Nuclear Weapons: Asset or Liability?
Case in Point – Ukraine

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Introduction
In this essay, I aim to make a general **economics-focused argument** about the true cost of developing, owning, and maintaining nuclear weapons—deliberately setting aside the usual political discussions surrounding deterrence and the Cold War's MAD doctrine. Using Ukraine as a case study, I extend the analysis to other countries that have pursued, or are currently aspiring to acquire, nuclear weapons. My core position is this: the **development and upkeep of a nuclear arsenal is a massive economic burden**, one that can be **especially devastating for smaller nations** with already overstressed and fragile economies—countries whose national budgets are often struggling to meet the basic needs of their own citizens.

From this perspective, **nuclear weapons are a liability—not an asset**, contrary to what some governments may believe when they choose the nuclear path. In my view, **thermonuclear weapons—the most powerful kind—will never be used**, so long as the West remains **firmly and clearly committed to "annihilating" any first user** through immediate and overwhelming retaliation using its vastly superior nuclear arsenal.

Of course, that deterrent power only works if the West is governed by a **strong and decisive leadership**, capable of acting swiftly and in full coordination. It also requires sustained investment: **Western nuclear powers must allocate consistent shares of their GDP to maintain and modernize their arsenals**, ensuring readiness to respond if ever necessary.

The foundation of Western nuclear deterrence must therefore be **an unequivocal and credible commitment to act**, paired with clear, visible signaling of that commitment to the rest of the world.

What follows is an analysis focused on the **economic cost** of maintaining a nuclear arsenal, under the title **"Nuclear Weapons: Asset or Liability?"**—with Ukraine's former nuclear inheritance serving as a powerful case in point.

Background
In the post-Cold War era, many nations have either flirted with the idea of acquiring nuclear weapons or held onto them as a symbol of prestige and deterrence. But beneath the aura of power lies a far more sobering truth: for most countries—particularly smaller or economically stressed ones—nuclear weapons are a **crippling economic liability**, not an asset.

Nowhere is this clearer than in the case of **Ukraine**, which inherited a massive nuclear arsenal after the Soviet Union collapsed in 1991—becoming, overnight, the **third-largest nuclear power** in the world.

Ukraine's Brief Moment as a Nuclear Power
Ukraine inherited approximately **4,000 nuclear warheads**, comprising:
Strategic Warheads (~1,840):

- **130 UR-100N (SS-19) ICBMs**, each carrying 6 warheads
- **46 RT-23 (SS-24) rail-mobile ICBMs**, each with 10 warheads

- **25 Tu-95MS and Tu-160 bombers**, equipped with air-launched cruise missiles

Tactical Warheads (~2,000–2,500):

- Nuclear artillery, bombs, and short-range missiles

However, Ukraine **lacked operational control**: launch codes remained in Moscow, and the supporting infrastructure was fragmented. The warheads were high-maintenance, technologically sensitive devices Ukraine had no realistic means of sustaining independently.

💰 The Hidden Cost of Nuclear Ownership

If Ukraine had chosen to retain and maintain this arsenal, the **financial burden** would have been immense—even by today's standards.

Estimated Annual Maintenance Costs (2024 USD):

Warhead Type	Quantity	Cost per Unit/Year	Total Cost
Strategic Warheads	~1,840	~$42,500	~$78 million/year
Tactical Warheads	~2,250	~$7,500	~$17 million/year
Total (Direct)	—	—	**~$95–100 million**

But that's just the beginning.

To operate an independent nuclear arsenal, Ukraine would have needed:

- Tritium production and replenishment facilities (tritium decays with a **12.3-year half-life** and must be **routinely replaced**)
- Specialized warhead refurbishment labs
- Secure high-tech storage and handling infrastructure
- Satellite-based command-and-control systems
- Thousands of highly trained nuclear engineers, chemists, and security personnel

These overhead and infrastructure costs would add another **$200–400 million/year** to the budget, bringing the **total to around $300–500 million annually**—a figure **devastating to a struggling post-Soviet economy**.

☢️ Thermonuclear Weapons: Fragile and Costly

Unlike traditional fission bombs (U-235 or Pu-239), thermonuclear warheads rely heavily on **tritium boosting** to function efficiently. Tritium's short half-life makes these weapons inherently **unstable over time**. Without meticulous upkeep:

- Yield degrades
- Warheads may misfire
- Safety becomes a serious concern

This means a nation with a stockpile of thermonuclear weapons must engage in **constant, high-cost maintenance** just to keep them *usable*, let alone effective.

🕊️ Ukraine's Disarmament – Practical, Not Naïve

Ukraine agreed to relinquish its nuclear weapons between 1992 and 1996 under:

- The **Lisbon Protocol**
- The **Budapest Memorandum (1994)**, in which the U.S., U.K., and Russia pledged to **respect Ukraine's territorial integrity**

Although history later proved those assurances inadequate, the decision to disarm was not naïve—it was grounded in **economic, technical, and political reality**.

🌍 Lessons for Other Nations

Countries like **North Korea, Iran, and potentially others** see nuclear weapons as a shortcut to international clout or a safeguard against foreign intervention. But this path carries enormous costs:

1. **Development costs** (even with covert assistance) often exceed **billions of dollars**
2. **Ongoing maintenance** costs strain national budgets, diverting funds from health, education, and infrastructure
3. **Tritium handling and warhead safety** become a long-term scientific and technical challenge
4. **Geopolitical isolation** often follows nuclear pursuit, worsening the economic strain

Most importantly: **nuclear weapons will never be used**—at least not first—because any nation that launches a nuclear strike against a Western nuclear power would be **wiped out in retaliation** by an arsenal orders of magnitude more powerful and precise.

This form of **mutual assured destruction (MAD)** only functions if major powers—**especially the West—remain unified and ready to respond decisively**. Past administrations in the U.S. have shown dangerous hesitation in this regard. The credibility of deterrence **rests entirely on the resolve of Western leadership** to act swiftly and overwhelmingly if nuclear norms are violated.

Conclusion: Illusion of Power

For any smaller nation, the illusion of safety or status that nuclear weapons might offer is far outweighed by the **economic, technical, and political liabilities** they introduce. Ukraine's case shows not what was lost, but what was never realistically attainable in the first place: an affordable, autonomous, secure nuclear arsenal.

In reality, nuclear weapons are not assets—they are **unsustainable burdens** for all but the wealthiest, most technologically advanced states. For the rest, the cost is not just in money, but in national focus, stability, and global standing.