

Challenges of a Multi-Polar Nuclear World

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Abstract

Nuclear warfare, being calamitous, is nevertheless, unlike popular perception, far from being apocalyptic. In the paper, we consider possible scenarios of nuclear war in a multi-polar nuclear world, arguing that a democratic society has good chances of victory against a totalitarian nuclear-possessing state. Afterwards, we focus on two technical issues of primary importance – targeting doctrine and civil defense. We conclude that steadfast and determined stance together with properly conceived and well planned policies for dealing with aggression is the price democratic societies must be willing to pay in order to effectively battle aggression on all levels.

The main points of the paper is the elected politicians and bureaucrats' incentives to chose wrong strategies in foreign and military policies. Attempt to reason policy advice for the elected leaders is the practical goal of the paper.

Introduction

The future world is going to be a world with many nuclear-possessing actors, whether we wish or (probably) not. Anti-proliferation efforts have yielded up to now very limited results, and it is widely believed that any state which is determined to acquire nuclear weapons – will "build, buy, borrow or burgle" it [1].

Assuming that rogue states will acquire nuclear weapons, we have actually two alternatives:

- a) to surrender,
- b) to think.

This article suggests the second alternative. The nuclear warfare, being calamitous, is nevertheless, unlike popular perception, far from being apocalyptic. A steadfast and determined stance – including the willingness and ability to suffer heavy losses, in both human and economic terms – is the price democratic societies must be willing to pay in order to effectively battle aggression on all levels. He who wants peace now will not receive peace ever [2].

The article is organized as following. First, we make a short overview of the nuclear warfare. Then, we consider possible scenarios of nuclear warfare in a multi-polar nuclear

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world, arguing that a democratic society has good chances of victory against a totalitarian nuclear-possessing state. Afterwards, we focus on two technical issues of principle importance – targeting doctrine and civil defense. Regarding targeting, we claim that a democratic state should target first of all the infrastructure of a totalitarian adversary, rather than its military targets or population centers. Regarding civil defense – we support the claim that it is not only feasible and efficient, but just indispensable. None of these ideas is completely novel, but all need elaboration in the common framework.

A “leftist politician” in the present work is a certain “ideal type” of politician in a judicial democratic state. Such a politician argues for expanding the functions of the state **beyond supplying the pure public goods**. A “leftist politician” considers these new functions (supplying mixed public goods, controlling the behavior of citizens and markets) as the main ones for a modern state.

A “rightist (conservative) politician” is the proponent of views and preferences that are the mirror opposite of those of the “leftist politician.” He or she assumes that the only function of the state is to supply pure public goods (that is, the state only performs the function of the “night watchman”).

To be or not to be? Dealing with nuclear aggression

Weapons are seldom used without purpose, without the hope of achieving one's aims and defeating one's enemy. A democratic society must do everything possible to deprive terrorists and rogue states from harboring such hopes. Concessions, gestures of good will on the part of a democratic society, are seen as signs of weakness by totalitarian societies and lead only to an escalation of terror, as has been demonstrated by many authors [10]. Israel Aumann summarizes:

“...in such a situation concessions achieve the exact opposite of what they were meant to achieve when both sides are interested in peace. They encourage the aggressive side to demand and receive more and more and base the perception that the rope can be stretched further and further. Eventually the rope tears and there is a war in conditions far worse than what would previously have transpired, before the concessions.” [11]

A steadfast and determined stance – including the willingness and ability to suffer heavy losses, in both human and economic terms – is the price democratic societies must be willing

to pay in order to effectively battle aggression on all levels. As Winston Churchill put it: those who, given the choice of war or dishonor, choose dishonor, will have both war and dishonor.

