e.g. contributions to a child or to another dependent family member. The maximum captures the contribution given to an adult willing to work and requesting a start-up employment allowance.

⁴⁰ See <https://www.gov.pl/web/family/social-assistance-for-foreigners-what-kind-of-support-in-poland-can-they-expect>.

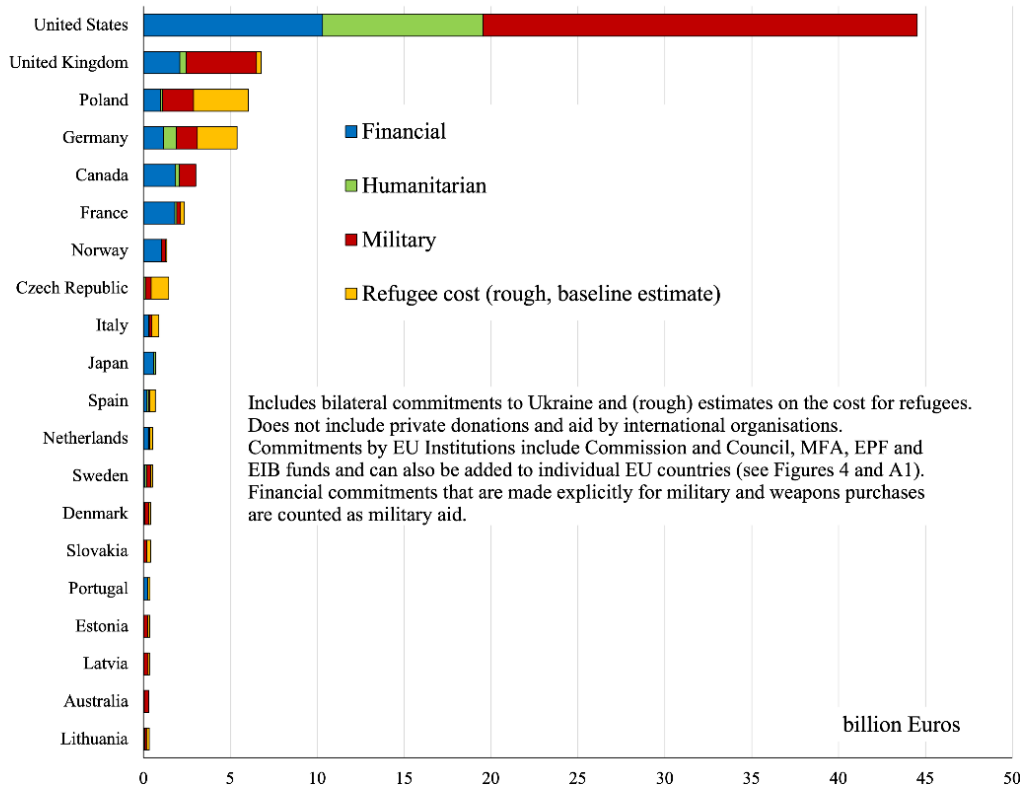
Figure 11. Rough cost estimates for hosting Ukrainian refugees in billion Euros
(top 20 of 40 countries)



Note: This figure shows the total costs paid by each country for welcoming refugees until August 3, 2022. The total cost has been computed by using country-level data provided by UNHCR (2022a) on Ukrainian refugees, along with three different estimates for monthly refugee cost (€250, €500, and €750). See the main text for details.

We next add the estimated refugee costs to other types of support from Figure 2, using the baseline assumption of €500 per refugee and month. The resulting country ranking is shown in Figure 12, with limited changes compared to the main Figure 2 above. The United States remains in first place (€44.53 billion), still followed by the United Kingdom with €6.78 billion, Poland (€6.03 billion) and Germany (€5.39 billion). Notably, the Czech Republic now moves up to 8th place, with overall aid equal to €1.46 million, of which €1.01 million are our (roughly estimated) costs for hosting refugees.

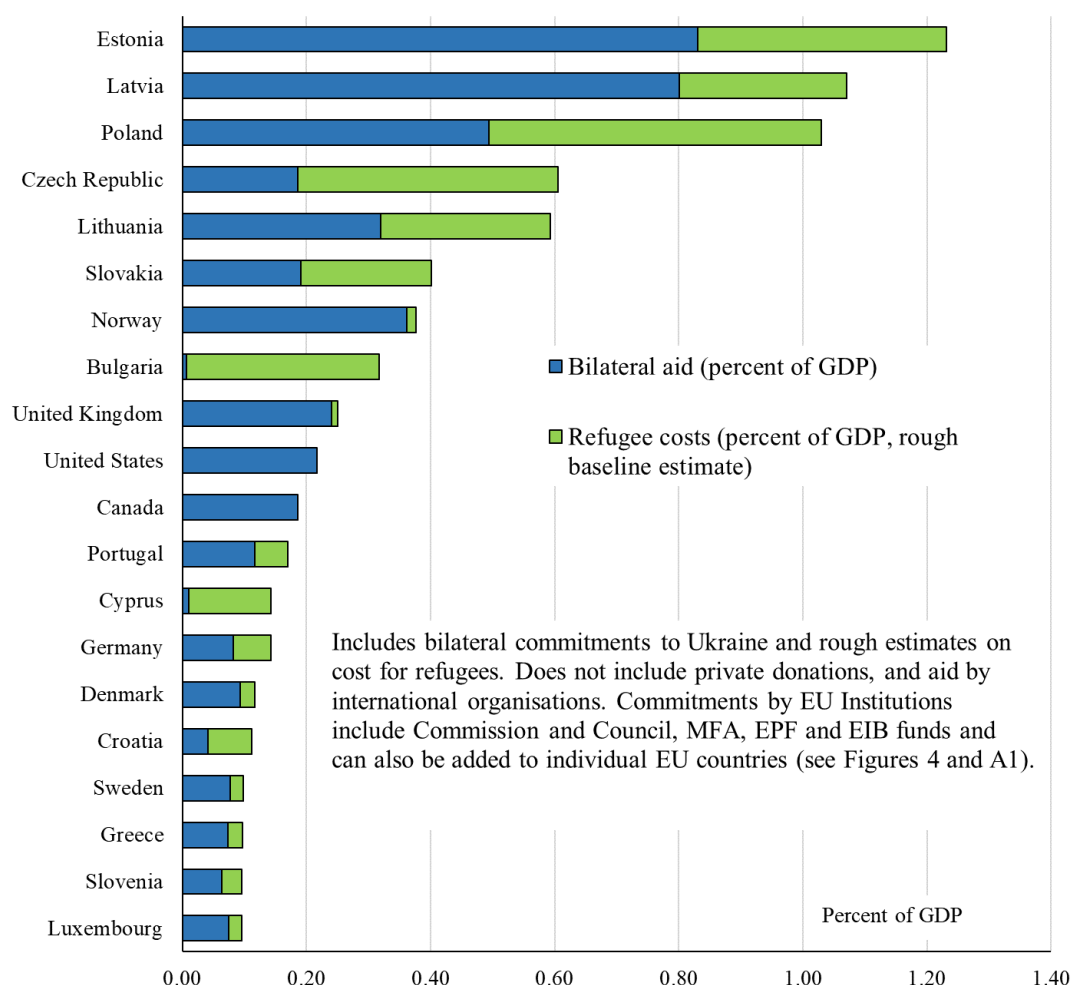
Figure 12. Adding bilateral aid and rough refugee cost estimate
(top 20 of 40 donor countries)



Note: This figure shows aid to Ukraine and incoming Ukrainian refugees until August 3, 2022. Each bar besides illustrates the type of assistance, meaning financial assistance (loans, grants, guarantees, and swap lines), humanitarian aid (assistance directed to the civilian population including food and medical items), and military assistance (arms, equipment, and utilities provided to the Ukrainian military). Military aid includes direct financial assistance that is tied to military purposes. Assistance to refugees is estimated with country-level data provided by UNHCR (2022a), and an estimate of the monthly cost per refugee of €500 (see main text).

Finally, we show Figure 13 which includes estimated refugee costs and shows the ranking as percent of each country's GDP. The ranking does again not change much when compared to Figure 3, with the most notable change being Bulgaria.

Figure 13. Government support including estimated refugee costs - percent of donor GDP
(top 20 of 40 donor countries)



Note: This figure shows the bilateral aid committed to Ukraine and the assistance provided to Ukrainian refugees until August 3, 2022, all in percent of the donor country's GDP. Assistance to refugees is estimated with country-level data provided by UNHCR (2022a), and an estimate of the monthly cost per refugee of €500. The data on GDP (current US\$) is for 2020 and is taken from the World Bank. See the main text for details on data collection and sources.

9. Concluding Remarks

This paper introduces and updates the “Ukraine Support Tracker”, which provides a comprehensive picture of the assistance offered by Western donors to Ukraine since the escalation of the conflict between Russia and Ukraine on January 24 2022, and up until August 3, 2022. Our dataset tracks €84.2 billion of financial, humanitarian, and military aid committed to Ukraine since January 24, 2022. In the coming weeks, we plan to continuously improve and expand the database and this working paper. For this purpose, we very much welcome comments and suggestions to ukrainetracker@ifw-kiel.de.

