How to Rebuild Ukraine: A Synthesis and Critical Review of Policy Proposals

Torbjörn Becker
Stockholm Institute of Transition Economics at the Stockholm School of Economics

Yuriy Gorodnichenko
UC Berkeley and CEPR

Beatrice Weder di Mauro
Geneva Graduate Institute
INSEAD and CEPR

Abstract: The anticipation of Ukraine's post-war reconstruction has led to an avalanche of academic and policy analyses on how to rebuild the country. To help the profession navigate this rapidly expanding literature, this paper provides a synthesis and critical overview of the proposals. After describing historical context, damages inflicted by Russian aggression, and funds required for Ukraine's recovery, the paper summarizes principles, phases and policies needed to deeply modernize the country. The reconstruction of Ukraine should provide a template for other recovery programs.

Keywords: Ukraine, post-war reconstruction, modernization, aid.

JEL code: F5, O2, O52, P2, P3, H84

When citing this paper, please use the following:

Becker, Torbjorn, Yuriy Gorodnichenko and Beatrice Weder di Mauro, 2024. Annu. Rev. Econ: Submitted.
DOI: https://doi.org/10.1146/annurev-economics-081324-093012

Contact information:

Becker: Torbjorn.Becker@hhs.se
Gorodnichenko: ygorodni@berkeley.edu
Weder di Mauro: beatrice.wederdimauro@graduateinstitute.ch

1. Introduction

On February 24, 2022, Russia invaded Ukraine. This unprovoked act of aggression was swiftly condemned by the General Assembly of the United Nations (UN) but this war, the largest in Europe since World War II, continues: millions of refugees and internally displaced persons, hundreds of thousands killed or injured, and many homes in ruins. Against all odds, Ukraine continues to fight for its freedom and independence. Because the outcome of the war will determine the future of not only Ukraine but also the global order and security,[1] many countries pledged their support for Ukraine. It is critical that Ukraine defeats Russian aggression and becomes a success story after the war is over.

Realizing the importance of Ukraine's post-war recovery and the need to commence planning early, academics, policymakers and the media almost immediately launched intensive discussions about how to rebuild Ukraine. Indeed, "A Blueprint for the Reconstruction of Ukraine" (Becker et al. 2022) was published on April 7, 2022—only six weeks after the full-scale invasion—and was followed by many policy proposals and debates. The list of contributors includes think tanks (e.g., Gorodnichenko, Sologub and Weder di Mauro 2022, Gangster et al. 2022, Savoy and Staguhn 2023, Boyarchuk et al. 2022, Center of Economic Strategy 2022, Shatz et al. 2023, Kochev et al. 2023, Herbst, Khakova, and Lichfield 2024, Carletti et al. 2024,), international organizations (World Bank 2022, 2024, Szczerba 2024), governments (e.g., G7 2022, European Commission 2022, NRC 2022), and scholars (e.g., Myerson 2022, Umland 2023, Berglöf and Rashkovan 2023, Bjerde 2023, Aslund and Becker 2024, Stiglitz and Kosenko 2024). According to Web of Science, more than 500 articles on Ukraine's reconstruction have been published in academic journals as of 2024. To help the profession navigate this rapidly expanding literature, this paper provides a synthesis and critical overview of the proposals.

As we discuss below, Ukraine's reconstruction is expected to be a decade-long process focused on modernizing the country not only in terms of physical infrastructure and productive capacity but also institutionally. Establishing and maintaining the credibility of reforms over many years—and through potential changes in government—will be crucial for attracting external funding and mobilizing domestic investment. The European Union (EU) accession of Ukraine—

[1] Garicano, Rohner, and Weder di Mauro (2022), Gorodnichenko and Rashkovan (2023), Andor and Optenhögel (2023), Mátyás (2024) and others discuss the global implications of the war for economy, democracy, and security.

now a candidate country—provides a credible anchor for these reforms. This process has already begun, with the negotiation framework for Ukraine's EU accession published in June 2024 (European Commission 2024) which takes into account the lessons from the past enlargement experiences and emphasizes fundamental reforms as well as making the reform process predictable and irreversible. Although the accession criteria are simple,[2] Ukraine will have to fulfill a comprehensive catalog of economic, political and legal requirements and to complete previous commitments.[3] This herculean task requires extraordinary coordination between governments, international organizations, non-governmental bodies, businesses and other stakeholders. The outcome of this process should be a full-fledged democracy with a strong economy, robust institutions, and defense capable of deterring future aggression.

The rest of the paper is structured as follows. Section 2 discusses pre-war trends for Ukraine to provide the context. Section 3 presents estimated costs of the war to appreciate the scale of the reconstruction project. Section 4 covers previous reconstruction programs to draw some lessons for Ukraine. Section 5 summarizes the principles of Ukraine's reconstruction that are developed in various proposals. Section 6 describes the phases of the reconstruction. Section 7 delves into selected issues of Ukraine's reconstruction. Section 8 concludes.

2. Pre-war trends

Although Ukraine was more developed than many Eastern European counties in the late 1980s, the transition to market economy from command economy was slow and challenging due to many Soviet legacy issues including a particularly difficult Soviet repression in Ukraine.[4] In the early 1990s, output contracted by approximately 60% and the country experienced hyperinflation. The transition created opportunities (private property, openness to international trade, free mobility) and obstacles (insider ownership, weak property rights and rule of law, high inequality). The latter

[2] The Copenhagen criteria require: 1) stable institutions that can guarantee democracy, the rule of law, human rights and the protection of minorities; 2) a functioning market economy and the ability to cope with the competitive pressure and market foreces of the EU market; 3) the ability to take on the obligations of EU membership, including the capacity to implement all EU law and adhere to the aims of the Union.

[3] The framework mentions, "the fulfilment of Ukraine's obligations under the Association Agreement, including a Deep and Comprehensive Free Trade Area, as well as Ukraine's progress in addressing the key areas identified in the Commission's reports and relevant Council conclusions."

[4] For example, the Holodomor ("killing by hunger") in the 1930s continues to weigh heavily on economic and political life even in the post-Soviet era; see Yaremko (2023). Åslund (2009, 2015) provides comprehensive accounts of Ukraine's economic and political history since Ukraine regained independence in 1991.

resulted in vulnerabilities to shocks and the rise of oligarchs after a mass privatization.[5] Unlike Poland, Hungary, Romania and other Eastern European countries, Ukraine was not invited to join the Eastern enlargement of the European Union and thus was left in a grey zone between Russia and the EU (Klimkin and Miklos 2022, Savoy and Staguhn 2023) which meant few institutional anchors to navigate post-communism.

Reforms (including the spurt after the Orange Revolution in 2004) and the upturn of the commodity cycle in early 2000s generated significant economic growth (nearly 8% per year between 2000 and 2007). This trajectory was dashed by the 2008-2009 Global Financial Crisis (GFC) that hit Ukraine particularly hard: the collapse of global demand for commodities was amplified by currency and banking crises and caused output to shrink by 15% in 2009. Appetite to invest into Ukraine and other emerging economies fell. The corrupt regime of President Viktor Yanukovych was not interested in making the country a part of the European Union economic ecosystem thus making the country even less attractive for investment. Furthermore, the inadequate response to the GFC left Ukraine's financial system perennially plagued by non-performing loans and distrust in banks and other institutions (see Carletti et al. (2024) for more details) thus exacerbating economic problems.

After economic stagnation and decline in 2008-2013, Ukraine was hit by Russia's illegal annexation of Crimea and occupation of the Donbas which led to another financial and economic crisis: inflation surged to 50% and output in Ukraine-controlled territories fell by 10%. This existential threat spurred another round of reforms after the Revolution of Dignity (also known as the Euromaidan) changed political elites in 2014.[6] For example, public officials and their relatives were required to disclose not only their income but also spending. ProZorro, an electronic public procurement system, opened access to government contracts and improved transparency. The banking system was thoroughly reformed to eradicate related-party lending, improve bank supervision and ensure the central bank's independence. In a geopolitical pivot, Ukraine and the EU signed agreements to allow visa-free travel and liberalize trade (Deep and Comprehensive Free

[5] Forbes (2021) estimated that 100 wealthiest people in Ukraine controlled almost 25 percent of the Ukrainian economy.

[6] The Revolution of Dignity is also known as Euromaidan exactly because people in Ukraine wanted to have a future in the EU rather than in the Russia-dominated Eurasian customs union. Becker (2023) shows that for a long list of indicators of well-being, economic development, and freedom, transition countries that joined the EU are doing far better than the ones that are part of the Russian customs union.

Trade Area agreement), which launched harmonization of Ukraine's regulation with the EU's. Consistent with Ukraine's political practice and tradition, power was peacefully transferred after the presidential and parliamentary elections in 2019. Adaptation and reforms helped to resume growth (approximately 3% per year in 2016-2019) but Russian aggression in 2014 directly (thousands of civilians killed, destruction of productive capacity, Russia controlled 7% of Ukraine's territory; see OHCHR 2016) and indirectly (huge losses in loan portfolios and asset prices, security concerns radically reduced Ukraine's appeal to investors) depressed economic activity thus contributing to one of the lowest foreign direct investment per capita ratios in Europe.

The persistently difficult economic conditions adversely affected human development. Population declined from 52.2 million in 1992 to 43.8 million in 2021. Life expectancy fell from 70.5 years in 1989 to 66.7 in 1995 with a gradual recovery to 71.8 in 2019. Budgetary constraints undermined the quality of education and research (see Kahanec et al. 2022, Bezvershenko and Kolezhuk 2022). Consistent with limited domestic opportunities, remittances from abroad accounted for 10% of Ukraine's Gross Domestic Product (GDP) in 2021.

By the start of the Russian full-scale invasion in 2022, Ukraine was one of the poorest European countries. It experienced a lot of macroeconomic volatility, little economic growth, and chronically high inflation (Table 1). These lackluster results were due to a combination of exogenous forces (Russian aggression, GFC) and poor domestic policies.

3. Cost

Although the thick fog of war makes estimates of damages in Ukraine rather tentative, it is clear that the price tag is extremely high and rises as Russian aggression continues and more facts come to light. For example, the World Bank (2022, 2024) revised its estimated needs for reconstruction and recovery from $349 billion as of June 1, 2022 to $486 billion as of 31 December 2023. The recovery program presented by the Ukrainian government in 2022 estimated the cost at $750 billion (NRC 2022). The head of the European Investment Bank suggested in 2022 that the cost would exceed $1.1 trillion (Arons 2022). Bogdan, Grieveson, and Landesmann (2022) provide a lower estimate of $410 billion.

Although much of the country is affected by the war, the physical damage is concentrated geographically and sectorally. The Kyiv School of Economics (2024) estimated that as of January

2024, the biggest damages were in housing (38% of total damages) and infrastructure (23%) while Donetska and Kharkivska oblasts accounted for 24% and 19% of damages. In a similar vein, Russian missiles destroyed all major oil refineries, but the IT sector exhibited growth despite blackouts. This concentration is correlated with the intensity of Russian attacks and fighting (compare Figure 1 and Figure 2) as well as whether a given area was occupied by the Russian forces. According to the National Bank of Ukraine, output declined by more than 30% in 2022 and the unemployment rate soared from 10% in 2021 to 26% in mid-2022. While the economy has been modestly recovering after this shock, output and employment remain well below pre-war levels.

The United Nations High Commission on Refugees (UNHCR; 2024) estimated that as of March 2024, roughly 6 million Ukrainian refugees—mostly women with children—had been recorded in Europe and another and half a million elsewhere. The willingness of these refugees to return to Ukraine has been declining over time. Initially, nearly all refugees wanted to return but more recent surveys (e.g., Sologoub 2024, Mykhailyshyna et al. 2023) suggest that two thirds plan to return to Ukraine after the war is over. The massive disruption of the war is also reflected in the large number (almost 4 million as of early 2024, see Migration Data Portal 2024) of internally displaced Ukrainians.

Damages to human capital are harder to estimate but, in all likelihood, the magnitude is staggering. UNHCR (2023) reports that only about 50% of refugee children are enrolled in formal, in-person education in their host countries. Ukraine's Ministry of Education and Science reported that, because of damages,[7] security concerns and lack of bomb shelters, approximately 50% of ~ 4 million children enrolled in schools relied on an online or mixed format of instruction in the beginning of the 2023-2024 school year, which comes on the top of education lost due to the COVID19 pandemic. These challenges are amplified by an exodus of scientists from Ukraine (Ganguli and Wladinger 2024) and unfathomable Russian abductions of Ukrainian children.[8] As discussed in Gorodnichenko, Kudlyak and Sahin (2022) and Égert and de la Maisonneuve (2024), the mass underemployment and subpar education induced by the war can result in significant

[7] The Kyiv School of Economics (2024) reports that, as of January 2024, 1,888 schools and 1,285 kindergartens were damaged or destroyed.