Nuclear conflict – possible scenarios

Scenario #	Potential Belligerents	Scenario Probability	Comments
1	Rule of Law market democracy vs. Rule of Law market democracy	Pretty low	Outside (beyond) the scope of the article analysis because of low probability
2	Authoritarian regime (rouge state, "roving bandit") vs. Rule of Law market democracy	Reasonably higher than all of the rest options	The democratic state decision making process in the case vulnerable of public perception (education, elected leaders strategic choice); it could be analyzed by the Public choice theory instruments; Rent extraction motive of the roving bandit
3	Terrorist organization vs. Rule of Law market democracy	Pretty low	See above, scenario # 1 comment
4	Authoritarian regime vs. Authoritarian regime	Likely option	Decision making process has pretty weak dependence of public perception of the possible outcomes and of the public opinion itself. The only significant aspect couldn't be ignored by the chieftain: the action (attack) or absenteeism shouldn't be considered by any possible challenger (external and internal) as a signal of the regimes' weakness
5	Terrorist organization vs. Authoritarian regime	Pretty low	See above, scenario # 1 comment
6	Other (unclearly definable belligerents)	Likely option	India vs. Pakistan for example; beyond the scope of the article because decision making process is quite different from scenario #2 (closer to scenario # 4)

As happened in the wake of 9/11, a single nuclear attack – and very possibly even the fear of one – may well significantly impact the lifestyle of modern societies world-wide. Such change would not be due to direct damage to life and property but to extensive (and arguably

justified) counter-measures that societies may adopt. In view of the foregoing, it seems likely that at least the current overestimation of radiation hazards ("radiophobia") will dissipate in the wake of the first "live" nuclear attack. This in turn will mean that indirect economic damage – currently estimated as astronomical – will in actuality be far less than feared.

Can non-state actors gain access to nuclear weapons? In principle, yes, particularly if we speak of a time frame measured in decades and take into account future proliferation. Having said that, the complexity and high unit price of nuclear devices reduces this likelihood to sporadic and accidental access.

The amassing of a significant above-threshold nuclear arsenal by an irresponsible government also seems improbable. The more likely scenario is that it would either use its nuclear capability at the first opportunity, or become responsible, or at least rational. The question of rationality is not necessarily connected to the question of democracy, as attested to by the world's experience with the USSR over a period of 40 years.

We do not imply that a rational government would never initiate nuclear aggression. We claim, rather, that such a decision would be based on careful and rational, though probably erroneous, judgments. E.g., it was reasonably argued [\[12\]](#) that Japan would probably never have attacked Pearl Harbor had they not incorrectly assessed the determination of the United States to wage war until victory when attacked.

Let us now consider state-scale nuclear warfare. According to popular perception, there would be no winners in such a conflict, as implied by the term "Mutual Assured Destruction" (MAD). It is believed that MAD concept was central to the nuclear standing of the two super-powers during the Cold War, however this is not exact. While the US scientists and intelligence believed in MAD, the USSR certainly considered possibility of victory in full-scale nuclear war and acted accordingly [\[13\]](#). We shall not discuss the question (fortunately an historical one) of MAD between super-powers – though Herman Kahn reasonably claimed that even in the case of all-out nuclear interchange of 5,000 MT from each side, "life would go on" and it would be possible to rebuild the destroyed cities in about 10 years [\[14\]](#). With reference to a possible regional nuclear conflict between a rogue state and a democratic one, the no-winner scenario is probably false. An analysis by Anthony Cordesman et al. regarding a possible Israel-Iran nuclear conflict estimated that while Israel might survive an Iranian nuclear blow, Iran would certainly not survive as an organized society [\[15\]](#). Even though the projected casualties cited in that study seem to us overstated, especially as regards Israel, the conclusion rings true.

Also in general, citizens of democratic societies believe in their values and trust their government, and are thus more likely to be motivated and determined to fight [16]. There is, however, an additional aspect specific to nuclear warfare which favors democracy. In a nuclear conflict, due to the extremely high intensity of fighting and extensive damage to infrastructure, the central government can be expected to lose its ability to govern and maintain direct control already during the early stages of the conflict. This was *not* the case during WWII until the very end. This in turn means that people's ability to make decisions and act independently, their devotion to their mission in the absence of direct commands and the fear of immediate punishment, is of primary importance.

Due to the extreme high-intensity ("above-conventional") of nuclear conflict, it is nearly certain that such a war, no matter its outcome, would not last for years as we have become accustomed to in current low-intensity conflicts. Rather we should anticipate a new geopolitical reality: the emergence of clear winners and losers within several days or at most weeks after the initial outbreak of hostilities. This latter reality will most probably contain fewer nuclear-possessing states than the former.