References

- Adamowski, J. (2022). Poland confirms T-72 tank delivery to Ukraine, with Challenger 2 tanks to fill gap. <https://www.defensenews.com/land/2022/04/26/poland-confirms-t-72-tank-delivery-to-ukraine-with-challenger-2-tanks-to-fill-gap/>. April 26, 2022.
- Alhas, A. M. (2022). Europe to send €500 million worth of lethal, non-lethal supplies to Ukraine. <https://www.aa.com.tr/en/europe/europe-to-send-500m-worth-of-lethal-non-lethal-supplies-to-ukraine/2517466>. February 28, 2022.
- Allison, G. (2022). Britain sending anti-aircraft and Javelin missiles to Ukraine. <https://ukdefencejournal.org.uk/britain-sending-anti-aircraft-and-javelin-missiles-to-ukraine/>. March 9, 2022.
- Atlantic Council (2022). A conversation with Minister of Defense of Ukraine Oleksii Reznikov. <https://www.atlanticcouncil.org/event/a-conversation-with-oleksii-reznikov/>. July 19, 2022.
- Bachmann, R., Baqaee, D., Bayer, C., Kuhn, M., Löschel, A., Moll, B., Peichl, A., Pittel, K. & Schularick, M. (2022). What if? The Economic Effects for Germany of a Stop of Energy Imports from Russia. *ECONtribute*, Report No. 28, 1-15.
- Barnes, J. E. & Ismay, J. (2022). U.S. Add ‘Kamikaze Drones’ as More Weapons Flow to Ukraine. <https://www.nytimes.com/2022/03/16/us/politics/us-ukraine-weapons-drones.html>. March 16, 2022.
- Becker, T., Eichengreen, B., Gorodnichenko, Y., Guriev, S., Johnson, S., Mylovanov, T., Rogoff, K. & Weder di Mauro, B. (2022). A Blueprint for the Reconstruction of Ukraine. *CEPR Press*, April 8, 2022, 1-31.
- Brien, P. & Loft, P. (2022). Ukraine crisis 2022: Aid and refugees. <https://commonslibrary.parliament.uk/research-briefings/cbp-9467/>. March 17, 2022.
- Buzby, J. C., Wells, H. F. & Hyman, J. (2014). The Estimated Amount, Value, and Calories of Postharvest Food Losses at the Retail and Consumer Levels in the United States. https://www.ers.usda.gov/webdocs/publications/43833/43679_eib121_summary.pdf?v=5978.7. February 2014.
- Chazan, G. & Minder, R. (2022). Germany and east European allies struggle to seal deals over Ukraine-bound weapons. <https://www.ft.com/content/f8b1b0b1-237e-4a91-b782-6ec49aac6308>. July 28, 2022.
- Clark, D. (2022). Amount contributed to the budget of the European Union in 2020, by member state. <https://www.statista.com/statistics/316691/eu-budget-contributions-by-country/>. February 22, 2022.
- Congressional Research Service (2021). Ukraine: Background, Conflict with Russia, and U.S. Policy. <https://sgp.fas.org/crs/row/R45008.pdf>. October 5, 2021.
- Congressional Research Service (2022). U.S. Security Assistance to Ukraine. <https://crsreports.congress.gov/product/pdf/IF/IF12040>. March 28, 2022.
- Curtis, J. & Mills, C. (2022). Military Assistance to Ukraine since the Russian invasion. <https://researchbriefings.files.parliament.uk/documents/CBP-9477/CBP-9477.pdf>. March 23, 2022.
- Dahm, J. (2022). Slowenien übernimmt Teilschuld am langsamen Ringtausch. <https://www.euractiv.de/section/eu-aussenpolitik/news/slowenien-uebernimmt-teilschuld-am-langsamen-ringtausch/>. July 13, 2022.

Dalton, M. (2022). France Won't Detail Military Support to Ukraine to Avoid Provoking Russia. <https://www.wsj.com/livecoverage/russia-ukraine-latest-news-2022-03-09/card/france-won-t-detail-military-support-to-ukraine-to-avoid-provoking-russia-V1csLhxaNQh4Ymoeyq7g>. March 9, 2022.

Danish Ministry of Defence (2022). Ukraine, The United Kingdom and Denmark are hosting an international donors conference in Copenhagen. <https://www.fmn.dk/en/news/2022/ukraine-storbritannien-og-danmark-er-varter-for-international-donorkonference-i-kobenhavn/>. August 16, 2022.

Darvas, Z. (2022). Bold European Union action is needed to support Ukraine's refugees. <https://www.bruegel.org/blog-post/bold-european-union-action-needed-support-ukrainian-refugees>. April 6, 2022.

Duszczyk, M. (2022). Ukrainian refugees in Poland: current situation and what to expect. <https://freepolicybriefs.org/2022/03/17/ukrainian-refugees-in-poland/>. March 17, 2022.

DZI (2022). Bereits 631 Millionen Euro Geldspenden für die Ukraine-Hilfe. <https://www.dzi.de/pressemitteilungen/bereits-631-millionen-euro-geldspenden-fuer-die-ukraine-hilfe/>. March 25, 2022.

European Commission (2016). An Economic Take on Refugee Crisis. https://ec.europa.eu/info/sites/default/files/file_import/ip033_en_2.pdf. July, 2016.

European Commission (2022a). Ukraine. Macro-financial assistance. Emergency MFA. https://economy-finance.ec.europa.eu/international-economic-relations/candidate-and-neighbouring-countries/neighbouring-countries-eu/neighbourhood-countries/ukraine_en. April 13, 2022.

European Commission (2022b). EU disburses €600 million in Macro-Financial Assistance to Ukraine. https://ec.europa.eu/commission/presscorner/detail/en/IP_22_3183. May 20, 2022.

European Commission (2022c). Ukraine: Commission presents plans for the Union's immediate response to address Ukraine's financial gap and the longer-term reconstruction. https://ec.europa.eu/commission/presscorner/detail/en/ip_22_3121. May 18, 2022.

European Commission (2022d). Ukraine: Commission presents plan for the Union's immediate response to address Ukraine's financing gap and the longer-term reconstruction. https://ec.europa.eu/commission/presscorner/detail/en/ip_22_3121. May 18, 2022.

European Commission (2022e). Stand Up For Ukraine: €9.1 billion pledged in support of internally displaced and refugees. https://ec.europa.eu/commission/presscorner/detail/en/IP_22_2382. April 9, 2022.

European Commission (2022f). European Commission's support to Ukraine. https://ec.europa.eu/commission/presscorner/detail/en/IP_14_219. March 5, 2022.

European Commission (2022g). The European Union and Ukraine. https://neighbourhood-enlargement.ec.europa.eu/system/files/2022-01/20220124-Ukraine_factograph.pdf. January 24, 2022.

European Council (2022a). EU to support Ukraine: Council doubles funding under the European Peace Facility. <https://www.consilium.europa.eu/en/press/press-releases/2022/03/23/eu-support-to-ukraine-council-doubles-funding-under-the-european-peace-facility/>. March 23, 2022.

European Council (2022b). EU support to Ukraine: Council agrees on third tranche of support under the European Peace Facility for total €1.5 billion. <https://www.consilium.europa.eu/en/press/press-releases/2022/04/13/eu-support-to-ukraine-council-agrees-on-third-tranche-of-support-under-the-european-peace-facility-for-total-1-5-billion/>. April 26, 2022.

European Council (2022c). EU support to Ukraine: Council agrees on further increase of support under the European Peace Facility. <https://www.consilium.europa.eu/en/press/press-releases/2022/05/24/eu-support-to-ukraine-council-agrees-on-further-increase-of-support-under-the-european-peace-facility/>. May 24, 2022.

European Council (2022d). European Peace Facility: EU support to Ukraine increased to €2.5 billion. <https://www.consilium.europa.eu/en/press/press-releases/2022/07/22/european-peace-facility-eu-support-to-ukraine-increased-to-2-5-billion/>. July 22, 2022.

European Council (2022e). Ukraine: €17 billion of EU funds to help refugees. <https://www.consilium.europa.eu/en/press/press-releases/2022/04/04/ukraine-council-unlocks-17-billion-of-eu-funds-to-help-refugees/>. April 4, 2022.

European Parliament (2022). How the EU is supporting Ukraine. <https://www.europarl.europa.eu/news/en/headlines/world/20220127STO22047/how-the-eu-has-been-supporting-ukraine>. April 7, 2022.

European Union (2012). Consolidated versions of the Treaty on European Union and the Treaty on the Functioning of the European Union. *Official Journal of the European Union*, C 326, 1-390.

European Union (2022). European Investment Bank approves €668 million immediate financial support to Ukraine. <https://euneighbourseast.eu/news/latest-news/eib-board-approves-e668-million-immediate-financial-support-to-ukraine/>. March 7, 2022.

Federal Foreign Office (2022). Germany – a reliable partner. <https://www.deutschland.de/en/topic/politics/germany-ukraine-partnership-and-support>. February 1, 2022.