[8] Maria Lvova-Belova, Russian children's commissioner, reported that more than 700,000 Ukrainian children have been taken from Ukraine to Russia between 2022 and 2023. In 2023, the International Court of Justice issued warrants to arrest Maria Lvova-Belova and Vladimir Putin for their role in organizing the abductions.

depreciation of human capital. As many as 5 million veterans (Herbst et al. 2024) will need assistance to return to civilian lives. These figures suggest a long-term damage to Ukraine's productivity capacity may stem not only from destroyed infrastructure but also from a significant decline of population and human capital.

Russian aggression also has led to massive damages to the environment. We provide a few statistics to give a sense of magnitudes. The Ukrainian government and others (e.g., von Cramon-Taubadel and Nivievskyi 2023, World Bank 2024) estimate that ~180,000 km^2 (roughly a half of Germany) needs cleaning from land mines and unexploded ordinance (with current technologies, removing a land mine costs between \$300 and \$1,000). According to UN (2023) estimates, Russia's destruction of the Kakhovka dam alone cost \$14 billion. The ultimate toll will not be clear until the end of the war but available projections point to an environmental catastrophe.

The trauma and stress from the full-scale invasion come on the top of damages inflicted by Russia since 2014. Havlik et al. (2020) estimated that the economic cost of Russian occupation of the Donbas was at least \$21.7 billion. To be clear, these estimates do not include significant deterioration in mental health and related issues (e.g., Coupe and Obrizan 2016).

4. **Previous reconstruction and recovery efforts**

Obviously, Ukraine is not going to be the first country to rebuild after a major conflict and one can learn a lot from previous triumphs and failures. In this context, the success of the Marshall Plan to rebuild Europe after World War II—and counter the influence of the Soviet Union—has inspired many reconstruction efforts after wars and natural disasters.

To better understand the workings of the Plan, we highlight several key features.[9] First, the US government created the Economic Cooperation Administration (ECA), a dedicated, self-standing agency (it was not a part of the Treasure Department or the State Department), to administer aid. This design was to minimize mission drift, improve coordination, enhance accountability, and provide flexibility in responding to the changing conditions and heterogeneous needs of the recipient countries. Second, although the agency's budget was approved by the US Congress annually, there was an evident bipartisan understanding that the Plan is a multi-year project (with clear sunset provisions) which greatly reduced uncertainty and allowed long-term

[9] More details are in e.g. Eichengreen (1995), DeLong and Eichengreen (1993), and Conley (2022).

planning. In the end, the Plan was funded for four years. Third, the agency had a clear, hierarchical governance structure with Paul Hoffman, previously a president of Studebaker, at the helm. The ECA had a large task force (600 Americans and 800 Europeans) in its regional Paris office and had frequent and large missions to monitor progress on the ground. Importantly, the ECA could hire fresh, highly motivated cadre because as a newly established agency it did not have institutional inertia and organizational "baggage". Fourth, the ECA relied on the local authorities to determine priorities as well as co-fund projects (so called "counterpart funds"). This feature was important to ensure that Europeans "owned" the recovery and had "skin in the game" thus maximizing the impact of the Plan's funds.[10] Finally, apart from shipping foodstuffs to avoid hunger and to providing debt relief (90% of the aid was in grants rather than loans), the ECA focused on rebuilding and upgrading the productive capacity of the countries (e.g., shipping machine tools from the US to Europe, encouraging technological transfer though missions and delegations), forging intra-Europe trade and links (e.g., the cross-border payment system) to address bottlenecks for economic development, and supporting institutional reforms to promote market-economy democracies. Eventually, the ECA was transformed into the Organization for Economic Cooperation and Development (OECD).

The design and performance of the ECA contrasted sharply with the United Nations Relief and Rehabilitation Administration (UNRRA) which was established in 1943 with similar objectives, a large budget ($3.7 billion vs. $13.3 billion in the Marshall Plan), and a huge staff of 12,000 civil servants. In contrast to ECA, UNRRA was focused on distributing food, medicine and other humanitarian aid. From the onset, the UNRRA suffered from lack of personnel and leadership, short-termism, poor coordination with local authorities, weak organizational structure, and inadequate accountability. Critics described the UNRRA as an amateurish effort and failed international coordination (Hitchcock 2009). When designing the Marshall Plan, Will Clayton, deputy US Secretary of State for economic affairs, observed that "…we must avoid getting into another UNRRA." UNRRA was dissolved in 1948.

[10] George Marshall, US Secretary of State, expressed this point clearly: "It would be neither fitting nor efficacious for this Government to undertake to draw up unilaterally a program designed to place Europe on its feet economically. This is the business of the Europeans. The initiative, I think, must come from Europe." See Chapter 2 in Carletti et al. (2024) and Eichengreen (1995) for more details.

Subsequent reconstruction efforts typically fall somewhere between these polar cases. For example, the reconstruction programs of Iraq and Afghanistan in early 2000s were plagued by many problems like those in the UNRRA: poor coordination and oversight, conflicting objectives, ignoring input from local authorities, understaffing, low capacity to absorb aid, etc.[11] In contrast, Pakistan's response to a major earthquake in 2005 was more similar to the Marshal Plan (World Bank 2014): a dedicated agency (the Earthquake Reconstruction and Rehabilitation Agency, ERRA), clear political leadership (the prime minister chaired ERRA) and accountability, intensive cooperation with local stakeholders and international aid donors, a strong legal mandate to address cross-cutting issues, sunset provisions (to avoid creation of more bureaucracy in the longer run), etc. Rebuilding Sri Lanka after the 2004 tsunami was a mixed bag (e.g., Franco et al. 2013). Similar to the Marshal Plan, Sri Lanka set up a dedicated agency run by political heavyweights and business leaders, focused on "build back better", and engaged local authorities. At the same time, similar to the UNRRA, the agency was dismantled too early, poor coordination led to regional disparities and varying quality of construction.

Among these different experiences the Marshall Plan stands out as the most successful approach. Despite its relatively small size (on average about 2.5 percent of national income, albeit with large differences across European countries) it contributed significantly to the recovery of Europe after the World War II, mostly by promoting reforms, restoring financial stability, establishing the foundations of a market economy and providing guarantees of institutional credibility (Eichengreen and Uzan 1992). These lessons are increasingly enshrined in policy reports and recommendations (OECD 2005, O'Driscoll 2018, World Bank 2018) as well as in the reformed EU accession process, which prioritizes institutional reforms (Darvas et al. 2024). The "build back better" principle is now understood not only as an effort to rebuild physical assets but also as a set of reforms designed to enhance efficiency and broad-based, inclusive growth in the long run. That is, economic and institutional modernization that build local state capacity should be supported by physical reconstruction and vice versa. History also teaches that donors should coordinate their funding and projects to avoid duplication, waste, and rivalry. As a result, multi-

[11] For Afghanistan, the Tarakhil Power Plant near Kabul ($335 million cost) did not provide electricity to the capital because the donors failed to utilize local knowledge and engage local authorities. For Iraq, these successive organizations were running the US reconstruction program but most of the funding was managed by the US Defense Department. SIGIR (2013) presents many more examples of mismanagement.

donor trust funds (MDTFs) have been increasingly used to channel resources to countries in distress, which included Ukraine after 2014.

5. Principles of Ukraine's post-war reconstruction

Before we proceed with an overview of principles for Ukraine's reconstruction, we observe that all proposals share the same starting point: Ukraine must have ironclad security that another round of Russian aggression is not possible in the foreseeable future. This is not to say that countries cannot succeed in hostile environments; indeed, South Korea and Israel accomplished tremendous progress despite having difficult relations with their neighbors. But war *risks* cast a long shadow on economic activity. As a result, most proposals tie the reconstruction of Ukraine to joining the NATO or possibly developing other deterrents that can obviate Russia's advantage in size.

Despite generally agreeing on many guiding principles and approaches, proposals sometimes diverge sharply on implementation details. For these cases, we weigh pros and cons and sketch possible compromises.

A. Minimize damage during the war

With the ongoing hostilities (at the time of writing this article), the first step towards a successful post-war recovery is to minimize damage to physical capital (power plants, dams, bridges, factories, etc.) and human capital. Indeed, Russian attacks not only destroy Ukraine's infrastructure but also prevent millions of children from getting proper education and lead to "brain drain." Apart from reinforcing air defense systems, Ukraine can rely on non-military means to protect productive assets and human lives. As we discussed above, bomb shelters in educational institutions is a basic measure to increase safety of in-person instruction. Decentralized production (e.g., solar panels, wind turbines and other sources of renewable sources of electric power, agribusiness, IT services) is less vulnerable to Russian missile strikes. If decentralization is not possible, Dombrovskis et al. (2024) propose creating fortified clusters of economic activity. Moving production facilities underground or further away from the frontlines reduces the risk of destruction. Building in redundancies and interoperability can increase the resilience of the economy (e.g., interconnectors for power lines should robustify the supply of energy). Enhanced infrastructure for cross-border flows between Ukraine and the EU can stabilize supply chains and secure shipments of Ukraine's products to the global markets. Given limited fiscal resources of Ukraine, economic aid is critical to maintain basic government services such as healthcare and education. Finally, this principle also means that some reconstruction (e.g., repair electric grid) must happen during the war.

B. Ownership

There is a consensus view that reconstruction should be owned by Ukraine. This principle has several practical elements. First, initiative should emanate from Ukrainian authorities, but this initiative based on local knowledge should be matched with responsibility and accountability to build Ukrainian institutions and state capacity. Put bluntly, if the mayor of Bucha wants to rebuild a school, he or she should do this because the local community wants the school rather than because a donor wants to put its flag on a project in Bucha. Of course, donors can provide technical assistance, review and vet projects, and more generally participate in joint governance of agencies created to facilitate reconstructions. Second, ownership should rest on broad domestic support that can be achieved via consultation with civil society, business community and local authorities because reforms and investments will endure only if citizens view them as legitimate and serving their best interests. This calls for engagement, transparency and data sharing (CES 2022). Third, even with limited resources, Ukrainian authorities should co-fund projects to ensure the right incentives: the authorities will have a stronger motivation to select projects prudently when they use their budgets to pay a fraction of the cost. For example, the Marshall Plan had a 50/50 split between grants and domestic counterpart funds. Fourth, to fully utilize local knowledge, reconstruction should have a significant degree of decentralization to generate inclusive recovery, community building, and local participation (see Meyerson 2023).

C. EU accession

In course of two years, Ukraine progressed from a country in “Russian space” to an EU candidate country negotiating the terms of accession. While accession and reconstruction do not have to be joint, experts are unanimous in recommending that accession and reconstruction are strongly linked to ensure a stable funding source, an institutional anchor for many reforms, and a source of technical assistance and expertise. Indeed, Klimkin and Miklos (2022) and others argue that Ukraine fell behind Poland and other Eastern European countries largely because it was not a part of eastern enlargement and hence did not have a powerful incentive to reform its regulatory and legal framework to deliver rule of law, low corruption, and a strong democracy. In other words, accession will turn reconstruction into deep modernization of Ukraine.

D. Conditionality of Aid

A likely horizon for Ukraine's reconstruction is about 10 years. This is a long period in politics and yet Ukraine must stay focused on reforms. As discussed in Roland (2000) and Mylovanov and Roland (2022) it is critical to ensure consistency and irreversibility of reforms as well as to overcome vested interests. As a result, all proposals on Ukraine's reconstruction suggest that aid to Ukraine should be conditional on transparent, objectively measured, and verifiable outcomes. Given many potential sources of aid, Gangster et al. (2022) observe that having one body to oversee reconstruction should help avoid conflicting donor conditionalities.[12] Some proposals (e.g., Boyarchuk et al. 2023) suggest project-based funding to facilitate evaluation and transparency. The Ukraine Facility Plan (4 years, €50 billions) signed by Ukraine and the EU in 2024 is an example of how tranches of aid can be tied to a schedule of more than 150 reforms.