A country emerging victorious from nuclear warfare, even having suffered extremely high losses, is anticipated to not only gain territory, but also to attain extremely high international standing and credibility, which would then translate into massive international investment. As a consequence, extensive destruction and economic damage may be repaired rather quickly, as was the case, ironically, in post-war Germany and Japan.

Targeting Doctrine

The targeting doctrine of a democratic state involved in nuclear warfare requires careful consideration. There can be little doubt that terrorists or rogue states will target population centers, correctly assessing that human life is the highest value in a democratic society, and that by destroying lives they will inflict the greatest damage. The correct response is not necessarily symmetric. As the aim is to inflict the greatest damage to the aggressor, in order to achieve this we must play our game, not theirs. A tyranny is relatively insensible to the loss of human life, unless the affected population constitutes its power base. On the other hand, a dictator's paramount concern is his continued ability to prosecute his act of aggression. It is extremely instructive to consider Allied experience in World War II:

“The importance of careful selection of targets for air attack is emphasized by the German experience. The Germans were far more concerned over attacks on one or more of

their basic industries and services – their oil, chemical, or steel industries or their power or transportation networks – than they were over attacks on their armament industry or the city areas. The most serious attacks were those which destroyed the industry or service which most indispensably served other industries. The Germans found it clearly more important to devise measures for the protection of basic industries and services than for the protection of factories turning out finished products.” [17]

The list of high-priority targets of more than half a century ago – oil, power stations, transportation etc. – needs to be carefully studied by relevant agencies. Direct attack against nuclear facilities – almost certainly heavily protected and widely distributed – may well be ill advised.

Why to choose wrong strategy?

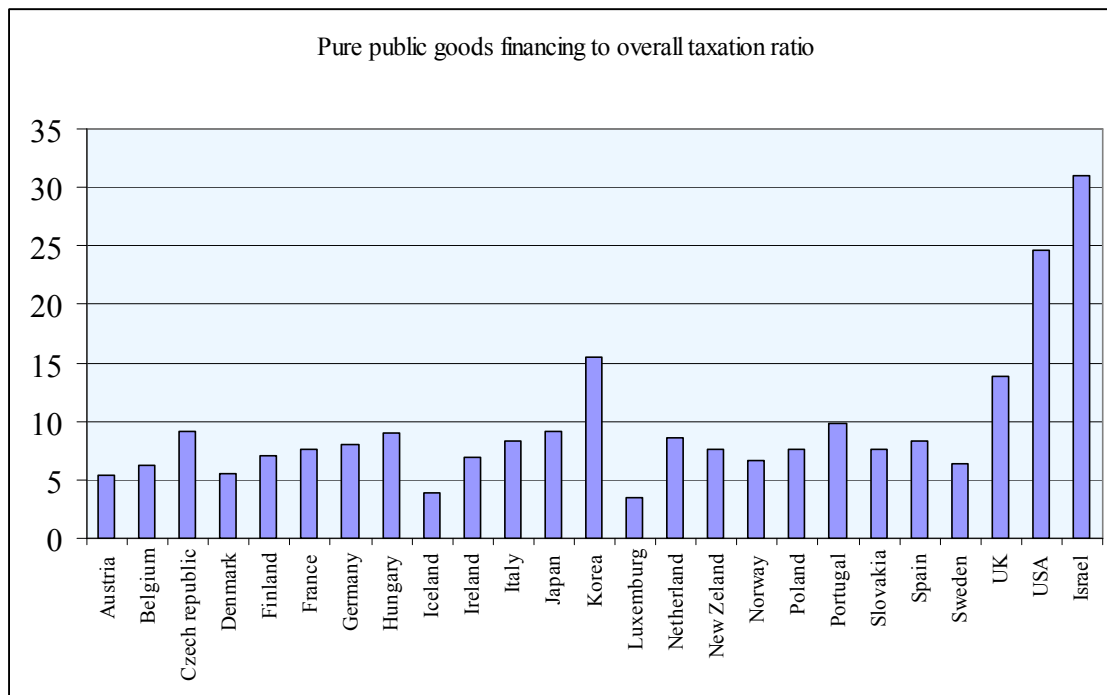
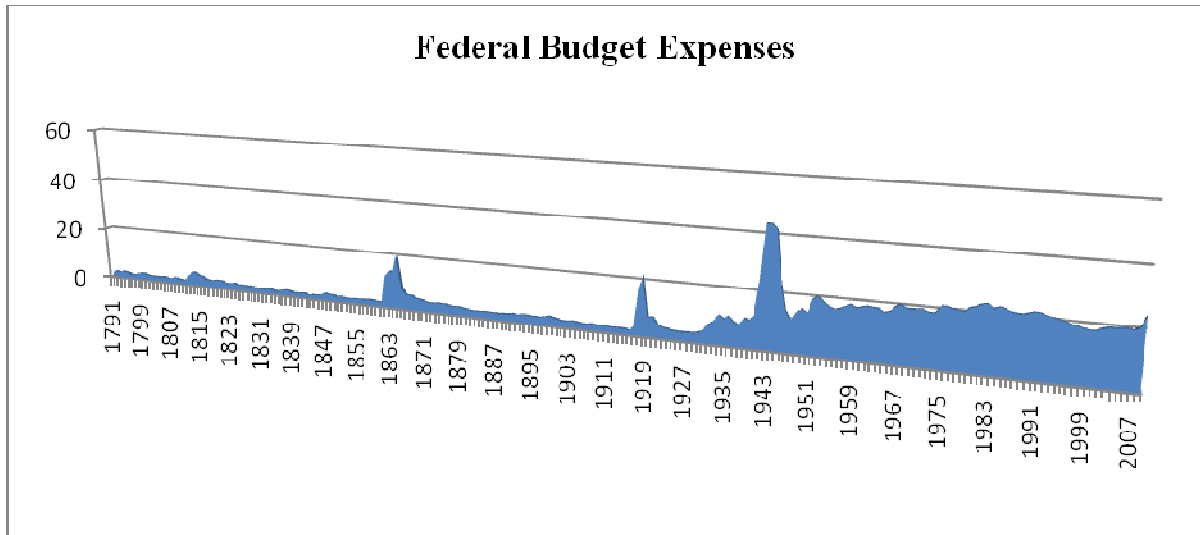