Foreign Assistance Act, 22 U.S.C. 2321j (1961). [https://uscode.house.gov/view.xhtml?req=\(title:22%20section:2321j%20edition:prelim](https://uscode.house.gov/view.xhtml?req=(title:22%20section:2321j%20edition:prelim).

Foreign Assistance Act, 22 U.S.C. 2318 (1961). [https://uscode.house.gov/view.xhtml?req=\(title:22%20section:2318%20edition:prelim](https://uscode.house.gov/view.xhtml?req=(title:22%20section:2318%20edition:prelim).

Fotidiadis, A. & Schmidt, N. (2022). The European Peace Facility, an unsecured gun on EU's table. <https://www.investigate-europe.eu/en/2022/european-peace-facility-controversy/>. March 29, 2022.

Fraňková, R. (2022). Czech Republic to send more arms to Ukraine. <https://english.radio.cz/czech-republic-send-more-arms-ukraine-8745032>. March 16, 2022.

Gebauer, M. (2022). Ukraine-Krieg: Deutschland lieferte Ukraine bisher Waffen für 37 Millionen Euro. <https://www.spiegel.de/politik/deutschland/ukraine-krieg-deutschland-lieferte-waffen-fuer-37-millionen-euro-a-460a7b35-70aa-40bb-8ec7-80f5606f0d5a>. March 24, 2022.

Gebauer, M. & von Hammerstein, K. (2022). Wo es beim Panzer-Ringtausch mit Slowenien hakt. <https://www.spiegel.de/politik/deutschland/ukraine-waffenlieferungen-wo-es-beim-panzer-ringtausch-mit-slowenien-hakt-a-f9e764c1-df3c-4a70-bfc3-8b49fe7b4beb>. May 6, 2022.

Giucci, R. & Zachmann, G. (2014). Eastern promises: The IMF-Ukraine bailout. <https://www.bruegel.org/blog-post/eastern-promises-imf-ukraine-bailout>. March 27, 2022.

Government of Canada (2022a). Canada's leadership in the world. <https://budget.gc.ca/2022/report-rapport/chap5-en.html> April 7, 2022.

Government of Canada (2022b). Canada's engagement in Ukraine. <https://www.international.gc.ca/country-pays/ukraine/relations.aspx?lang=eng>. April 1, 2022.

Government of Canada (2022c). Government of Canada announces loan of up to CAD 120 million to support Ukraine's economic resilience and development. <https://www.canada.ca/en/global-affairs/news/2022/01/government-of-canada-announces-loan-of-up-to-120-million-to-support-ukraines-economic-resilience-and-development.html>. April 28, 2022.

Gronholt-Pedersen, J. (2022). Western countries pledge \$1.55 bln in military aid to Ukraine. <https://www.reuters.com/world/europe/denmark-will-contribute-additional-110-mln-euros-ukraine-pm-2022-08-11/>. August 16, 2022.

Grylls, G. & Swinford, S. (2022). PM plans tank swap in defence of Ukraine. <https://www.thetimes.co.uk/article/pm-plans-tank-swap-in-defence-of-ukraine-c7dgnbknb>. April 26, 2022.

G7 Germany (2022). G7 finance ministers and central bank governors Petersburg communiqué. <https://www.bundesregierung.de/resource/blob/998440/2042892/0e49b3d6176a9c79de0a27ab1d6d2b15/2022-05-20-g7-finanzminister-en-data.pdf?download=1>. May 20, 2022.

Harding, L. (2022). "We couldn't stand it": the Ukrainians travelling for days to flee Russian bombs and rockets. <https://www.theguardian.com/world/2022/mar/08/we-couldnt-stand-it-the-ukrainians-travelling-for-days-to-flee-russian-bombs-and-rockets>. March 8, 2022.

Hauck, U. & Küstner, K. (2022). Warum der Ringtausch nicht funktioniert. <https://www.tagesschau.de/inland/innenpolitik/ringtausch-101.html>. July 20, 2022.

Hofmann, M. (2022). Getting Ukrainian refugees into work: the importance of early competence check. <https://www.icmpd.org/blog/2022/getting-ukrainian-refugees-into-work-the-importance-of-early-competence-checks>. March 28, 2022.

Horn, S., Reinhart, C. M. & Trebesch, C. (2020). Coping with Disasters: Two Centuries of International Official Lending. *NBER Working Paper*, No. 27343, 1-66.

House Committee on Appropriations (2022). DeLauro applauds senate passage of legislation to provide additional support to Ukraine. <https://appropriations.house.gov/news/press-releases/delauro-applauds-senate-passage-of-legislation-to-provide-additional-support-to%201%20%22::~:~:text=WASHINGTON%20-%20The%20Senate%20today%20passed,Russia's%20unprovoked%20attack%20on%20Ukraine>. May 19, 2022.

IISS (2022). The Military Balance 2022. <https://www.taylorfrancis.com/books/9781003294566>. February 15, 2022.

IMF (2022a). Joint Statement of Heads of International Financial Institutions with Programs in Ukraine and Neighboring Countries. <https://www.imf.org/en/News/Articles/2022/03/17/pr2280-joint-statement-heads-ifis-programs-ukraine-neighboring-countries>. March 17, 2022.

IMF (2022b). IMF Executive Board Approves the Establishment of a Multi-Donor Administered Account for Ukraine. <https://www.imf.org/en/News/Articles/2022/04/08/pr22111-imf-executive-board-approves-establishment-of-a-multi-donor-administered-account-for-ukraine>. April 8, 2022.

Kaul, A. (2022). Greece delivered "unbelievable" amount of military equipment to Ukraine: report. <https://www.republicworld.com/world-news/russia-ukraine-crisis/greece-delivered-unbelievable-amount-of-military-equipment-to-ukraine-report-articleshow.html>. June 5, 2022.

King (2019). Not Contributing Enough? A Summary of European Military and Development Assistance to Ukraine Since 2014. <https://www.csis.org/analysis/not-contributing-enough-summary-european-military-and-development-assistance-ukraine-2014>. September 26, 2019.

Lawder, D. & Shalal, A. (2022). World Bank to send Ukraine \$1.5 billion as food, energy prices spike. <https://www.reuters.com/business/world-bank-says-it-is-preparing-15-billion-aid-package-ukraine-2022-04-12/>. April 12, 2022.

Lima, C. (2022). U.S. quietly paying millions to send Starlink terminals to Ukraine, contrary to SpaceX claims. <https://www.washingtonpost.com/politics/2022/04/08/us-quietly-paying-millions-send-starlink-terminals-ukraine-contrary-spacexs-claims/>. April 8, 2022.

Mills, C. (2022). Military assistance to Ukraine 2014–2021. <https://researchbriefings.files.parliament.uk/documents/SN07135/SN07135.pdf>. March 4, 2022.

Ministry of Defence of Estonia (2022). US increases security assistance to Baltic countries. <https://www.kaitseministeerium.ee/en/news/us-increases-security-assistance-baltic-countries%22%20/1%20%22:~:text=The%20United%20States%20Congress%20has,10%20million%20over%20last%20year>. April 26, 2022.

Ministry of Defence of Ukraine (2022). Facebook-Post from June 9, 2022. https://m.facebook.com/story.php?story_fbid=pfbid0XyaPArAuVjbGCVqBwHmx4pMDHwVMiBna8vt6Xcp3EXEimLsf6uiZmCGbvtHSt84i&id=100069073844828. June 9, 2022.

Ministry of Finance of Ukraine (2022). Ukraine's state budget financing since the beginning of the full-scale war. https://mof.gov.ua/en/news/ukraines_state_budget_financing_since_the_beginning_of_the_full-scale_war-3435. May 17, 2022.

Ministry of Foreign Affairs Republic of Poland (2022). International Donors' Conference for Ukraine. <https://www.gov.pl/web/diplomacy/international-donors-conference-for-ukraine>. May 5, 2022.

National Recovery Council (2022). Ukraine's National Recovery Plan. https://uploads-ssl.webflow.com/621f88db25fbf24758792dd8/62c166751fcf41105380a733_NRC%20Ukraine%27s%20Recovery%20Plan%20blueprint_ENG.pdf. August 16, 2022.

OECD (2015). Migration policy debates. <https://www.oecd.org/migration/How-will-the-refugee-surge-affect-the-European-economy.pdf>. November, 2015.

Pandey, A. (2022). Has the EU found a solution to Ukrainian refugees' cash problem?. <https://www.dw.com/en/has-the-eu-found-a-solution-to-ukrainian-refugees-cash-problem/a-61351525>. April 4, 2022.

Petersen, L. (2022). Zu wenig Leopard-Panzer angeboten: Scholz' Waffen-Deal mit der Slowakei droht zu platzen. <https://www.businessinsider.de/politik/deutschland/ringtausch-verzoegert-sich-weiter-scholz-panzer-deal-mit-der-slowakei-droht-zu-platzen-b/#:~:text=Zu%20wenig%20Leopard%2DPanzer%20angeboten,der%20Slowakei%20droht%20zu%20platzen&text=Deutschland%20will%20dem%20ukrainischen%20Nachbarland,Kampfpanzer%20an%20die%20Ukraine%20weitergibt>. June 21, 2022.