E. Grants rather than loans

The country destroyed by the war will unlikely be able to service and repay additional debts in the short run. A focus on loans will increase the risk of a debt crisis in the future. To attract fresh capital after the war, the country should not be saddled with debt. While the Marshall Plan set an important precedent in this respect, the wartime funding of Ukraine suggests that donors tend to rely on loans (Trebesch, 2023): according to the Kiel Institute for the World Economy, less than 40% of financial aid to Ukraine (~$80 billion) as of April 2024 was in grants. Furthermore, all proposals stress the importance of predictable, multi-year financing for Ukraine's reconstruction.[13]

---

[12] As a point of reference, Natalie Jaresko, Ukraine's minister of finance in 2014-2016, was managing more than 400 individual conditions important by various bilateral and multilateral agreements (Savoy and Staguhn 2023).

[13] EU accession could provide more funding through the union's structural funds but, as we discuss below, access to these funds may be delayed. The only significant funding source that is not putting pressure on either Ukraine's future fiscal position or on the finance ministers of the EU is the frozen Russian assets. A large part of these funds (around €200bn) are held by Euroclear in Belgium, and in total there is supposedly around $300bn in different jurisdictions that are part of the sanctions coalition. These funds could be a significant contribution to the reconstruction without the fiscal problems mentioned above. International law consideration has so far prevented a full transfer of funds to Ukraine, but the G7 together with the EU is planning to use the returns of the frozen Russian assets to create a $50bn fund for Ukraine. Becker and Gorodnichenko (2024) argue that this fund could be at least twice this size.

F. Build Back Better

Reconstruction proposals are unanimous in wanting to convert the tragedy of the war into an opportunity to deeply modernize the country. For example, Russian attacks destroyed more than 90% of power generation that relied on coal and other fossil fuels. While some power plants may have to rely on fossil fuels to provide maneuverability for the supply of electricity, one can envision a post-war power generation that is much more environmentally friendly (Deryugina et al. 2022). In a similar spirit, the destroyed housing stock was constructed in the Soviet era and hence was hugely energy inefficient. Rebuilding housing according to current energy efficiency standards can hit two birds with one stone: cut emissions and reduce reliance on Russian energy (Green et al. 2022). Making infrastructure more compatible with the EU's will help integrate Ukraine in the European markets.

To be clear, the building back better principle covers not only "hardware" such as bridges, housing, etc. but also "software" such as norms, institutions, human and social capital. For example, although Ukraine has made dramatic progress in addressing corruption, Transparency Internation ranks Ukraine as one of the most corrupt counties in Europe. Further efforts to reform the courts, civil service, antitrust regulation, to ensure free media (Mylovanov and Roland 2022), to strengthen anti-corruption practices (Becker et al. 2022), and to delegate more powers and responsibilities to local governments (Myerson 2022).

G. Coordination

Experts agree that coordination of reconstruction efforts is critically important, the body tasked with coordinating aid and reconstruction should have strong presence on the ground in Ukraine, a certain degree of centralization is needed to ensure efficiency, planning, and prioritization. At the same time, it is recognized that some decentralization is needed to utilize local knowledge, build local capacity, and create competition for funds.

However, the views on how to implement coordination vary. For example, Becker et al. (2022) recommend that aid should be administered by a self-standing EU-affiliated or authorized *agency* independent of but accountable to multilateral, bilateral, and nongovernmental donors. On the other hand, the proposal in Gangster et al. (2022) suggests a *platform* led by G7 to involve non-EU countries and international financial institutions into reconstruction. While *agency* vs. *platform* may appear a minute difference, the practical implications can be rather significant. For instance, agencies typically entail predictable budgets and stable staff. In contrast, platforms tend to be meeting places where non-binding decisions are made and periodic donor conferences are organized.[14]

Many other elements of design are important. While experts generally agree that Ukraine should have strong voice in the organization that coordinates recovery, they have different plans for the exact role of Ukraine. For instance, while Eichengreen and Rashkovan (2022) envision an EU-centered agency headquartered in Brussels and with offices in Kyiv and other regions of Ukraine, Gangster et al. (2022) suggest that a multi-donor trust fund run by "an American with a global stature" potentially located in Washington DC can be the coordination vehicle.[15] The European Commission (EC) proposes that the effort is co-led by the EC and the Ukrainian government (EC 2022). RRR4U (2023) proposes to utilize the line ministries of Ukraine and have the Prime Minister as the head of the effort with "the Agency for Restoration" being responsible for public procurement. In a similar spirit, the Ukrainian government's proposal (NRC 2022) builds on the existing ministries coordinated by a council co-chaired by the Prime Minister, the speaker of the parliament, and the head of the office of President of Ukraine. This contrasts with parallel governance structures (including external, independent "inspector general", auditors, etc.) discussed in Gangster et al. (2022), Todd et al. (2022), Savoy and Stanugh (2023) and others.[16] Thus, autonomy assigned to the body varies greatly across the proposals.

What functions will the body perform and how much power the body should have? Data collection and dissemination, technical assistance, communication and coordination with stakeholders, and organization of donor conferences are generally agreed on. There is also consensus that the body should have some authority to have influence on the recovery process, but

[14] The current G-7 platform (G7+ Ukraine Energy Coordination Group; coordinationplatformukraine.com) was established December 2022. The platform has a secretariat of 30 persons (compare with thousands of people working for the ECA) and meets approximately every two months at the level of finance ministers. In addition to Ukraine and G7 countries, the platform includes Sweden, Korea, Norway, and the Netherlands. The platform is co-chaired by Ukraine, the USA, and the EU.

[15] As of 2024, nearly all key international financial institutions manage their own multi-donor trust fund. Proliferation of the funds suggests that such vehicles lead to more rivalry rather than coordination.

[16] For example, United Nations' Interim Administrative Mission in Kosovo (UNMIK) was a central agency effectively running the country while it was establishing its own institutions. Ukraine does not need such external governance structures because unlike Kosovo and other emerging or failed states, Ukraine has a functioning government.

the suggested degree of authority varies from recommendations to the government (NRC 2022) to a "tzar" controlling the purse strings (Gangster et al. 2022).

Clearly, the details will depend on the outcome of the war and complicated political processes in Ukraine and abroad. Given the trade-offs in the design and other principles (e.g., EU accession, conditionality, etc.), a compromise can take the following form. On balance, an agency is preferred to a platform because the agency option can provide consistent practices and clearer responsibility. There should be unambiguous leadership and hence accountability similar to what Paul Hoffman had in the Marshall plan. Building parallel governance structures will likely result in more bureaucracy, delays, and interagency rivalries. Instead, the focus should be on building and utilizing the capacity of Ukrainian institutions and civil society (e.g., the Accounting Chamber of the Parliament, see Boyarchuk (2023) for a discussion). As a result, it can be an EU agency[17] (with regional offices in Ukraine) co-led by the EC and the Ukrainian government to recognize that EU accession is the ultimate objective of reconstruction, avoid creating new government bodies in Ukraine, coordinate funding and projects, and align with EU practices.[18] This agency can have decision-making autonomy (not only from the Ukrainian government but also the government of an EU country to escape hold-ups) and its power can come from the agency's ability to delay or withdraw funding in response to proposals made by Ukrainian authorities. The new agency with sunset provisions (e.g., the mandate of the agency expires when Ukraine joins the EU) can recruit fresh cadre or use experts on secondment. As suggested by Shatz et al. (2023) and others, the role of the US may be centered on ensuring Ukraine's security. Other countries (Japan, Canada, Korea, etc.) can participate via the MDTFs managed by the agency.

H. Corruption and Rule of Law

There are few issues that are more important than fighting corruption and establishing a strong rule of law system for the citizens and businesses of Ukraine as well as the country's international partners. In every discussion of EU accession, foreign financial assistance or companies considering investing in Ukraine, perceived and actual problems of corruption always come up.

---

[17] Becker et al. (2022), Bandura (2023) and others give also a political reason for an EU agency. They observe that many international financial institutions where Russia and Russia's supporters are shareholders who may show little interest in Ukraine's long-term success. An institution with owners vested in Ukraine's recovery will address these concerns.

[18] Kosmehl et al. (2024) observe that 70% of EU programs are executed under shared responsibility of the EC and national/regional authorities of EU member states.

Although the focus in many discussions is on anti-corruption measures, rule of law more generally is the foundation of both a democratic society and market economy as well as the basis for fighting corruption. It is also part of the Copenhagen criteria and a must for a country that wants to join the EU. Moreover, the EU has introduced a revised enlargement methodology in 2020, which takes on board the lessons from previous enlargement rounds, in particular the difficulties the EU is having with member countries backsliding on rule of law and judiciary independence after accession. The revised accession process is organized around negotiating chapters that set the criteria for candidate countries to enter, and the "fundamentals" chapter (covering inter alia judiciary rights, freedom and security, public procurement and financial controls) is the keystone, it is opened first and closed last (Darvas 2024). Rule of law is also crucial for property rights protection which has been identified as a key factor limiting foreign direct investment (FDI) in the past (Movchan and Rogoff, 2022). Reforming the judicial system[19] to strengthen rule of law will therefore have to be a key ingredient in Ukraine's strategy and donors should provide adequate funding and technical assistance in this area while ensuring that strict conditions are met as part of funding agreements. Reforms should be implemented upfront and aligned with EU laws and institutions.

I. Public vs private funds

The staggering cost of Ukraine's reconstruction suggests that public financing is unlikely to cover Ukraine's needs. Recognizing this funding gap, the reconstruction proposals suggest that Ukraine should focus on making the country an attractive destination for FDI. The experience of Eastern European countries indicates that the tangible prospect of joining the EU should be a powerful factor in encouraging European firms to invest in Ukraine that can already offer educated workforce, geographical proximity to EU markets, unique expertise in IT, etc.[20] In addition to providing capital, FDI can facilitate technological transfer to Ukraine and integration of Ukraine into European and global value chains. The proposals thus focus on how one can leverage public

[19] This also means joining the EU institutions. For example, Becker et al. (2022), Gangster et al. (2022) and others suggest that Ukraine should join the European Public Prosecutor's Office.

[20] Becker and Olofsgård (2018) document that investment rates in transition countries that joined the EU were significantly higher than in the ones that did not (21 percent compared with 15 between 1991-2015 on average). The higher investment rate alone increased predicted annual growth by more than a percentage point in transition countries that joined the EU.

funds to maximize the flow of private funds. In this context, policies with large multiplier effects include various forms of risk sharing (public-private partnerships, guarantees), concessionary loans via development banks (e.g., European Bank for Reconstruction and Development, European Investment Bank, Council of Europe Bank, European Development Finance Institutions), war insurance to de-risk investment (similar to the World Bank's Multilateral Investment Guarantee Agency; see Repko (2023) for a discussion), and encouraging entry of European banks into Ukraine.

6. Phases of reconstruction

Proposals generally suggest three phases of reconstruction (e.g., Becker et al. 2022, Gangster et al. 2022, NRC 2022): *i*) relief (or emergency response), *ii*) revival of critical infrastructure and economy, *iii*) modernization and EU accession. As emphasized in Gangster et al. (2022), there is a delicate balance between the urgent needs of the country ravaged by the war and the country's ability to absorb aid.

The first phase (relief) is akin to the response to a natural disaster when humanitarian aid must be delivered rapidly to cover basic needs (food, medical supplies, access to electricity and heating, etc.). This phase should be focused on helping areas that are close to the front lines or are under Russian occupation. While conditionality of aid is expected to be relaxed at this phase, it is important to prepare for effective relief: estimate likely needs (e.g., maintain a real-time registry of damages), line up resources (e.g., prescreen contractors), prepare contracting framework (e.g., develop framework agreements, protect whistleblowers, adopt Open Contracting Data Standards similar in spirit to ProZorro), and coordinate with international relief programs. There is much uncertainty about how much this phase can last, but the available estimates suggest 6 to 12 months for this phase.

The second phase is about rebuilding critical social and physical infrastructure. In other words, the effort should be focused not only on repairing bridges, water pipes, and electric power lines and plants, replenishing the stock of railroad cars, trucks, busses, etc. but also on resuming access to temporary shelter and institutions of education and healthcare. The latter is critical to ensure the return of refugees and internally displaced persons to their home regions. At this stage, the government should also lay foundations for the third phase. For example, because the war deeply impaired the balance sheets of Ukraine's financial institutions, the National Bank of Ukraine should conduct a rapid asset quality review of the banks and recapitalize them as necessary. Experts predict that this phase can take about a year or two. Because of the war-related risks (e.g., the need to demine large swaths of land), the brunt of funding is expected to fall on the public sources.

The last phase is about setting the country on a long-term, sustainable growth trajectory. This phase includes alignment of Ukraine's physical and legal infrastructure with the EU's. This phase also broadly means breaking away from the Soviet legacy. For example, Myerson (2022), OECD (2022) and others stress that Ukraine should give more political and economic power to local governments to create more political competition, build resilience of local communities and enhance effectiveness of governance and resource allocation. Investment in housing stock is often mentioned as a high priority because, as suggested by the post-WWII experience, lack of housing is a limiting factor for bringing people back to their home regions and to work (e.g., Eichengreen 2023). While this phase is expected to take 10 years or so,[21] Klimkin and Miklos (2022), Becker et al. (2022), Gangster et al. (2022) and others emphasize that many reforms should be frontloaded (even done during the war) to create the momentum, ensure irreversibility of the changes towards the EU accession, and maintain public support of Ukraine in the West. For this phase experts expect private FDI to take the dominant role. This is the time to forge cross-border alliances for businesses, universities, and governments.

7. Sectoral Policies

Given space constraints, this section provides summaries for selected sectoral dimensions of the reconstruction. We focus on highlighting key issues and potential solutions.

A. Regulation, Industrial Policy and Allocation of Resources

Previous reconstruction cases suggest that some degree of government planning is essential to ensure coordination and efficiency. For example, France adopted indicative planning (the Monet

[21] Even the accelerated transition of East Germany after reunification, which involved substantial transfers from West to East, took decades.

plan) after World War II to set investment targets and allocate funds (Eichengreen 1995). As we discussed above, government intervention is likely to be particularly important at the relief stage when market forces cannot function properly in a destroyed economy. For later phases of recovery, most proposals suggest that the long-term development of Ukraine has to rely on market-based allocations of resources to ensure efficiency. However, this view is not shared universally. For instance, Stiglitz and Kosenko (2024), Tooze (2023) and others warn of the dangers of trying to implement another version of the so-called Washington Consensus for transition economies in post-war Ukraine.

Naturally, there has to be a balance between costs and benefits of government intervention, but, to give a perspective on the matter, we provide a few examples of how deep state intervention goes in Ukraine. Unlikely many transition economies, Ukraine had a repeatedly-renewed moratorium on land markets thus effectively denying citizens to exercise their rights on their land, agribusiness to utilize economies of scale, and banks to use land as collateral (Gorea 2023, Carletti et al. 2024). The labor code of Ukraine is based on the law passed in the 1970s with some modifications sporadically introduced to address crises (Kupets et al. 2023, Boyarchuk et al. 2023). This legislation does not address the needs of the modern economy and pushes the labor market into shade. World Bank's Ease of Doing Business Index ranked Ukraine at 151st place in 2011 and, although Ukraine made tremendous progress since then, the country was ranked 64th in 2020 (for comparison, Poland was 40th). These illustrations should provide a sense of pervasive red tape which not only inhibits economic activity but also breeds corruption. On the other hand, the light regulatory touch for IT services generated a phenomenal boom in this sector thus helping the country to accelerate digitalization of the government sector and broader economy (Movchan and Rogoff 2022, Savoy and Staguhn 2023, Boyarchuk et al. 2023, Kosmehl et al. 2024).

The choice of dirigisme vs. markets is also important for post-war reallocation of resources. Indeed, Movchan and Rogoff (2022), Green et al. (2022), Kochnev et al. (2023) and others observe that economic activity in Ukraine was increasingly gravitating toward Western Ukraine that was safer and closer to the EU market. Many experts predict that the war and EU accession will accelerate this process and hence Ukraine will likely go through a massive reallocation of resources. For example, Anastasia et al. (2022) estimate that at least 10% of the workforce will need to change jobs. Some industries (e.g., coal mines in Eastern Ukraine) are gone for good. To facilitate this process, Ukraine should have an element of planning and other forms of government support (e.g., retrain workers, protect workers rather than jobs, provide war insurance) but ultimately one needs the flexibility of the markets to ensure that labor and capital flow to the best uses and hence to fully utilize scarce resources. Given the weak capacity of the government, Becker et al. (2023), Aslund and Kubilius (2023), Bjerde (2023) and others argue that public policies relying on differential treatment of economic activities may overwhelm state capacity and thus backfire. For instance, Ukraine had a negative experience of experimenting with special economic zones that turned out to be vehicles for money laundering rather than economic growth. On the other hand, Ukraine's agribusiness is highly competitive without significant government subsidies or other forms of protection. These considerations call for deregulation (lower compliance burdens, simpler taxation, etc.) and refocusing scarce government capacity from determining economic activity to providing a level playing field.[22]

B. Macroeconomy

Based on historical experience, nearly all proposals indicate that a successful recovery requires a stable macroeconomic environment. Becker et al. (2023) make detailed recommendations for fiscal and monetary policies.[23] In a nutshell, even after the war is over, Ukraine will face significant shortages of funds and inflationary pressures as the reconstruction needs far exceed the fiscal capacity of the government and various dislocations and bottlenecks in the economy drive up the costs. As a result, the government should seek a deep debt relief, mobilize revenues (specifically, close tax loopholes, broaden the tax base, reduce the cost of tax compliance, introduce progressive income taxes or a solidarity tax), privatize state-owned enterprises (to reduce opportunities for corruption and to minimize quasi-fiscal deficits), align regulated prices to cost-recovery levels, and control spending (e.g., make aid more targeted,[24] consolidate and digitize public services, reform the pension system, etc.). Importantly, Becker et al. (2023) suggest establishing a fiscal council to bring discipline and transparency to budgetary matters.

---

[22] At the same time, experts generally agree that some industries are critical for reconstruction (e.g., renewable energy, critical minerals, the manufacture of metals, machine building, agro-food, IT) and thus there could some scope for an industrial policy. See Grygorenko and Schnitzer (2022) and Kosmehl et al. (2024) for a discussion.

[23] See also Bandura (2023), de Groot and Skok (2023), and Bogdan and Jovanović (2023).

[24] For example, Boyarchuk et al. (2023) reports that only 36% of social assistance went to households in the bottom third of incomes and 24% of the assistance when to the top third. Social insurance is provided by ten central government agencies and 12 local government agencies (Ieruslymov and Marchak 2021). Because there is no centralized registry of social aid recipients, social insurance is rather fragmented.

On the monetary front, there is a general agreement that Ukraine will be best served by the regime of inflation targeting with a floating exchange rate.[25] The proposals envision that the float will be managed to minimize fluctuations that may undermine macroeconomic stability. To avoid potential boom-bust dynamics, the experts suggest rigorous macroprudential policy. The National Bank of Ukraine is well positioned to be an effective regulator as it oversees most financial services. There is less agreement on the role of capital controls. Becker et al. (2023) advocate the use of capital controls (as a part of macroprudential toolkit) towards achieving macroeconomic stabilization as well as avoiding excessive growth of credit, speculative capital flows, and large fluctuation in the exchange rate. On the other hand, Herbst et al. (2024) suggest that capital should flow freely to attract FDI. Another important task for the National Bank of Ukraine is to resolve non-performing loans (after reviewing several options, De Haas and Pivovarsky, 2022, propose a semi-centralized approach that was use after Russian aggression in 2014) and recapitalize banks (the backbone of Ukraine's financial system) to ensure that credit flows support economic recovery. There is a broad-based agreement that the central bank should not finance fiscal deficits or act as a development bank. These activities could contradict the price stability mandate and open the central bank to political influence.

C. Demography, Human Capital and Labor Market

Tverdostup (2023), Perelli-Harris (2023) and others are warning that Ukraine's population can shrink from 42 million before the Russian full-scale invasion to as little as 30 million after the war due to elevated mortality rates, low birth rates, and high emigration. The demographic problems are amplified by large losses of human capital and the need to re-integrate millions of veterans, refugees and internally displaced persons to normal, civilian lives (Schuettler and Caron 2020, Torosyan et al. 2018). To address these negative factors, Anastasia et al. (2022), Kupets et al. (2023), and others propose a multi-pronged strategy with a number of cross-cutting considerations.

[25] Historically, monetary regimes varied at the recovery stage across countries. Consider for example countries discussed in Section 4. After WWII, Western European countries adopted fixed exchange rates under the Bretton Woods system. Post-2004 Iraq pegged its currency to the US dollar. Afhagnistan's economy in early 2000s was cash based and did not have a meaningful financial system. Cobham (2021) classified monetary regimes in Pakistan and Sri Lanka as "loosely structured discretion", i.e., regimes where i) the instruments are effective but the objectives and trade-offs are unclear; or ii)) the objectives and trade-offs are clear but the instruments are ineffective; or iii) combinations of i) and ii). Interestingly, the International Monetary Funded urged the central bank of Pakistan to raise interest rates to fight inflationary pressures after the 2005 earthquake. Despite this variation, Fratzscher et al. (2020) and Ramcharan (2007) document that countries with inflation targeting and a flexible exchange rate regimes have better economic performance after natural disasters.

First, losses in human capital should be compensated by remedial education and training. Kahanec et al. (2022) suggest that Ukraine needs to reform its educational system (specifically, vocational training) to refocus from quantity to quality of education. Pham et al. (2023) find that soft and analytical skills are increasingly demanded in Ukraine and the reformed education system should help to meet this demand. Second, available human capital should be utilized more effectively. In practical terms, groups marginally attached to the labor market should be encouraged to seek gainful employment. For example, more government sponsored childcare can allow more women to participate in labor force—and potentially increase birth rates, see e.g., Sobotka et al. (2019) and Klawij (2010). This also entails flexibility of labor relations to overcome not only the consequences of the war but also pre-war mismatches and other distortions (e.g., Kupets 2016), which among other things calls for an overhaul of Ukraine's Public Employment Service. Policy proposals also suggest that Ukraine should consider migrants to address potential labor shortages. Third, a post-war labor market should offer not only flexibility (the leitmotif of the proposals is to shift the focus from protecting jobs to providing insurance to workers) but also training and protection to the most vulnerable groups (e.g., veterans and older workers). It is important that such a system of support is sustainable in the long run and relies on communities (Demers 2011) and high-quality data (Kupets et al. 2023). Finally, even if some Ukrainians stay abroad after the war, one can still make use of this diaspora. Indeed, these "ambassadors" in the EU and other countries can help forge stronger links between Ukraine and the host countries (Adema et al. 2023).

More generally, policy proposals emphasize the importance of human-centered nature of Ukraine's reconstruction (e.g., Busby and Burke, 2024) and the need to modernize the systems of education and science (e.g., Bervershenko and Kolezhuk 2022) and healthcare (e.g., Dhzygyr et al. 2022). This is a key concern because reconstruction programs tend to focus on physical investment projects and, perhaps not surprisingly, the plan outlined by the Ukrainian government (NRC 2022) allocated less than one percent of the entire budget to education-related projects (Kosmehl et al. 2023).

D. Urban Development

Russian attacks destroyed nearly 9% (as of July 2024) of Ukraine's housing stock. Mariupol, Bakhmut and many other cities in Eastern Ukraine are in ruins. Kharkiv, Kryvyi Rih and other cities close to front lines are bombarded daily. Even safer cities such as Lviv, Vinnitsa and Kyiv have significant damage. Green et al. (2022), Bredelles et al. (2023), Cirella (2024), UN4UkrainianCities (2024) and others provide recommendations on how to rebuild urban centers, a monumental task and tremendous opportunity to facilitate greater urban productivity and improve quality of life (Hornbeck and Keniston 2017).

As we discussed above, the housing stock is largely inherited from the Soviet era (90% of buildings were erected before 1991). Furthermore, unlike cities in market economies, Ukrainian cities have high central densities for their size and heavy emphasis on public transportation. Another unusual feature is that, because of mass privatization, roughly 90% of households own their residential units (which can make coordination difficult) but buildings are managed by the government and the government often owns the land. Finally, data for many key variables are incomplete or missing.