Pisani-Ferry, J. (2022). The economic policy consequences of the war. <https://www.bruegel.org/blog-post/economic-policy-consequences-war>. March 8, 2022.

Podolyak, M. (2022). Twitter post from June 13, 2022. https://twitter.com/Podolyak_M/status/1536244944637202432. June 13, 2022.

Porter, R. (2022). EBRD unveils €2 billion resilience package in response to the war on Ukraine. <https://www.ebrd.com/news/2022/ebd-unveils-2-billion-resilience-package-in-response-to-the-war-on-ukraine-.html>. March 9, 2022.

Rationalinsurgent (2022). How Much Does A Switchblade Drone Cost {March 2022} Read. <https://rationalinsurgent.com/how-much-does-a-switchblade-drone-cost/>. March 21, 2022.

Republic of Latvia (2022). Latvia supports Ukraine. <https://www.mk.gov.lv/en/latvia-supports-ukraine>. April 22, 2022.

Republic of Poland (2022). High-level International Donors' Conference for Ukraine - Thursday 5 May 2022 in Warsaw. <https://www.gov.pl/web/canada-en/high-level-international-donors-conference-for-ukraine---thursday-5-may-2022-in-warsaw>. May 5, 2022.

Reuters (2022a). France promises to increase military and humanitarian aid to Ukraine. <https://www.reuters.com/world/europe/france-strengthen-military-humanitarian-aid-ukraine-elysee-2022-04-30/>. April 30, 2022.

Reuters (2022b). Berlin to supply arms to Greece, Athens to deliver Soviet weapons to Kyiv – Scholz. <https://www.reuters.com/business/aerospace-defense/germany-supply-ifvs-greece-athens-deliver-soviet-weapons-kyiv-scholz-2022-05-31/>. May 31, 2022.

Ruist, J. (2016). Fiscal costs of refugees in Europe. <https://cepr.org/voxeu/columns/fiscal-cost-refugees-europe>. January 28, 2016.

Sheetz, M. (2022). Elon Musk's SpaceX sent Ukraine thousands of Starlink satellite internet dishes to Ukraine, company's president said. <https://www.cnbc.com/2022/03/22/elon-musk-spacex-thousands-of-starlink-satellite-dishes-sent-to-ukraine.html>. March 22, 2022.

SIPRI (2022). The SIPRI Arms Transfers Database. <https://www.sipri.org/databases/armstransfers>. March 14, 2022.

Spyropoulou, L. & Tsakiris, G. (2022). Griechen zerlegen Panzer-Pläne von Kanzler Scholz. <https://www.bild.de/politik/ausland/politik-ausland/ukraine-krieg-griechen-zerlegen-scholz-waffen-ringtausch-80318168.bild.html>. June 7, 2022.

Tagesschau (2022). Mehr als eine Milliarde Euro Militärhilfe. <https://www.tagesschau.de/inland/scholz-ukraine-militaerhilfe-101.html>. April 15, 2022.

The White House (2022a). Fact Sheet on U.S. Security Assistance for Ukraine. <https://www.whitehouse.gov/briefing-room/statements-releases/2022/03/16/fact-sheet-on-u-s-security-assistance-for-ukraine/>. March 16, 2022.

The White House (2022b). Fact Sheet: White House Calls on Congress to Provide Additional Support for Ukraine. <https://www.whitehouse.gov/briefing-room/statements-releases/2022/04/28/fact-sheet-white-house-calls-on-congress-to-provide-additional-support-for-ukraine/>. April 28, 2022.

The White House (2022c). Bills signed: H.R. 7691 and H.R. 7791. <https://www.whitehouse.gov/briefing-room/legislation/2022/05/21/bills-signed-h-r-7691-and-h-r-7791/>. May 21, 2022.

UNHCR (2022a). Operational Data Portal: Ukraine refugee situation. <https://data.unhcr.org/en/situations/ukraine>. Accessed on April 23, 2022.

UNHCR (2022b). Cash offers a lifeline to refugees from Ukraine arriving in Poland. [https://www.unhcr.org/uk/news/stories/2022/4/6246fd664/cash-offers-lifeline-refugees-ukraine-arriving-poland.html%22%201%20%22::~:~:text=In%20Poland%2C%20eligible%20refugees%20who,\(US%24605\)%20per%20month](https://www.unhcr.org/uk/news/stories/2022/4/6246fd664/cash-offers-lifeline-refugees-ukraine-arriving-poland.html%22%201%20%22::~:~:text=In%20Poland%2C%20eligible%20refugees%20who,(US%24605)%20per%20month). April 1, 2022.

UNHCR (2022c). Private sector donates over US\$200 million to UNHCR's Ukraine emergency response. <https://www.unhcr.org/news/press/2022/3/622f7d1f4/private-sector-donates-us200-million-unhcrs-ukraine-emergency-response.html>. March 14, 2022.

UK Ministry of Defence (2022). UK and allies agree expanded International Fund for Ukraine support. <https://www.gov.uk/government/news/uk-and-allies-agree-expanded-international-fund-for-ukraine-support>. August 16, 2022.

Ukraine Recovery Conference (2022a). Ukraine Recovery Conference: 4-5 July 2022 – Lugano, Switzerland. <https://www.urc2022.com>. August 16, 2022.

Ukraine Recovery Conference (2022b). All sessions of the Ukraine Recovery Conference. <https://www.urc2022.com/ukraine-recovery-conference-urc-2022>. August 16, 2022.

US Department of Defense (2022). Fact Sheet on U.S. Security Assistance for Ukraine (Roll Up) as of April 21, 2022. <https://www.defense.gov/News/Releases/Release/Article/3007664/fact-sheet-on-us-security-assistance-for-ukraine-roll-up-as-of-april-21-2022/>. April 22, 2022.

US Department of State (2022). \$100 Million in New U.S. Civilian Security Assistance for Ukraine. <https://www.state.gov/100-million-in-new-u-s-civilian-security-assistance-for-ukraine/>. March 26, 2022.

Von der Burchard, H. (2022). Germany promised swift tank swaps to aid Ukraine. It hasn't happened. <https://www.politico.eu/article/germany-olaf-scholz-pressure-tank-deliveries-ukraine/>. July 28, 2022.

World Bank (2022a). World Bank Mobilizes an Emergency Financing Package of over \$700 million for Ukraine. <https://www.worldbank.org/en/news/press-release/2022/03/07/world-bank-mobilizes-an-emergency-financing-package-of-over-700-million-for-ukraine>. March 7, 2022.

World Bank (2022b). World Bank Announces Additional \$200 Million in Financing for Ukraine. <https://www.worldbank.org/en/news/press-release/2022/03/14/world-bank-announces-additional-200-million-in-financing-for-ukraine>. March 14, 2022.

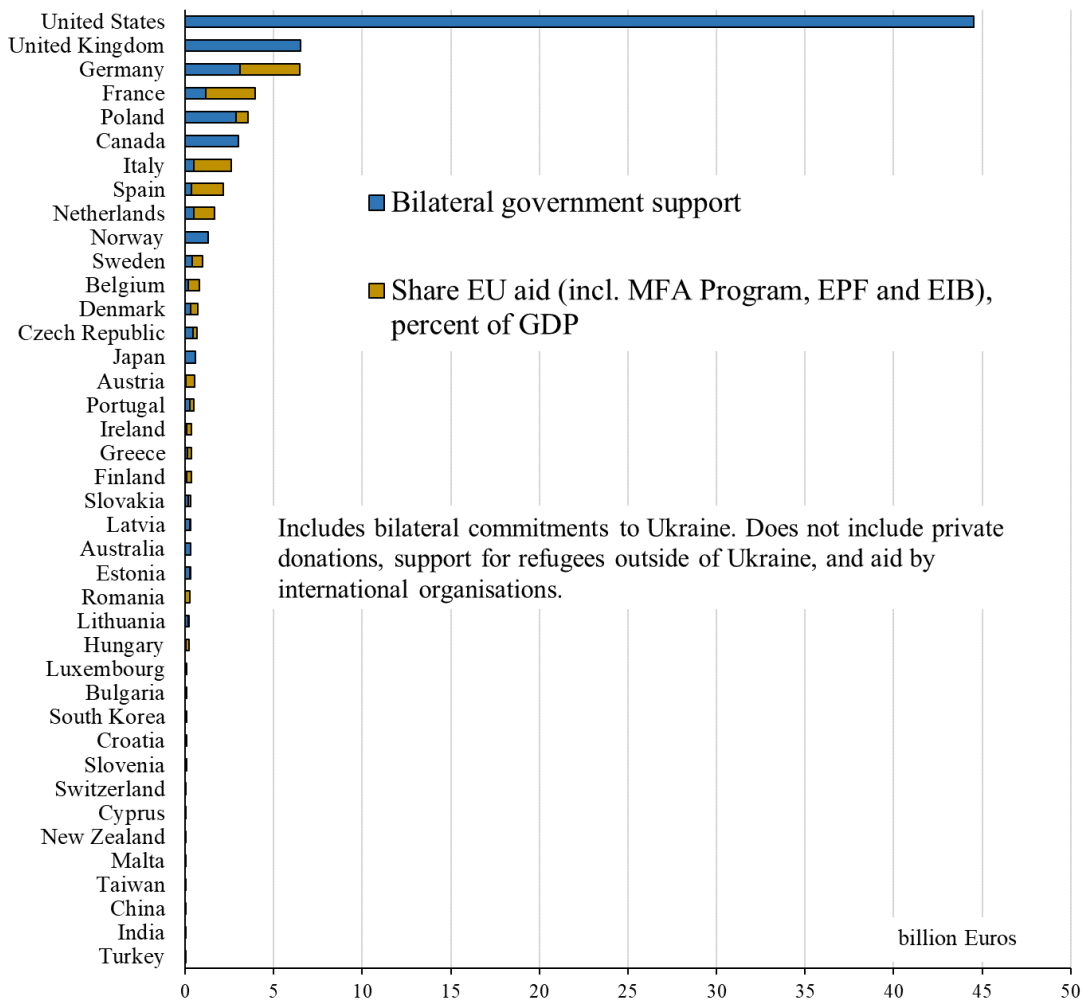
World Bank (2022c). World Bank announces additional \$1.49 billion financing support for Ukraine. <https://www.worldbank.org/en/news/press-release/2022/06/07/-world-bank-announces-additional-1-49-billion-financing-support-for-ukraine>. June 7, 2022.