Should the cities be renovated to their pre-war state? Given how energy inefficient Soviet standards were, restoring building to their original state is perceived as counterproductive. Some cities have lost their economic core (a mine or a factory built in Soviet times) or are too close to the border with Russia thus making a full recovery (or even the need for recovery) less than clear. Market economy will likely encourage less dense construction (i.e., more people will likely live in suburbs) which calls for rethinking city plans. In some cases, there could be political decisions to rebuild cities that cannot survive with their pre-war economic models. For these situations, experts suggest that government services, education and healthcare can provide economic foundations for these cities (the recovery of Pittsburgh after the collapse of steel industry is often mentioned in this context). In short, although there is a natural tendency to rebuild cities to the way they were, each city should be evaluated on an individual basis to determine how (or if) it will be rebuilt.

Conditional on the decision to rebuild a city, the next challenge is to secure financing, find competent contractors who can follow the modern building code, and to execute the plans. Green et al. (2022) recommend that the government should issue vouchers (roughly corresponding to the pre-war market value of the damaged/destroyed property) to households and businesses to buy or rent a new home, factory floor or land. Relative to providing government-sponsored housing, this mechanism can allow people to potentially reallocate to places with better employment opportunities and even out the pressure on existing and under-construction housing stock. Gorea (2023) argues that vouchers may be used as downpayments and thus can jumpstart the market for mortgages which are grossly underdeveloped in Ukraine (the pre-war stock of mortgage stood at approximately 1% of GDP, see Carletti et al. (2024) for a detailed discussion). To address pervasive corruption and cost overruns in the construction industry, Green et al. (2022) advocate for more competition and transparency in the industry (e.g., "sunshine laws", modular/prefabricated homes), which again may be easier to achieve with the voucher system. Clearly, some public funding will be necessary to make initial investments and hence there is a need for more decentralization of the government and a greater role for property taxes to ensure that local communities have the necessary resources and appropriate incentives. It is also critically important to liberalize the land market so that households and businesses can own land under their homes and factories and thus remove a major source of uncertainty. The government should have authority to remove rubble and take over land under destroyed or abandoned property (houses, farms, factories) to minimize holdup problems and aggregate land into contiguous parcels. Finally, capacity building at the local level is particularly important because many mayors do not have capacity to advocate for their cities (UN4UkrainianCities 2024).

E. Energy and Infrastructure

A big part of the build back better strategy for Ukraine is focused on modernizing its energy sector. Historically, Ukraine's economy was one of the most energy intensive economies in the world which reflected not only the industry mix but also tremendous energy inefficiency. Due to a combination of post-Soviet deindustrialization and adjusting energy prices closer to market levels, energy consumption fell by a factor of almost 3 since the late 1980s with big declines in power generation from fossil fuels. However, aging energy infrastructure (e.g., 90% of electricity transmission lines are outdated) leads to massive energy losses (e.g., the loss rate for electricity is 10%, which is approximately a double of the loss rates in Poland, France and other advanced economies) and Soviet-era housing stock is hugely energy inefficient. At the same time, experts point to a number of bright spots: more than 50% of electricity is generated by CO_2-clean nuclear power, renewables (including biomethane production based on Ukraine's strong agricultural sector) account for a small share but they have great potential and their growth has been rapid, Ukraine's electric and natural gas grids are connected to the EU grids.

All policy proposals (e.g., Deryugina et al. 2022, NRC 2022, DiXie Group 2024, Holovko, and Haug 2023) emphasize the unique opportunity for Ukraine to radically upgrade and decarbonize its energy sector. For example, Russia destroyed 90% (as of May 2024) of Ukraine's power generation that relied on fossil fuels. Because many of these power plants are beyond repair, Ukraine can technologically leapfrog and focus on cleaner energy sources. In a similar spirit, the destroyed housing stock should be replaced with energy efficient homes. There is a consensus view that further investments in energy efficiency of existing housing should be matched with stronger price incentives to conserve energy (e.g., install electric, gas, and heat meters, more electrification, cost-recovery prices for energy) and encouraging more competition, supply and transparency in power generation (e.g., allow multiple providers of energy, replace cost-plus tariffs with regulatory asset-based (RAB) tariffs, gather and publish disaggregated data on production and consumption of energy). Further investment in renewable energy should not only reduce the CO_2 footprint but also help address national security concerns (distributed power generation and distribution makes the economy more resilient). Policy proposals suggest that these measures should allow Ukraine to become self-sufficient in energy and to create potential synergies such as "green steel" production. Policy discussions stress the importance of aligning Ukraine's energy standards with the EU's and fully integrating the energy grids of Ukraine and the EU. For example, the war demonstrated that, despite accelerated connection to the European Network of Transmission System Operators (ENTSO-E) Ukraine does not have enough interconnectors for electric transmission. As of June 2022, NRC (2022) estimated that green transition for Ukraine can take about 10 years and cost $100-$150 billion. While the price tag is high, some of the cost may be shouldered by the EU Green Deal. The EU accession process will require an accelerated transformation of the energy system, since Ukraine would eventually be expected to join the EU emissions trading system (ETS) and the path to net zero.

Many of these issues and recommendations apply to the broader infrastructure of Ukraine (e.g., Bilotkach and Ivaldi 2022, Bandura et al. 2022, Kosse 2023, EIB 2023). For instance, Bilotkach and Ivaldi (2022) observe that the dense, electrified railroad network of Ukraine is Moscow-centric not only in terms of gauge width but also the network of tracks (more than 23,000 kilometers; see Grushevska et al. (2016) for more details) while accession to the EU dictates the need to have more interoperability with the EU rail network. In practice, this means more interconnectors (including more cross-border crossing points[26]) and changing the gauge for at least

[26] For example, using help from the EU, Ukraine revamped its ports on the Danube river to reopen shipping lanes after Russia left the "grain corridor" deal.

some tracks to the European 1,435 mm standard (the projected cost varies from $40 billion to $130 billion with 10 or more years to completion, but a "backbone" version can cost only $15 billion, see EIB 2023) to reduce the cost and time of shipping goods between Ukraine and the EU (now, cargo and passengers have to change at border terminals), increase competition, and to address security concerns (e.g., Russia is now using Ukraine's railroad network with 1,520 mm gauge in the occupied territories to move troops, military equipment, and materiel). Other transport infrastructure (especially seaports) will need more urgent investments to resume operations but, with come centralization of planning (Sakalasuria et al. 2018) for post-war reconstruction to meet the "dig once" objective, one can envision more decentralization and private funding (e.g., concessions, tolls, public-private partnerships) for sea/river ports, airports, and highways to cover the cost and increase competition (OECD 2011). In short, although Ukraine joined the EU's Trans-European Transport Network (TEN-T) program in 2017, the reconstruction should accelerate and deepen compatibility and interoperability with the EU networks.

F. Anticorruption

Much of corruption in the past has been linked to specific schemes or sectors, such as the financial system, public procurement, state-owned enterprises, overregulated markets, improper use of public assets, tax evasion, and petty corruption in providing public services. Policy proposals on fighting corruption (e.g., Becker et al. 2022, Lohsen and Fenton 2022, Boyarchuk et al. 2023) focus on four components: removing opportunities for corruption and rent extraction; monitoring and transparency; information and education regarding corruption; and ensuring that anti-corruption and legal institutions are working properly. Each of these components has several practical implications. For example, the DREAM (Digital Restoration Ecosystem for Accountable Management) system recently developed by Ukraine illustrates how public service delivery can be improved while also providing opportunities for enhanced reporting and transparency. Fighting corruption has many cross-cutting issues ranging from deoligarchization to community building. For instance, given the vast amounts of money and highly diverse sources of funds, a single institution in charge of reconstruction should be better positioned to limit corruption. At the same time, local governments and citizen involvement will be crucial to ensure that money is used in the best interest of all citizens (e.g., Meyerson 2023).

G. Political economy

Inevitably, wars result in winners and losers. So do rapid transformations of countries. An enduring lesson from transition economies is that political economy considerations can stall or undo reforms (Roland 2002). Indeed, the massive re-distribution of property and incomes led to high inequality and deep unhappiness in post-Soviet countries (Djankov et al. 2016, Guriev and Zhuravskaya 2009). Hence, it is vital to maintain public support for the modernization of the country and EU accession. As discussed in Mylovanov and Roland (2022), Klimkin and Miklos (2022) and others, this means starting with reforms that are more likely to have broad-based backing (e.g., visa-free travel to the EU was very popular among Ukrainians), protecting the vulnerable groups subject to maintaining appropriate incentives (e.g., low-income households should have subsidies to pay for utilities but such households should face the market-rate tariff for the marginal unit of electricity, heat, etc.), involving stakeholders in adopting and monitoring policies (e.g., decentralization should help reduce the distance between citizens and policymakers), ensuring transparency, fairness and inclusiveness of government programs (e.g., a registry of recipients of government aid, credible audits by independent watchdog organizations). Mylovanov and Roland (2022), Boayrchuk et al. (2024), Savoy and Staguhn (2023), Bandura (2023) and others stress the importance of ensuring that Ukraine's reconstruction does not lead to a new class of oligarchs or resurrection of existing oligarchs weakened by the war (Minakov 2023).

H. Changes in the European Union

Although analyses of Ukraine's reconstruction tend to concentrate on various projects and policies in Ukraine (including adopting the EU acquis), there is a general sense that Ukraine's accession to the EU will likely spur changes in how the EU operates (e.g., Klimkin and Miklos 2022). For example, Ukraine can change the balance of power in the Union not only with its size but also with its "claim" on EU structural and agricultural funds at the expense of other EU members.[27] The emerging expectation is that Ukraine will follow the template of Eastern European countries in the 2004-2007 enlargement and have delayed access to EU funds, free worker mobility, etc. (i.e., concessional accession with transition periods). A similar approach was deployed to overcome farmers' opposition against the southern enlargement, where notably French farmers in the south

[27] According to one widely cited study estimated that with current rules of the common agricultural policies, Ukraine's membership would cost up to €96 billion, which would result in a 20 percent reduction of for other countries (Albaladejo 2024). Herbst et al. (2024) report that Ukraine can claim €186 billion from the EU's seven-year budget.

feared Spanish competition and threatened farmer's revolts. The solution entailed grandfathering of incumbents, concessions and transition periods by accession countries as well as a reform of the agricultural policies (Albaladejo 2024). Despite these concerns, integrating Ukraine's agribusiness into EU value chains (Kosmehl et al. 2024) also constitutes a great opportunity for Europe to improve its' food security.

Fears of large migration flows may be a further concern both for the EU and for Ukraine. As noted above, since the Russian invasion about 6 million Ukrainians have fled the country and are currently living in the EU. Based on the accession experience of the Baltics, Bulgaria and Romania and assumptions about the willingness of refugees to return, Darvas et al. (2024) estimate that a further 3-6 million Ukrainian people might migrate. Compared to the EUs' overall estimated net immigration (of about 40 million from 2023- 2050) this is sizable but not overwhelming. However, in the high emigration scenario Ukraine might suffer further brain drain and, reducing its' population to 20 million by 2050 and challenging its economic recovery.

More generally, the EU of 27 members is already challenged by the complexity of its procedures and the need for unanimity on many key issues. The flip side of unanimity is the individual veto power, which can result in the union being "held hostage" by single rogue actors (as has repeatedly been shown by Hungary's President Orban). The EU will need to embark on a deep process of institutional reform to prepare for further enlargement. As discussed in Costa et al. (2023), the most important reform will be moving towards broader use of qualified majority voting rather than unanimity.

In short, the reforms on the EU side to accommodate the newcomers like Ukraine will also be challenging. But, enlargement constitutes an opportunity to enact necessary institutional reforms, transform and modernize, both, Ukraine and the EU.

8. Concluding remarks

This article is unusual: instead of surveying existing results, it focuses on forward-looking proposals, future projects, and potential solutions. And yet, because there are so many possible paths for recovery and modernization and so much is at stake, an early analysis and synthesis of the things to come is precisely what the public and academic discourse must have. Indeed, an enduring lesson of the Marshall Plan was that it came almost too late: the distance from Victory

Day in Europe (May 8, 1945) to launching the Plan (April 3, 1948) was the three most painful years in the countries devastated by World War II. Hence, the monumental endeavor of Ukraine's reconstruction should commence now. No single article can provide an exhaustive account of this seemingly unsurmountable challenge, but we hope that this paper will help stimulate future debates and steer policy towards sustained economic development of Ukraine and lasting peace in Europe and beyond.

References

Adema, Joop, Yvonne Giesing, Tetyana Panchenko and Panu Poutvaara, 2023. "The Role of the Diaspora for the Recovery of Ukraine," *CESifo EconPol Forum* 2 / 2023 March Volume 24: 41-45. Available at https://www.cesifo.org/en/publications/2023/article-journal/role-diaspora-recovery-ukraine .

Albaladejo Roman, Antonio, 2024. "Ukrainian Agriculture, From Russian invasion to EU integration," European Parliament Research Service, PE 760.432, April 2024

Anastasia, Giacomo, Tito Boeri, Marianna Kudlyak, and Oleksandr Zholud, 2022. "The labour market in Ukraine: Rebuild better," in Yuriy Gorodnichenko, Ilona Sologoub, and Beatrice Weder di Mauro (eds), *Rebuilding Ukraine: Principles and policies*, CEPR Press.

Andor, László, and Uwe Optenhögel, eds., 2023. *Europe and the War in Ukraine: From Russian Aggression to a New Eastern Policy*. London Publishing Partnership.

Lohsen, Andrew, and Nick Fenton, 2022. Corruption and Private Sector Investment in Ukraine's Reconstruction. Center for Strategic and International Studies. Available at https://www.csis.org/analysis/corruption-and-private-sector-investment-ukraines-reconstruction.

Arons, Steven, 2022. "Ukraine Reconstruction May Cost $1.1 Trillion, EIB Head Says" Bloomberg June 21, 2022, available at https://www.bloomberg.com/news/articles/2022-06-21/ukraine-reconstruction-may-cost-1-1-trillion-eib-head-says.

Åslund, Anders, 2009. *How Ukraine Became a Market Economy and Democracy.* Washington, DC: Peterson Institute for International Economics, 2015.

Åslund, Anders, 2015. *Ukraine: What Went Wrong and How to Fix It.* Washington, DC: Peterson Institute for International Economics.

Åslund, Anders, and Andrius Kubilius, 2023. *The Reconstruction, Reform, and Accession of Ukraine*. Frivärld – Stockholm Free World Forum.

Åslund, Anders, and Torbjörn Becker, 2024. "A European Marshall Plan for Ukraine on the Way to the EU," in Antonina Bakardjieva Engelbrekt, Per Ekman, Anna Michalski, Lars

Oxelheim, eds., *The Borders of the European Union in a Conflictual World*. Palgrave Mcmillan.

Bandura, Romina, 2023. Eight Recommendations to Reconstruct and Modernize Ukraine. *CESifo EconPol Forum* 2 / 2023 March Volume 24: 10-15. Available at https://www.cesifo.org/en/publications/2023/article-journal/eight-recommendations-reconstruct-and-modernize-ukraine.

Bandura, Romina, Janina Staguhn, and Benjamin Jensen, 2022. *Modernizing Ukraine's Transport and Logistics Infrastructure*. Center for Strategic and International Studies. Available at https://www.csis.org/analysis/modernizing-ukraines-transport-and-logistics-infrastructure.

Becker, Torbjörn, and Yuriy Gorodnichenko, 2024. "Using the returns of frozen Russian assets to finance the victory of Ukraine", VoxEU column, April 25. Available at https://cepr.org/voxeu/columns/using-returns-frozen-russian-assets-finance-victory-ukraine.

Becker, Torbjörn, 2023. "How Ukraine can finish the unfinished transition agenda," in Yuriy Gorodnichenko and Vladyslav Rashkovan (eds), *Supporting Ukraine: More critical than ever*, CEPR Press, Paris & London. https://cepr.org/publications/books-and-reports/supporting-ukraine-more-critical-ever

Becker, Torbjörn, Barry Eichengreen, Yuriy Gorodnichenko, Sergei Guriev, Simon Johnson, Tymofiy Mylovanov, Maurice Obstfeld, Kenneth Rogoff, Ilona Sologoub and Beatrice Weder di Mauro, 2023. *Post-war Macroeconomic Framework for Ukraine*, CEPR Rapid Response Economics #3. Available at https://cepr.org/publications/books-and-reports/post-war-macroeconomic-framework-ukraine.

Becker, Torbjörn, Barry Eichengreen, Yuriy Gorodnichenko, Sergei Guriev, Simon Johnson, Tymofiy Mylovanov, Kenneth Rogoff, and Beatrice Weder di Mauro, 2022. *A Blueprint for the Reconstruction of Ukraine*, CEPR Rapid Response Economics #1, April 7, 2022. Available at https://cepr.org/publications/books-and-reports/blueprint-reconstruction-ukraine.

Becker, Torbjörn, Jonathan Lehne, Tymofiy Mylovanov, Giancarlo Spagnolo and Nataliia Shapoval, 2022. "Anti-corruption policies in the reconstruction of Ukraine," in Yuriy Gorodnichenko, Ilona Sologoub, and Beatrice Weder di Mauro (eds), *Rebuilding Ukraine: Principles and policies*, CEPR Press.

Becker, Torbjörn, and Anders Olofsgård, 2018. "From abnormal to normal: Two tales of growth from 25 years of transition," *Economics of Transition* 26(4): 1–32.

Berglöf, Erik, and Valdyslav Rashkovan, 2023. "Reconstructing and Reforming Ukraine," *LSE Public Policy Review* 3(1): 1–12. DOI: https://doi.org/10.31389/lseppr.95 .

Bezvershenko, Yuliia, and Oleksiy Kolezhuk, 2022. "Transforming Ukraine's research and development to become a driving force of reconstruction," in Yuriy Gorodnichenko, Ilona

Sologoub, and Beatrice Weder di Mauro (eds), *Rebuilding Ukraine: Principles and policies*, CEPR Press.

Bilotkach, Volodymyr, and Marc Ivaldi, 2022. "Rebuilding Ukrainian transport infrastructure," in Yuriy Gorodnichenko, Ilona Sologoub, and Beatrice Weder di Mauro (eds), *Rebuilding Ukraine: Principles and policies*, CEPR Press.

Bjerde, Anna 2023. "Laying Foundations for Building Back Better in Ukraine," *CESifo EconPol Forum* 2 / 2023 March Volume 24: 5-9. Available at https://www.cesifo.org/en/publications/2023/article-journal/laying-foundations-building-back-better-ukraine-policy.

Bogdan, Tetiana, and Branimir Jovanović, 2023. "Public Expenditure and Tax Policy for the Post-War Reconstruction of Ukraine," WIIW Policy Notes and Reports 69.

Bogdan, Tetiana, Richard Grieveson, and Michael Landesmann, 2022. "Evaluation of Ukraine's National Recovery Draft Plan," wiiw Policy Notes 61, The Vienna Institute for International Economic Studies, wiiw.

Boyarchuk, Dmytro, Christopher Hartwell, Marek Dabrowski, Lyubov Akulenko, Dmytro Naumenko, Olena Pavlenko, Volodymyr Dubrovskiy, Andriy Savarets, Andriy Boytsun, Dmytro Yablonovskyi, Yvonne Hegele, Jana Machljankin, Yuriy Ganushchak, Natalia Leshchenko, 2023. Economic Prirorities in Post-War Ukraine. CASE-Ukraine. Available at https://case-ukraine.com.ua/en/publications/economic-priorities-in-post-war-ukraine/.

Breddels, Lilet, Tetyana Oliynyk, and Fulco Treffers, 2023. *Urban Coalition for Ukraine: Strategies and Proposals*. DOM publishers.

Busby, Scott, and Lauren Burke, 2024. "A Human Rights– Centered Approach to Reconstruction in Ukraine." Center for Strategic and International Studies. Available at https://www.csis.org/analysis/human-rights-centered-approach-reconstruction-ukraine.

Carletti, Elena, Yuriy Gorodnichenko, Harold James, Jan Krahnen, Vladyslav Rashkovan, Alexander Rodnyansky and Ilona Sologoub, 2024. "Ukraine's Reconstruction: Policy Options for Building an Effective Financial Architecture", CEPR Press, Paris & London. Available at https://cepr.org/publications/books-and-reports/ukraines-reconstruction-policy-options-building-effective-financial .

CES - Center for Economic Strategy, 2022. "Ukraine after victory: Ukrainian vision 2030." Available at https://ces.org.ua/en/imagining-ukraine-in-2030/.

Cirella, Guiseppe (eds), 2024. *Handbook on Post-War Reconstruction and development Economics of Ukraine*. Springer.

Cobham, David, 2021. "A comprehensive classification of monetary policy frameworks for advanced and emerging economies", *Oxford Economic Papers* 73(1): 2-26.

Conley, Heather, 2022. A Modern Marshall Plan for Ukraine: Seven Lessons from History to Deliver Hope. German Marshall Plan. Available at https://www.gmfus.org/sites/default/files/2022-10/A%20Modern%20Marshall%20Plan%20for%20Ukraine.pdf.

Costa, Olivier, Daniela Schwarzer, Pervenche Berès, Gilles Gressani, Gaëlle Marti, Franz Mayer, Thu Nguyen, Nicolai von Ondarza, Sophia Russack, Funda Tekin, Shahin Vallée, and Christine Verger, 2023. "Sailing on High Seas: Reforming and Enlarging the EU for the 21st Century," Report of the Franco-German Working Group on the EU Institutional Reform. Available at https://www.auswaertiges-amt.de/blob/2617322/4d0e0010ffcd8c0079e21329bbbb3332/230919-rfaa-deu-fra-bericht-data.pdf.

Coupe, Tom, and Maksym Obrizan, 2016. "The impact of war on happiness: The case of Ukraine," *Journal of Economic Behavior & Organization* 132(PA): 228-242.

de Groot, Oliver, and Yevhenii Skok, 2023. "Ensuring monetary-financial stability for successful recovery," n Yuriy Gorodnichenko and Serhiy Stepanchuk, eds., *Ukraine's Road to Recovery*. Universities UK International. Available at https://www.universitiesuk.ac.uk/sites/default/files/field/downloads/2023-07/UkraineRecoveryReport.pdf.

De Haas, Ralph, and Alexander Pivovarsky, 2022. "The reconstruction and development of Ukraine's financial sector after the war," in Yuriy Gorodnichenko, Ilona Sologoub, and Beatrice Weder di Mauro (eds), *Rebuilding Ukraine: Principles and policies*, CEPR Press.

DeLong, Bradford, and Barry Eichengreen (1993), "The Marshall Plan: History's Most Successful Structural Adjustment Program", in R. Dornbusch, W. Noelling and R. Layard, eds, *Post-World War II Economic Reconstruction and its Lessons for Eastern Europe Today*, MIT Press, Cambridge MA, 189-230.

Demers, Anne, 2011. "When Veterans Return: The Role of Community in Reintegration," *Journal of Loss and Trauma* 16(2): 160–179.

Deryugina, Tatyana, Oleksandr Kravchenko and Mar Reguant, 2022. "Rebuilding Ukraine's energy sector: Challenges and Opportunities," in Yuriy Gorodnichenko, Ilona Sologoub, and Beatrice Weder di Mauro (eds), *Rebuilding Ukraine: Principles and policies*, CEPR Press.

DiXie Group, 2024. *Long-term decarbonisation pathways for Ukraine's power sector*. Available at https://dixigroup.org/wp-content/uploads/2024/03/report-full1.pdf.

Djankov, Simeon, Elena Nikolova, and Jan Zilinsky, 2016. "The happiness gap in Eastern Europe," *Journal of Comparative Economics* 44(1): 108-124.

Darvas, Zolt, Marek Dabrowski, Heather Grabbe, Lucy Léry Moffat, Andre Sapir and Georg Zachmann, 2024. "Ukraine's path to European Union membership and its long-term implications", *Policy Brief* 05/2024, Bruegel

Dzhygyr, Yuriy, Kateryna Maynzyuk, Adrianna Murphy and Carol Propper, 2022. "The health system," in Yuriy Gorodnichenko, Ilona Sologoub, and Beatrice Weder di Mauro (eds), *Rebuilding Ukraine: Principles and policies*, CEPR Press.

Égert, Balázs, and Christine de la Maisonneuve, 2024. "The impact of the war on human capital and productivity in Ukraine," *Policy Studies* 45(3-4): 282-292.

EIB - European Investment Bank, 2023. *Strategy for the EU integration of the Ukrainian and Moldovan rail systems*. Available at https://jaspers.eib.org/knowledge/publications/a-strategy-for-the-eu-integration-of-the-ukrainian-and-moldovan-rail-systems.

Eichengreen, Barry (ed.), 1995. *Europe's post-war recovery*, Cambridge University Press.

Eichengreen, Barry, and Mark Uzan, 1992. "The Marshall Plan: economic effects and implications for Eastern Europe and the former USSR," *Economic Policy* 7(14): 13-75.