Appendix I: Additional Figures

Bilateral aid to Ukraine including EU shares (in billion euros)

In Figure A1, we take into account assistance provided through the EU's institutions and financing vehicles since January 24, 2022, *in billions of euros*. EU assistance includes the aid of the European Commission and Council, the Macro-Financial Assistance (MFA) program, the European Peace Facility (EPF) and the European Investment Bank (EIB). The figure complements Figure 4 in the main text, which shows total (bilateral + EU) commitments as share of donor country GDP. As above, the blue bar segments illustrate bilateral aid (see Figure 2), followed by each country's share in EU-level commitments (brown segments).⁴¹

Figure A1. Government support to Ukraine including EU shares in € billion
Commitments January 24 to August 3, 2022



Note: This figure shows a ranking of bilateral commitments after accounting for EU-level aid and financing vehicles (in billion Euros). We assign EU-level commitments as follows: EU commitments (European Peace Facility, Macro-Financial Assistance, humanitarian aid) are allotted based on each member country's relative contribution to the EU budget. Similarly, we assign EIB commitments using each country weight in the EIB's capital subscription shares. See Figure 4 in the main text for a ranking of total (bilateral + EU) assistance in terms of country GDP. Please refer to the main text for details on data collection and sources.

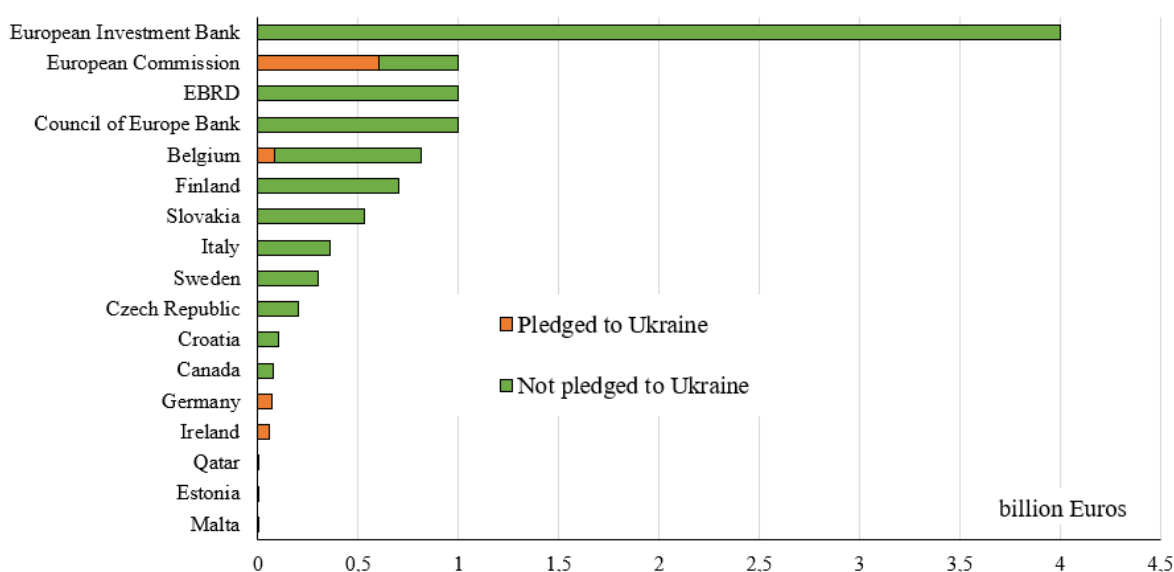
⁴¹ See Section 5 for details on how we assign EU commitments to individual countries.

Overall, the US remains the largest individual donor (€44.53 billion), but European countries see a significant increase in contributions, partly because it is possible that we now double count entries in case of weapon deliveries that are reimbursed through non-transparent schemes like the EPF. This is why this graph should be taken with care and is only shown in the appendix. The UK is still in 2nd place (€6.51 billion), followed by Germany (€6.48 billion), France (€3.95 billion), Poland (€3.57 billion) and Canada (€3.01 billion). Moreover, Spain considerably moves up the ranking when taking into account its EU contributions, from 14th to 8th place.

“Stand Up for Ukraine” event

Figure A2 shows the pledges during the “Stand Up for Ukraine” event across countries (see Section 3.3 in the main text). The figure distinguishes between donations *to Ukraine* and assistance to countries other than Ukraine, including self-pledges by governments to their own budget (primarily aimed at supporting Ukrainian refugee inflows). Of the 13 countries shown in the figure, only Belgium, Germany, and Ireland committed direct assistance to Ukraine during this event. Moreover, the European Commission offered assistance to Ukraine (€600 million) as well as to other countries (€400 million), while the European Investment Bank (EIB) tops the list with a total commitment of €4 billion to countries other than Ukraine.

Figure A2. Country pledges during the “Stand up for Ukraine” event



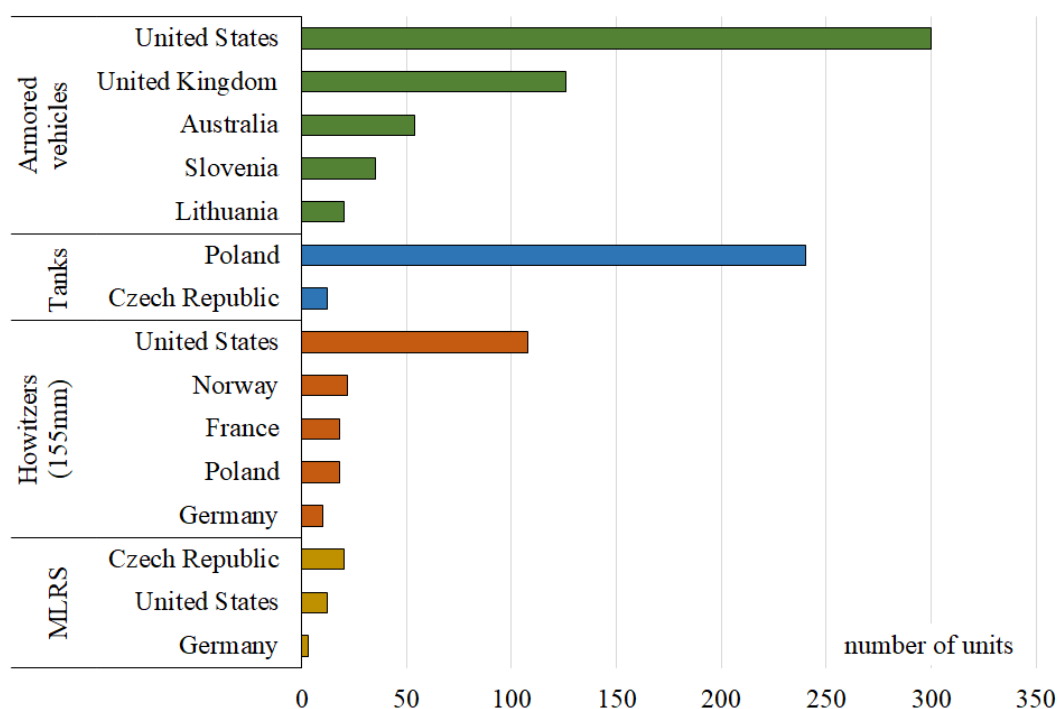
Note: This figure shows the country pledges during the “Stand up for Ukraine” event that took place on April 9, 2022, in Warsaw. The pledges are separated into assistance to Ukraine (for internally displayed civilians; brown) and to other countries (for refugees outside Ukraine; green).

Weapon deliveries by categories

Figure A3 offers an aggregate overview of the number of delivered items across the top donor countries in four main heavy weapon categories: armored vehicles, tanks, howitzers (155mm), and multiple rocket launcher systems (MLRS). For each category, we show the top five donor countries. If less than five countries have delivered heavy weapons of that type, we report the actual number of donating countries (i.e. for tanks and MLRS).

The United States stand out in terms of delivered armored vehicles and 155mm howitzers, taken together having delivered more than 400 units until August 3, 2022. It is striking that only Eastern European countries, namely Poland and the Czech Republic, have delivered tanks to Ukraine (modified T-72 tanks with the designations T-72A/T-72M1/M1R). Among the MLRS, the HIMARS and RM-70 systems are the most delivered systems.

Figure A3. Military deliveries of the top five donors by weapon category
Disclosed bilateral deliveries between January 24 and August 3, 2022

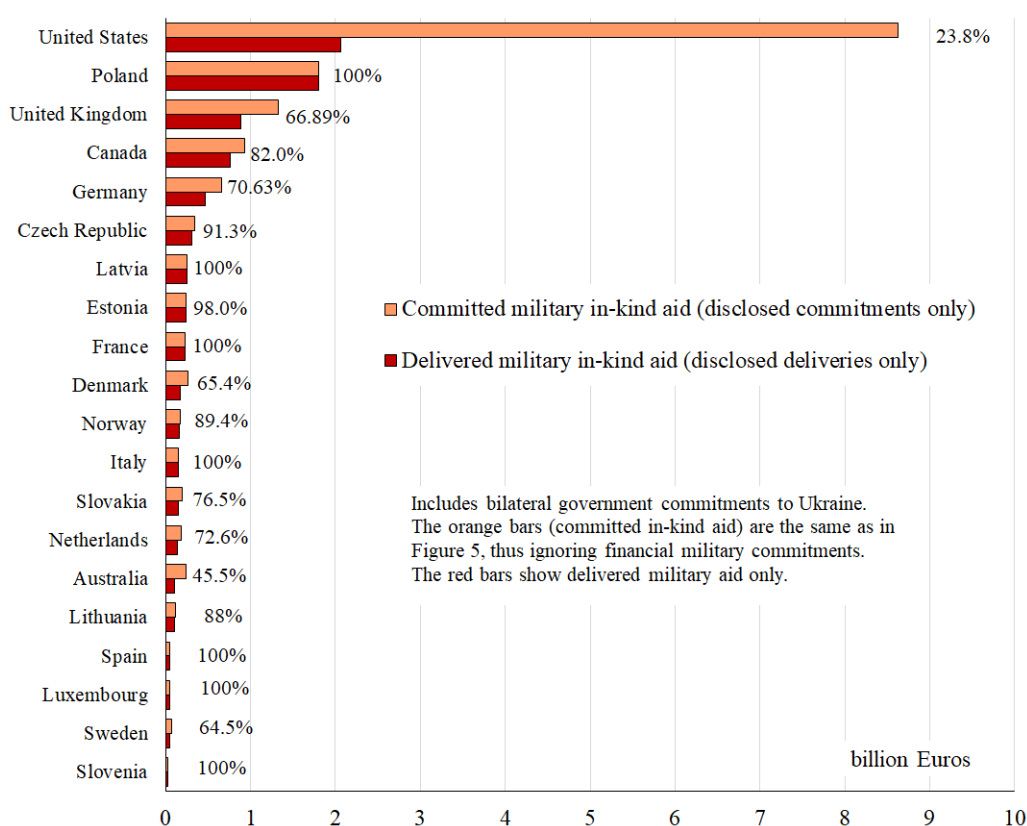


Note: This figure shows weapon deliveries (number of items) of the top five donor countries in four main categories: armored vehicles, tanks, howitzers (155mm), and MLRS (multiple launch rocket systems). We consider deliveries to Ukraine between January 24 and August 3, 2022. Less than five countries have committed tanks or MLRS during this period, so we show only the top two and top three countries, respectively. See the main text for details on data collection and sources.

Comparison committed and delivered military in-kind aid

Figure A4 show a ranking of committed and delivered in-kind military aid across countries (excluding financial aid with military purpose). The US is by far the largest provider of military in-kind assistance to Ukraine, before Poland and the UK. At the same time, actual US deliveries are considerably smaller due to the nature of budget drawdowns (where a committed amount typically is used for deliveries over time, and not in total immediately). The US only delivered around one fourth of committed military in-kind aid until August 3, 2022. Poland stands out by having committed a considerable amount of in-kind assistance, all of which was delivered by the beginning of August (Polish T-72 tank shipments plays a major role here).

Figure A4. In-kind military aid commitments and deliveries, € billion
Disclosed bilateral commitments and deliveries between January 24 and August 3, 2022



Note: This figure shows a ranking of the top 20 (out of 40) donors that have committed military in-kind assistance to Ukraine between January 24 and August 3, 2022 (bilateral disclosed military in-kind commitments and deliveries only, in billion Euros). See the main text for details on data collection and sources.

Appendix II: Deliveries of main weapons

This appendix provides an overview of the delivered main weapons *by weapon type*. In Section 6 in the main text, we offer an equivalent overview *across donor countries*. Finally, we document the sources reporting the weapon deliveries to Ukraine included in this paper.

Delivery of Main Weapons by type:

Table A1. **Artillery (howitzers):** commitments vs. deliveries
Bilateral commitments and deliveries between January 24 and August 3, 2022

Weapon type	Country	Committed	Delivered	Not (yet) delivered
<i>NATO artillery</i>				
AHS Krab self-propelled howitzer	Poland	May 29	18	-
M777 howitzer	Canada	Apr 22	4	-
	Australia	Apr 28	6	-
	United States	until June 15	108	18
M114 155mm howitzer	Portugal	May 8	-	5
CAESAR howitzer	France	Apr 23, June 30	18	-
M109 A3GM 155mm howitzer	Norway	Until July 6	22	-
	United Kingdom	Until	-	40
FH70 howitzer	Italy	May 9	undisclosed	-
Panzerhaubitze 2000	Germany	until July 27	10	-
	Netherlands	until June 28	5	3
<i>Intermediate sum</i>			<i>191 units</i>	<i>66 units</i>
<i>Soviet-type artillery</i>				
DANA howitzer	Czech Republic	April	20	-
D-30 122 mm howitzer	Estonia	February	at least 9	-
<i>Intermediate sum</i>			<i>29 units</i>	<i>-</i>
<i>Mortars</i>				
M10 mortar	Denmark	Apr 21	-	undisclosed
Mortar	Lithuania	Apr 21	undisclosed	-
LMP-2017 60mm mortar	Poland	until April 5	100	-
<i>Intermediate sum</i>			<i>100 units</i>	<i>undisclosed</i>
Total sum			<i>320 units</i>	<i>66 units</i>

Note: See below and our database (sheet “Main dataset”) for further details and sources.

The table shows bilateral commitments and deliveries between January 24 and August 3, 2022.

Table A2. **Multiple rocket launchers:** commitments vs. deliveries
Bilateral commitments and deliveries between January 24 and August 3, 2022

Weapon type	Country	Committed	Delivered	Not (yet) delivered
RM-70	Czech Republic	Apr 22	20	-
Mars II	Germany	June 1	3	-
M270 weapon system	United Kingdom	June 6	-	undisclosed
HIMARS 142	United States	until July 22	8	4
Total sum			31	4 units at least

Note: See below and our database (sheet “Main dataset”) for further details and sources.

The table shows bilateral commitments and deliveries between January 24 and August 3, 2022.

Table A3. **Armored vehicles:** commitments vs. deliveries
Bilateral commitments and deliveries between January 24 and August 3, 2022

Weapon type	Country	Committed	Delivered	Not (yet) delivered
<i>APC (Armoured Personnel Carrier)</i>				
Mastiff (6x6) protected patrol vehicle	United Kingdom	Apr 09	120	-
M113 armored personnel carrier	United States	Apr 13	200 (partially delivered)	-
	Denmark	Apr 21	-	50
	Australia	until July 4	14	14
	Portugal	May 8	14	1
	Lithuania	until July 28	20	10
	Spain	July 12	undisclosed	undisclosed
Humvee Multipurpose Vehicle	Germany	until July 27	-	10
	United States	until Apr 1	100	-
Armoured Combat Support Vehicles (ACSV)	Canada	June 30	0	39
M577 Command Post Carrier	Lithuania	July 20	undisclosed	undisclosed
	United States	July 22	-	4
IVECO LAV 3	Norway	July 29	14	-
Iveco M 40.12 WM/P 4x4 armored vehicle	Portugal	Apr 30	-	4
Mambas (4x4) armored vehicle	Estonia	until May 6	undisclosed	-
VAMTAC (4x4) lightly armored vehicle	Spain	Apr 21	20	-
Roshel Senator (4x4) armored personnel carrier	Canada	Apr 22	8	-
Lince armored car	Italy	May 13	-	undisclosed
Stormer armored vehicle	United Kingdom	May 19	6	-
Bushmaster protected mobility vehicle	Australia	until July 4	40	20
<i>Intermediate sum</i>			408	152

PPV (Protected Patrol Vehicle)

Mastiff 6x6, Wolfhound and Husky armoured vehicle	United Kingdom	Apr 9	120	-
<i>Intermediate sum</i>			120	-

Other Armored Vehicles

YPR-765 infantry vehicle	Netherlands	Apr 19	undisclosed	undisclosed
M80A infantry fighting vehicle	Slovenia	June 16	35	-
BVP-1 infantry fighting vehicle	Czech Republic	Apr 05	5	-
<i>Intermediate sum</i>			40	
Total sum			568	152

Note: See below and our database (sheet “Main dataset”) for further details and sources.