Eichengreen, Barry. 2023. Economic Recovery in Post-World War II West Germany and Ukraine Today. *CESifo EconPol Forum* 2 / 2023 March Volume 24: 30-35. Available at https://www.cesifo.org/en/publications/2023/article-journal/economic-recovery-post-world-war-ii-west-germany-and-ukraine.

European Commission, 2022. "Ukraine: Commission presents plans for the Union's immediate response to address Ukraine's financing gap and the longer-term reconstruction", Press Release, May 18, 2022. Available at https://ec.europa.eu/commission/presscorner/detail/en/ip_22_3121.

European Commission, 2024. Conference On Accession to the European Union: General EU Position. June 21, 2024. D 9/24 LIMITE CONF-UA 2. Available at https://www.consilium.europa.eu/media/hzmfw1ji/public-ad00009en24.pdf.

Franco, Guillermo, Alpa Sheth and Michelle Meyer (2013), *Observations on the Recovery and Reconstruction in Sri Lanka Following the December 26, 2004 Tsunami*, Earthquake Engineering Research Institute.

Fratzscher, Marcel, Christoph Grosse-Steffen, and Malte Rieth, 2020. "Inflation targeting as a shock absorber," *Journal of International Economics* 123(C): 103308.

Forbes, 2021. 100 Richest Ukrainian 2021. May 6, 2021. Available at https://forbes.ua/ratings/100-bogateyshikh-ukraintsev-2021-06052021-1536.

G7. 2022. *International Expert Conference on the Recovery, Reconstruction and Modernisation of Ukraine: Conference Report*. Berlin, 25 October 2022. Available at https://www.g7germany.de/resource/blob/975226/2153244/abaee1adce725c2bc41397c3a3f148b8/2022-12-12-ukr-aufbaukonferenz-abschluss-data.pdf.

Gangster, Ronja, Jacob Kirkegaard, Thomas Kleine-Brockhoff, and Bruce Stokes, 2022. *Designing Ukraine's recovery in the Spirt of the Marshall Plan*. German Marshall fund, September 2022.

Ganguli, Ina, and Fabian Waldinger, 2024. "War and Science in Ukraine," *Entrepreneurship and Innovation Policy and the Economy* 3: 165-188.

Garicano, Luis, Dominic Rohner, and Beatrice Weder di Mauro, eds., 2022. *Global Economic Consequences of the War in Ukraine: Sanctions, Supply Chains and Sustainability*. CEPR Press.

Gorea, Denis, 2023. "The Housing Challenge: A plan for rebuilding residential housing in Ukraine," in Yuriy Gorodnichenko and Serhiy Stepanchuk, eds., *Ukraine's Road to Recovery*. Universities UK International. Available at https://www.universitiesuk.ac.uk/sites/default/files/field/downloads/2023-07/UkraineRecoveryReport.pdf.

Gorodnichenko, Yuriy, and Vladyslav Rashkovan, eds. 2023. *Supporting Ukraine: More Critical Than Ever*. CEPR Press. Available at https://cepr.org/publications/books-and-reports/supporting-ukraine-more-critical-ever.

Gorodnichenko, Yuriy, Ilona Sologoub, and Beatrice Weder di Mauro (eds.), 2022. *Rebuilding Ukraine: Principles and Policies*. CEPR Press. December 7, 2022.

Gorodnichenko, Yuriy, Marianna Kudlyak, and Aysegül Sahin, 2022. "The Effect of the War on Human Capital in Ukraine and the Path for Rebuilding," CEPR Policy Insight 117.

Green, Richard, Vernon Henderson, Matthew Kahn, Alex Nikolsko-Rzhevskyy, and Andrii Parkhomenko, 2022. "Accelerating urban economic growth in Ukraine," in Yuriy Gorodnichenko, Ilona Sologoub, and Beatrice Weder di Mauro (eds), *Rebuilding Ukraine: Principles and policies*, CEPR Press.

Grushevska, K, T Notteboom, and A Shkliar, 2016. "Institutional rail reform: The case of Ukrainian Railways," *Transport Policy* 46: 7-19.

Grygorenko, Yegor, and Monika Schnitzer, 2022. "Ukraine's business environment," in Yuriy Gorodnichenko, Ilona Sologoub, and Beatrice Weder di Mauro (eds), *Rebuilding Ukraine: Principles and policies*, CEPR Press.

Guriev, Sergei, and Ekaterina Zhuravskaya, 2009. "(Un)happiness in Transition." J*ournal of Economic Perspectives* 23 (2): 143–68.

Havlik, Peter, Artem Kochnev, and Olga Pindyuk, 2020. Economic Challenges and Costs of Reintegrating the Donbas Region in Ukraine. WIIW. Available at https://wiiw.ac.at/economic-challenges-and-costs-of-reintegrating-the-donbas-region-in-ukraine-p-5351.html.

Herbst, John, Olga Khakova, and Charles Lichfield, 2024. *Reconstructing Ukraine at War: The Journey to Prosperity Starts Now*. Atlantic Council. Available at https://www.atlanticcouncil.org/in-depth-research-reports/report/reconstructing-ukraine-at-war-the-journey-to-prosperity-starts-now/.

Hitchcock, William, 2009. *The Bitter Road to Freedom: The Human Cost of Allied Victory in World War II Europe*, Free Press.

Holovko, Iryna, and Constanze Haug, 2023. *Rebuilding Ukraine: Principles for a Green Post-War Reconstruction*. Adelphi Report. Available at https://adelphi.de/system/files/mediathek/bilder/Rebuilding%20Ukraine_adelphi_January_2023_final.pdf .

Hornbeck, Richard, and Daniel Keniston, 2017. "Creative destruction: Barriers to urban growth and the Great Boston Fire of 1872," *American Economic Review* 107(6): 1365-98.

Ieruslymov, Vladyslav, and Daryna Marchak, 2021. "Analysis of the effectiveness of legislative regulation of the provision of social assistance in Ukraine for the main target groups", Kyiv School of Economics. Available at https://kse.ua/wp-content/uploads/2021/07/Sotsialni-dopomogi_doslidzhennya-1.pdf.

Kahanec, Martin, Snezhana Leu-Severynenko, Anna Novosad, and Yegor Stadnyi, 2022. "Education reforms during and after the war", in Yuriy Gorodnichenko, Ilona Sologoub, and Beatrice Weder di Mauro (eds), *Rebuilding Ukraine: Principles and policies*, CEPR Press.

Klawij, Adriaan, 2010. The Impact of Family Policy Expenditure on Fertility in Western Europe. *Demography* 47(2): 503–519.

Klimkin, Pavlo, and Ivan Mikloš, 2022. "Ukraine's EU integration," in Yuriy Gorodnichenko, Ilona Sologoub, and Beatrice Weder di Mauro (eds), *Rebuilding Ukraine: Principles and policies*, CEPR Press.

Kochnev, Artem, Miriam Kosmehl, Michael Landesmann, Ambre Maucorps, Bernhard Moshammer and Stefani Weiss, 2023. *Ukraine's economic reconstruction - Addressing territorial inequalities, consolidating regional policy and reaping the benefits of EU integration*. WIIW and BertelsmannStiftung Joint Study No. 2023-12, December 2023. Available at https://wiiw.ac.at/ukraine-s-economic-reconstruction-addressing-territorial-inequalities-consolidating-regional-policy-and-reaping-the-benefits-of-eu-integration-p-6718.html

Kosmehl, Miriam, Veronika Movchan, Olga Pindyuk and Stefani Weiss, 2024. Ukraine's future competitiveness - Directions for structural shifts in foreign trade and investment. WIIW and BertelsmannStiftung Joint Study No. 2024-05, May 2024. Available at https://wiiw.ac.at/ukraine-s-future-competitiveness-directions-for-structural-shifts-in-foreign-trade-and-investment-p-6900.html.

Kosse, Iryna, 2023. "Rebuilding Ukraine's infrastructure after the war," Policy Notes and Reports #72, The Vienna Institute for International Economic Studies (wiiw), Vienna

Kupets, Olga, 2016. "Education-job Mismatch in Ukraine: Too Many People with Tertiary Education or Too Many Jobs for Lowskilled?" *Journal of Comparative Economics* 44(1): 125–147.

Kupets, Olga, Oleksandra Betliy, and Fabien Postel-Vinay, 2023. "Ukraine's labour market: the past, the present and the future," in Yuriy Gorodnichenko and Serhiy Stepanchuk, eds., *Ukraine's Road to Recovery*. Universities UK International. Available at https://www.universitiesuk.ac.uk/sites/default/files/field/downloads/2023-07/UkraineRecoveryReport.pdf.

Kyiv School of Economics, 2024. "Report on damages to infrastructure from the destruction caused by Russia's military aggression against Ukraine as of January 2024," April 2024, available at https://kse.ua/wp-content/uploads/2024/05/Eng_01.01.24_Damages_Report.pdf.

Mátyás, László (eds), 2024. *Central and Eastern European Economies and the War in Ukraine: Between a Rock and a Hard Place*. Springer.

Migration Data Portal, 2024. "Crisis Movements". Available at https://www.migrationdataportal.org/ukraine/crisis-movements.

Minakov, Mykhailo, 2023. The War Has Helped Ukraine Rein in the Oligarchs. The Wilson Center at the Kennan Institute. Available at https://www.wilsoncenter.org/blog-post/war-has-helped-ukraine-rein-oligarchs.

Myerson, Roger, 2022. *Perspectives on Ukraine and the Russian Invasion*. Available at https://home.uchicago.edu/~rmyerson/ukraine2022nov.pdf.

Myerson, Roger, 2023. "Postwar reconstruction assistance and local governments in Ukraine," in Yuriy Gorodnichenko and Vladyslav Rashkovan (eds), *Supporting Ukraine: More critical than ever*, CEPR Press, Paris & London. https://cepr.org/publications/books-and-reports/supporting-ukraine-more-critical-ever

Mykhailyshyna, Dariia, Maksym Samoiliuk, and Mariia Tomilina (2023), "Refugees from Ukraine: Who Are They, How Many Are There, and How to Return Them?", Policy Paper, Centre for Economic Strategy. Available at https://ces.org.ua/wp-content/uploads/2023/09/refugees.pdf.

Mylovanov, Tymofiy, and Gérard Roland, 2022. "Ukraine's post-war reconstruction and governance reforms," in Yuriy Gorodnichenko, Ilona Sologoub, and Beatrice Weder di Mauro (eds), *Rebuilding Ukraine: Principles and policies*, CEPR Press.

NRC - National Recovery Council of Ukraine, 2022. Ukraine's National Recovery Plan, July 2022. Available at https://www.urc-international.com/urc2022-recovery-plan.

O'Driscoll, Dylan, 2018. *Good Practice in Post-Conflict Reconstruction*, K4D Helpdesk Report, Institute of Development Studies.

OECD ‑ Organization for Economic Co-operation and Development, 2011. *Competition in Ports and Port Services*, Policy Roundtable, 19 December 2011.

OECD ‑ Organization for Economic Cooperation and Development, 2005. *The Paris Declaration on Aid Effectiveness and the Accra Agenda for Action.*

OECD – Organization for Economic Cooperation and Development, 2022. *Rebuilding Ukraine by Reinforcing Regional and Municipal Governance*. Available at https://www.oecd-ilibrary.org/urban-rural-and-regional-development/rebuilding-ukraine-by-reinforcing-regional-and-municipal-governance_63a6b479-en.

Office of the United Nations High Commissioner for Human Rights, 2015. "Report on the human rights situation in Ukraine: 1 December 2014 to 15 February 2015," Available at https://www.ohchr.org/sites/default/files/Documents/Countries/UA/9thOHCHRreportUkraine.pdf

OHCHR - Office of the United Nations High Commissioner for Human Rights, 2016. Report on the human rights situation in Ukraine. Available at http://www.ohchr.org/Documents/Countries/UA/OHCHRThematicReportUkraineJan2014-May2016_EN.pdf.

Perelli-Harris, Brienna, 2023. "Ukraine's Demographic Crisis, " in Yuriy Gorodnichenko and Serhiy Stepanchuk, eds., *Ukraine's Road to Recovery*. Universities UK International. Available at https://www.universitiesuk.ac.uk/sites/default/files/field/downloads/2023-07/UkraineRecoveryReport.pdf.