The table shows bilateral commitments and deliveries between January 24 and August 3, 2022.

Table A4. Tanks and anti-aircraft armored fighting vehicles: commitments vs. deliveries
Bilateral commitments and deliveries between January 24 and August 3, 2022

Weapon type	Country	Committed	Delivered	Not (yet) delivered
<i>Soviet-type tanks</i>				
T-72 tank	Poland	until May 5	240	-
	Czech Republic	Apr 05	12	8
PT-91 Twardy	Poland	July 25	undisclosed	undisclosed
<i>Intermediate sum</i>			252	8
<i>NATO-type anti-aircraft armoured fighting vehicles</i>				
Gepard anti-aircraft armored vehicle	Germany	Apr 26	8	22
<i>Intermediate sum</i>			-	22
Total sum			260	30

Note: See below and our database (sheet “Main dataset”) for further details and sources.

The table shows bilateral commitments and deliveries between January 24 and August 3, 2022.

Table A5. Air-defense systems: commitments vs. deliveries
Bilateral commitments and deliveries between January 24 and August 3, 2022

Weapon type	Country	Committed	Delivered	Not (yet) delivered
S-300	Slovakia	Apr 08	1	-
National Advanced Surface-to-Air Missile System (NASAMS)	United States	July 1	0	2
IRIS-T SLM	Germany	June 1	-	1
Total sum			1	3

Note: See below and our database (sheet “Main dataset”) for further details and sources.

The table shows bilateral commitments and deliveries between January 24 and August 3, 2022.

Table A6. Coastal defense systems: commitments vs. deliveries
Bilateral commitments and deliveries between January 24 and August 3, 2022

Weapon type	Country	Committed	Delivered	Not (yet) delivered
Harpoon anti-ship missile system	Denmark	May 23	1	-
	United States	August 1	-	2
Unspecified coastal defense vessel	United States	Apr 13	undisclosed	undisclosed
Unspecified coastal and riverine patrol boat	United States	June 23	-	18
RBS 17 anti-ship missile system	Sweden	June 2	-	1
Total sum			1	21

Note: See below and our database (sheet “Main dataset”) for further details and sources.

The table shows bilateral commitments and deliveries between January 24 and August 3, 2022.

Table A7. **Man-portable air-defense and anti-tank systems:** commitments vs. deliveries
Bilateral commitments and deliveries between January 24 and August 3, 2022

Weapon type	Country	Committed	Delivered	Not (yet) delivered
<i>MANPADS and anti-tank guided missile systems</i>				
Piorun	Poland	until May 5	undisclosed	-
Starstreak	United Kingdom	March 9	undisclosed	-
Mistral	Norway	Apr 20	undisclosed	-
Stinger	United States		800	-
	Netherlands	February 26	50	-
	Italy	February 28	undisclosed	-
	Latvia	until April 6	undisclosed	-
	Lithuania	March 16	undisclosed	-
	Denmark	Apr 22	300	-
Javelin launcher	United States	March 16	2000	-
Shoulder fired MANPAD	Czech Republic	February 27	160	-
<i>Intermediate sum</i>			<i>3,310</i>	-
<i>Other missile systems</i>				
M72 rocket launcher	Canada	February 27	4,500	-
	Belgium	February 27	200	-
	Denmark	Apr 21	2,700	-
	Norway	February 28/ March 31	4,000	-
Carl-Gustav M2 recoilles rifle	Canada	February 27	100	-
Strela	Germany	until April 19	2,000	-
Panzerfaust 3	Germany	until April 19	900	-
	Netherlands	February 26	50	-
AT4 anti-tank	Sweden	until March 23 / June 2	10,000	5,000
	United States	March 16	6000	-
NLAW anti-tank	Luxembourg	February 28	100	-
	United Kingdom	March 9 / April 8 March 15 / May	5,965	1,600
RPG-18 anti-tank	Greece	26	815	1,100
Javelin	Estonia	until June 6	undisclosed	-
	Poland	until May 4	undisclosed	-
	United States	March 16	500	1000
	United Kingdom	Apr 4	201	-
Javelin command launch	United States	June 1	-	50

<i>Intermediate sum</i>	36,031	8,750
Total sum	39,341	8,750

Note: See below and our database (sheet “Main dataset”) for further details and sources.

The table shows bilateral commitments and deliveries between January 24 and August 3, 2022.

Table A8. Aircraft: commitments vs. deliveries
Bilateral commitments and deliveries between January 24 and August 3, 2022

Weapon type	Country	Committed	Delivered	Not (yet) delivered
Mi-24 attack helicopter	Czech Republic	May 23	-	7
Mi-17 military helicopter	United States	until June 1	11	4
	Slovakia	June 16	4	-
Mi-2	Slovakia	June 16	1	-
Unspecified type of helicopter	Latvia	Apr 06	undisclosed	-
Total sum			16	11

Note: See below and our database (sheet “Main dataset”) for further details and sources.

The table shows bilateral commitments and deliveries between January 24 and August 3, 2022.

Table A9. Unmanned aerial systems: commitments vs. deliveries
Bilateral commitments and deliveries between January 24 and August 3, 2022

Weapon type	Country	Committed	Delivered	Not (yet) delivered
<i>Combat drones</i>				
Bayraktar TB2	Turkey	prior to Feb 24	undisclosed	-
Warmate drone	Poland	until June 27	undisclosed	-
Switchblade tactical unmanned aerial system	United States	Apr 1	900	-
Phoenix Ghost tactical unmanned aerial system	United States	until July 22	121 (partially delivered)	701
<i>Other drones</i>				
FlyEye	Poland	prior to Feb 24	undisclosed	-
Puma	United States	Apr 01	undisclosed	-
Lockheed Martin Desert Hawk	United Kingdom	June 30	-	200
Unspecified Tactical unmanned aerial system	United States	March 13	100	-
Skywatch	Denmark	Apr 22	25	-
Heavy transport drone	United Kingdom	May 5	-	-

Unspecified type of drone	Estonia	until June 7	undisclosed	-
Total sum			1025	917

Note: See below and our database (sheet “Main dataset”) for further details and sources.

The table shows bilateral commitments and deliveries between January 24 and August 3, 2022.

Sources for the delivery of main weapons - ordered by type of main weapon:

Artillery (howitzers):

- <https://mezha.media/en/2022/04/15/new-weapon-deliveries-from-the-czech-republic-dana-self-propelled-artillery-and-rm-70-multiple-rocket-launcher/>
- <https://mil.in.ua/en/news/officially-estonia-has-sent-122-mm-howitzers-to-ukraine/>
- <https://www.cbc.ca/news/politics/ukraine-m777-howitzer-russia-heavy-artillery-1.6427762>
- <https://news.defence.gov.au/international/working-together-ukraine>
- <https://www.aa.com.tr/en/americas/us-says-vast-majority-of-howitzers-has-arrived-in-ukraine/2581253>
- <https://www.strategypage.com/htm/htart/articles/20220502.aspx>
- <https://geopolitiki.com/italian-fh70-howitzers-ukraine-against-russians/>
- https://www-regjeringen-no.translate.goog/no/aktuelt/norge-har-donert-artilleriskyts-til-ukraina/id2917760/?_x_tr_sl=auto&_x_tr_tl=auto&_x_tr_hl=de
- <https://www.deutschlandfunk.de/ausbildung-ukrainischer-soldaten-hat-begonnen-100.html>
- <https://www.france24.com/en/live-news/20220601-arms-for-ukraine-who-has-sent-what>
- <https://kyivindependent.com/uncategorized/poland-has-provided-ukraine-with-weapons-worth-1-6-billion>
- <https://radio.lublin.pl/2022/05/polskie-nowoczesne-armatohaubicz-krab-dla-ukrainskiej-armii/>
- <https://www.thedefensepost.com/2022/04/19/us-arms-arrive-ukraine/>
- <https://www.aa.com.tr/en/americas/us-says-vast-majority-of-howitzers-has-arrived-in-ukraine/2581253>
- <https://frontnews.eu/en/news/details/31081>
- <https://www.thedefensepost.com/2022/07/20/french-caesar-canons-ukraine/>
- <https://twitter.com/oleksiireznikov/status/1539234531764486149>
- https://www.armyrecognition.com/defense_news_may_2022_global_security_army_industry/poland_delivers_to_ukraine_18_krab_155mm_self-propelled_howitzers.html
- <https://coffeordie.com/m777-howitzers-ukraine/#:~:text=More%20than%20100%20M777%20howitzers,according%20to%20the%20Defense%20Department.>
- <https://frontnews.eu/en/news/details/31081>

Multiple rocket launchers:

- <https://www.bundesregierung.de/breg-de/themen/krieg-in-der-ukraine/lieferungen-ukraine-2054514>
- <https://www.nytimes.com/2022/07/01/us/politics/himars-weapons-ukraine.html#:~:text=On%20June%2023%2C%20Ukraine's%20defense,one%20for%20some%20of%20them.%E2%80%9D>
- <https://twitter.com/oleksiireznikov/status/1554076054435889152?s=20&t=sxJyy3lEqaMPa3OlayEDw>
- <https://gagadget.com/en/129425-they-will-pour-armed-forces-of-ukraine-have-already-received-czech-multiple-launch-rocket-systems-rm-70/>
- <https://mil.in.ua/en/news/rm-70-have-joined-the-combat-the-first-video-of-the-use-of-the-czech-grad-released/>
- <https://www.thenationalherald.com/russias-ukraine-invasion-sees-greece-taking-bigger-nato-role#:~:text=Greece%20sent%20Ukraine%20military%20equipment%20compatible%20with%20that,rocket%20launchers%2C%20aligning%20itself%20with%20NATO%E2%80%99s%20indirect%20assistance.?msclkid=6dac7726ab8911ec980d9386f90d3180>

Armored vehicles:

- <https://news.defence.gov.au/international/working-together-ukraine>
- https://www.armyrecognition.com/defense_news_may_2022_global_security_army_industry/australia_announces_delivery_of_14_m113_tracked_apcs_and_20_bushmaster_armored_vehicles_to_ukraine.html
- <https://twitter.com/UAWeapons/status/1530575142115495937>
- https://en.defence-ua.com/weapon_and_tech/portuguese_m113_apc_are_on_their_way_to_ukraine-3615.html
- <https://www.thedefensepost.com/2022/04/19/us-arms-arrive-ukraine/>
- <https://www.gov.uk/government/news/uk-to-send-scores-of-artillery-guns-and-hundreds-of-drones-to-ukraine>
- <https://www.ukrinform.net/rubric-ato/3540240-norway-donates-14-iveco-lav-iii-armored-vehicles-to-ukraine.html>
- <https://echo24.cz/a/SrjYb/cesko-poslalo-na-ukrajinu-desitky-tanku-t-72-a-bvp>
- <https://defence-blog.com/dutch-ypr-765-infantry-vehicles-arrived-in-ukraine/>
- <https://www.rtvsi.si/slovenija/sarec-zaveze-natu-ostajajo-zmanjsevanja-sredstev-za-obrambo-ne-bo/631221>
- <https://www.bbc.com/news/world-europe-61482305>

Tanks:

- <https://www.wsj.com/livecoverage/russia-ukraine-latest-news-2022-04-29/card/poland-has-sent-more-than-200-tanks-to-ukraine-Krwar3DCPzHJJk4UMVh4>
- <https://kafkadesk.org/2022/04/06/czech-republic-becomes-first-country-to-send-tanks-to-ukraine/>
- <https://mil.in.ua/en/news/ukraine-receives-pt-91-twardy-tanks-from-poland/>
- <https://www.bundesregierung.de/breg-de/themen/krieg-in-der-ukraine/lieferungen-ukraine-2054514>
- <https://www.nytimes.com/2022/04/14/world/europe/ukraine-russia-nato-s300.html>
- <https://kafkadesk.org/2022/04/06/czech-republic-becomes-first-country-to-send-tanks-to-ukraine/>
- <https://www.thedefensepost.com/2022/04/19/us-arms-arrive-ukraine/>
- https://www.armyrecognition.com/defense_news_may_2022_global_security_army_industry/australia_announces_delivery_of_14_m113_tracked_apcs_and_20_bushmaster_armored_vehicles_to_ukraine.html
- <https://twitter.com/UAWeapons/status/1530575142115495937>
- <https://defence-blog.com/dutch-ypr-765-infantry-vehicles-arrived-in-ukraine/>

- <https://www.reuters.com/world/europe/czech-republic-sends-tanks-ukraine-czech-tv-reports-2022-04-05/>
- <https://www.businessinsider.de/politik/deutschland/software-probleme-aerger-mit-griechenland-lange-lieferzeiten-wie-schwierig-es-um-die-versprochenen-schweren-waffen-aus-deutschland-steht-e/>

Air-defense systems:

- <https://www.nytimes.com/2022/04/14/world/europe/ukraine-russia-nato-s300.html>

Coastal defense systems:

- <https://www.reuters.com/world/europe/ukraine-receives-harpoon-missiles-howitzers-says-defence-minister-2022-05-28/>

Man-portable air-defense and anti-tank systems:

- <https://rmx.news/poland/polish-army-to-order-additional-piorun-anti-air-missiles-after-the-weapon-outperforms-on-ukrainian-battlefield/>
- <https://eurasianimes.com/from-britain-with-love-uks-new-game-changing-missiles-to-ukraine-has-potential-to-turn-tables-on-belligerent-russia/>
- <https://www.globaldefensecorp.com/2022/03/04/denmark-delivered-2700-anti-tank-rockets-and-300-stinger-missiles-to-ukraine/>
- <https://www.teletrader.com/lithuania-to-give-ukraine-10m-in-military-aid/news/details/57547008?internal=1&ts=1654245351379>
- <https://www.thedefensepost.com/2022/04/19/us-arms-arrive-ukraine/>
- <https://www.rferl.org/a/czech-republic-poland-new-military-aid-ukraine/31873938.html>
- <https://tfiglobalnews.com/2022/03/21/canada-wanted-to-supply-weapons-to-ukraine-turns-out-it-didnt-have-any/>
- <https://www.youtube.com/watch?v=S4G4kaNLqbk>
- <https://www.aa.com.tr/en/russia-ukraine-war/norway-sends-roughly-100-anti-aircraft-missiles-to-ukraine/2568447>
- <https://www.bbc.com/news/world-europe-61482305>
- <https://www.oryxspioenkop.com/2022/05/guns-n-greece-hellenic-support-to.html>
- <https://kyivindependent.com/uncategorized/poland-has-provided-ukraine-with-weapons-worth-1-6-billion>
- <https://www.npr.org/2022/05/03/1096398193/retired-colonel-on-the-rise-of-javelin-missiles-as-biden-seeks-to-aid-ukraine?t=1660746030213>

Aircraft:

- <https://defence-blog.com/ukraine-receives-first-mi-17-helicopters-from-us/>
- https://twitter.com/edgarsrinkevics/status/1511694357560180745?ref_src=twsrc%5Etfw%7Ctwcamp%5Etweetembed%7Ctwterm%5E1511694357560180745%7Ctwgr%5E%7Ctwcon%5Es1_&ref_url=https%3A%2F%2Fwww.redditmedia.com%2Fmediaembed%2Ftxqhaq%3Fresponsive%3Dtrueis_nightmode%3Dfalse
- https://www.globaldefensecorp.com/2022/07/31/czech-republic-donates-mi-24-helicopters-to-ukraine/#:~:text=The%20Ukrainian%20military%20confirmed%20that%20the%20Armed%20Forces,Of%20Mi-24%20Helicopters%20To%20Ukraine%20May%2027%2C%202022https://twitter.com/JaroNad/status/1537194189066223616?ref_src=twsrc%5Etfw%7Ctwcamp%5Etweetembed%7Ctwterm%5E1537194189066223616%7Ctwgr%5E%7Ctwcon%5Es1_&ref_url=https%3A%2F%2Fgagadget.com%2Fen%2F138212-slovakia-handed-over-to-ukraine-mi-17-and-mi-2-helicopters-as-well-as-ammunition-for-the-grad-mlrs%2F
- <https://mil.in.ua/en/news/us-demonstrates-mi-17-helicopters-designated-for-ukraine/>

Unmanned aerial systems:

- <https://radar.rp.pl/przemysl-obronny/art35751811-pioruny-drony-i-amunicja-polskie-uzbrojenie-w-drodze-na-ukraine>
- <https://www.newyorker.com/magazine/2022/05/16/the-turkish-drone-that-changed-the-nature-of-warfare>
- <https://defensereview.com/aevex-aerospace-phoenix-ghost-secretive-suicide-kamikaze-drone-aircraft-being-shipped-to-ukraine-to-help-fight-the-russians/>
- <https://www.19fortyfive.com/2022/05/putin-is-mad-u-s-begins-delivering-new-phoenix-ghost-drones-to-ukraine/>
- <https://militaryleak.com/2022/05/01/denmark-to-send-m113-armored-personnel-carriers-and-weapons-to-ukraine/>
- <https://www.cnet.com/news/us-military-sends-another-600-switchblade-drones-to-ukraine/#:~:text=The%20United%20States%20has%20sent,the%20US%20sent%20in%20March>
- <https://defence-blog.com/ukraine-receives-rq-20-unarmed-aerial-vehicles-donated-by-us/>
- <https://www.bbc.com/news/world-europe-61482305>
- <https://www.ukrinform.net/rubric-politics/3501933-estonia-has-provided-240m-in-military-aid-to-ukraine-korinienko.html>
- <https://defensereview.com/aevex-aerospace-phoenix-ghost-secretive-suicide-kamikaze-drone-aircraft-being-shipped-to-ukraine-to-help-fight-the-russians/>
- <https://twitter.com/UAWapons/status/1531282230760378369>