Pham, Tho, Oleksandr Talavera, and Zhuangchen Wu, 2023. "Labor markets during war time: Evidence from online job advertisements," *Journal of Comparative Economics* 51(4): 1316-1333.

Ramcharan, Rodney, 2007. "Does the exchange rate regime matter for real shocks? Evidence from windstorms and earthquakes," *Journal of International Economics* 73(1): 31-47.

Repko, Maria, 2023. "War risk insurance mechanism for Ukraine," in Yuriy Gorodnichenko and Serhiy Stepanchuk, eds., *Ukraine's Road to Recovery*. Universities UK International. Available at https://www.universitiesuk.ac.uk/sites/default/files/field/downloads/2023-07/UkraineRecoveryReport.pdf.

Roland, Gérard, 2000. *Transition and Economics: Politics, Markets, and Firms*. MIT Press.

Roland, Gérard, 2002. "The Political Economy of Transition," *Journal of Economic Perspectives* 16 (1): 29–50.

RRR4U - Resilience, Reconstruction and Relief for Ukraine Consortium, 2023. "Ukraine Recovery Cookbook. Available at https://rrr4u.org/en/analytics/konsorczium-rrr4u-prezentuvav-kulinarnu-knygu-ukrayinskogo-vidnovlennya/.

Sakalasuriya, Maheshika, Richard Haigh, and Dilanthi Amaratunga, 2018. "A Conceptual framework to analyse consequences of post conflict reconstruction interventions," *Procedia Engineering* 212: 894-901.

Savoy, Conor M., and Janina Staguhn, 2023. Enabling an Economic Transformation of Ukraine: Recovery, Reconstruction and Modernization. Center for Strategic International Studies. Available at https://www.csis.org/analysis/enabling-economic-transformation-ukraine.

Schuettler, Kirsten, and Laura Caron, 2020. "Jobs Interventions for Refugees and Internally Displaced Persons," *Jobs Group Papers, Notes, and Guides* 32152447, The World Bank.

Shatz, Howard, Gabrielle Tarini, Charles Ries, and James Dobbins, 2023. "Reconstructing Ukraine: Creating a Freer, More Prosperous, and Secure Future," RAND, Available at https://www.rand.org/pubs/research_reports/RRA2200-1.html.

SIGIR ‑ Special Inspector General for Iraq Reconstruction (2013), *Learning from Iraq*.

Sobotka, Tomáš, Anna Matysiak, and Zuzanna Brzozowska, 2019. Policy responses to low fertility: How effective are they? UNFPA Technical Division Population & Development Branch, Working Paper No. 1. Available at https://www.unfpa.org/sites/default/files/pub-pdf/Policy_responses_low_fertility_UNFPA_WP_Final_corrections_7Feb2020_CLEAN.pdf.

Sologoub, Ilona (2024), "Ukrainian refugees: Who returns and why?", Stockholm School of Economics blog, 2 February.

Stiglitz, Joseph, and Andrew Kosenko, 2024. "The Way Forward for Ukraine's Economy," Project Syndicate, Jul 12, 2024. Available at https://www.project-syndicate.org/onpoint/ukraine-economy-roadmap-must-avoid-neoliberalism-pursue-market-government-balance-by-joseph-e-stiglitz-and-andrew-kosenko-2024-07.

Szczerba, Michal, 2023. *Towards the Reconstruction of Ukraine*. NATO Parliamentary Assembly. 024 ESCTD 23 E rev. 2 fin. Available at https://www.nato-pa.int/document/2023-reconstruction-ukraine-report-szczerba-024-esctd.

Tooze, Adam, 2023. "Warfare without the state - New Keynesian shock therapy for Ukraine's home front," Available at https://adamtooze.substack.com/p/chartbook-163-warfare-without-the.

Torosyan, Karine, Norberto Pignatti, and Maksym Obrizan , 2018. "Job market outcomes for IDPs: The case of Georgia," *Journal of Comparative Economics* 46(3): 800-820.

Trebesch, Christoph, 2023. "Foreign support to Ukraine: Evidence from a database of military, financial, and humanitarian aid", in Yuriy Gorodnichenko and Vladyslav Rashkovan, eds., *Supporting Ukraine: More critical than ever*, CEPR Press.

Umland, Andreas. 2023. "How the West Can Help Ukraine: Three Strategies for Achieving a Ukrainian Victory and Rebirth," *Political Observer* 19: 85-98.

UN – United Nations, 2013. *The Post Disaster Needs Assessment report of the Kakhovka Dam Disaster*. Available at https://ukraine.un.org/en/248860-post-disaster-needs-assessment-report-kakhovka-dam-disaster.

UN4UkrainianCities, 2024. *Kharkiv Masterplan: A Blueprint for the Reconstruction of Ukraine*. Available at https://www.un4ukrainiancities.org/resources/kharkiv-masterplan-a-blueprint-for-the-reconstruction-of-ukraine.

UNHCR – United Nations High Commission on Refugees, 2023. "Education on hold: Education Policy Brief", available at file:///C:/Users/yuriy/Downloads/UNHCR%20RBE%20Policy%20Brief%20-%20education%20Ukraine%20-%20Sept%202023.pdf.

UNHCR – United Nations High Commission on Refugees, 2024, "Ukraine Refugee Situations". Available at https://www.unrefugees.org/emergencies/ukraine/.

von Cramon-Taubadel, Stephan, and Oleg Nivievskyi, 2023. "Rebuilding Ukraine – the Agricultural Perspective," CESifo EconPol Forum 2 / 2023 March Volume 24: 36-40. Available at https://www.cesifo.org/en/publications/2023/article-journal/rebuilding-ukraine-agricultural-perspective.

World Bank, 2014. *Pakistan Earthquake 2005: The Case of Centralized Recovery Planning and Decentralized Implementation.*

World Bank, 2018. *Building Back Better: Achieving resilience through stronger, faster, and more inclusive post-disaster reconstruction.*

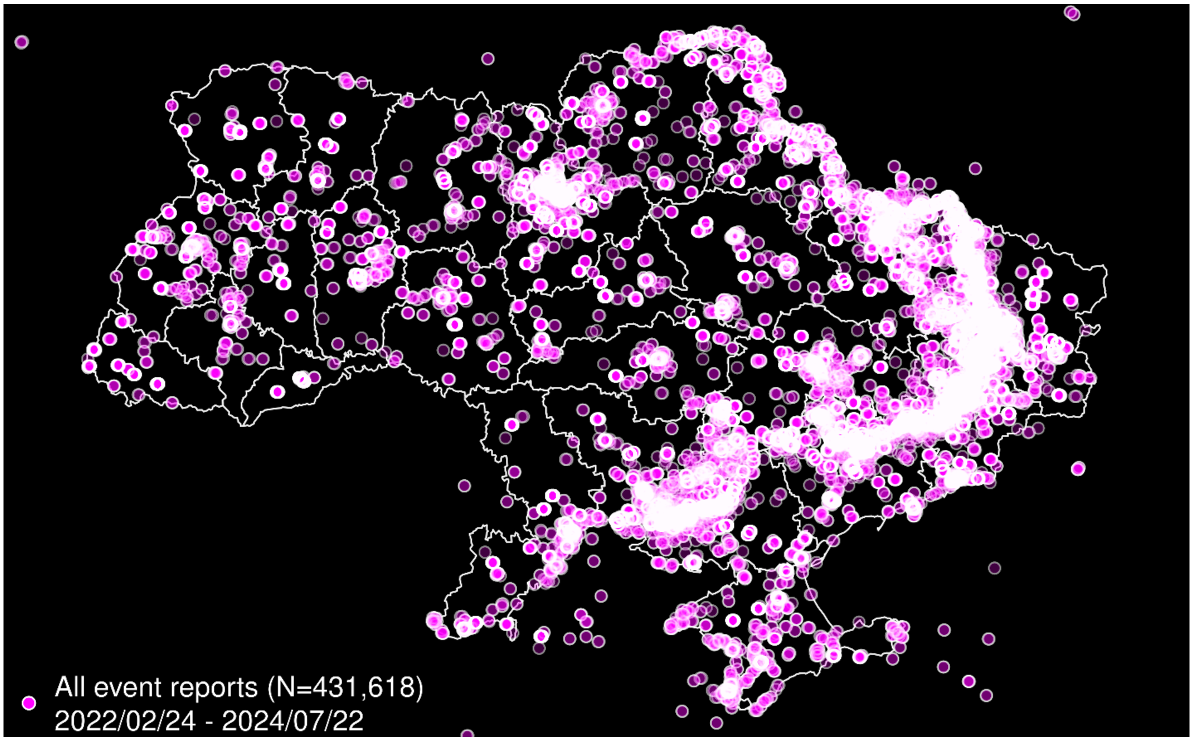
World Bank, 2022. "The Ukraine Rapid Damage and Needs Assessment – August 2022."

World Bank, 2024. "Ukraine - Third Rapid Damage and Needs Assessment (RDNA3): February 2022 - December 2023."

Yaremko, Vitaliia, 2023. "The Long-Term Consequences of Blacklisting: Evidence from the Ukrainian Famine of 1932-33." University of California – Berkeley, Ph.D. thesis.

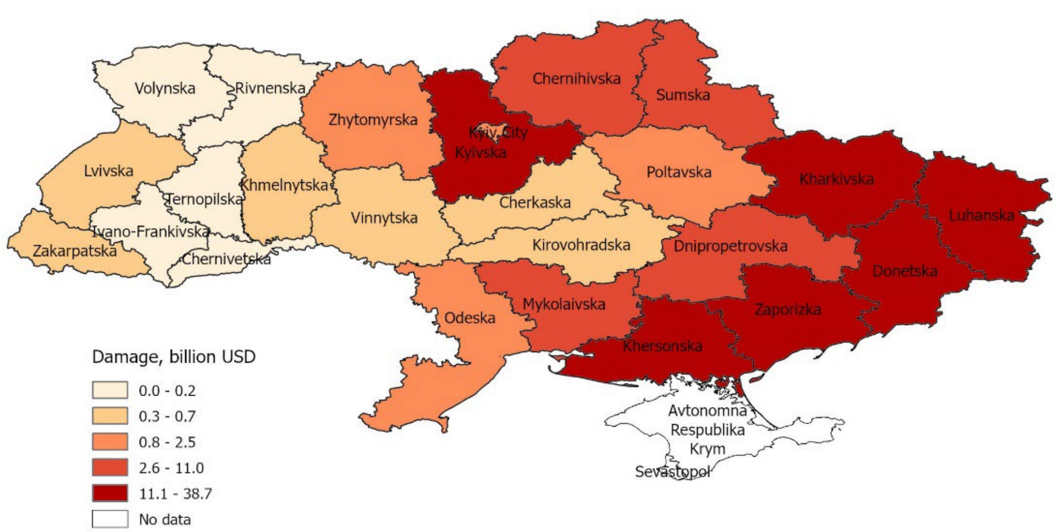
Zhukov, Yuri M., 2023. "Near-real time analysis of war and economic activity during Russia's invasion of Ukraine," *Journal of Comparative Economics* 51(4), 1232-1243.

Figure 1. Spatial distribution of firefights, tank battles, artillery shelling, missile strikes and other war related events



Source: Zhukov (2023)

Figure 2. Extent of damage by region as of December 31, 2023.



Source: World Bank (2024).

Table 1. Macroeconomic indicators.

	Growth rate of real GDP, 2001-2022, %				Inflation, 2001-2022, %				Income per capita, US$2017 PPP
	mean	median	std	2019	mean	median	std	2019	2019
Bulgaria	3.3	3.4	3.2	4.0	4.3	3.0	4.1	3.1	23,266
Czechia	2.5	2.9	3.1	3.0	2.9	2.3	3.1	2.9	40,990
Georgia	5.5	5.2	4.5	5.0	5.4	5.4	3.6	4.9	14,989
Croatia	2.3	3.3	4.6	3.4	2.3	2.1	2.5	0.8	29,348
Hungary	2.6	4.0	3.3	4.9	4.5	4.1	3.3	3.3	32,646
Moldova	4.0	4.9	5.3	3.6	8.5	7.0	5.8	4.8	12,777
Poland	3.7	4.0	2.1	4.5	2.9	2.3	3.1	2.2	33,160
Slovakia	3.6	3.6	3.6	2.5	3.5	2.7	3.2	2.7	32,056
Ukraine	0.6	3.1	9.4	3.2	11.9	10.2	10.3	7.9	12,805

Source: World Bank and Carletti et al. (2024)