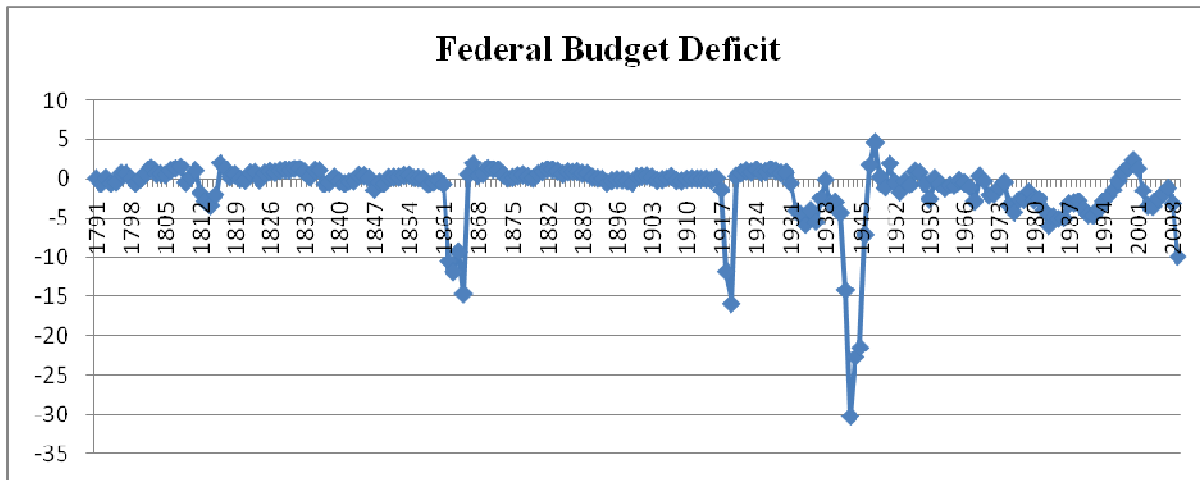
Diagram 1. Pure public goods financing to overall taxation ratio

Sources: OECD in Figures 2007 - OECD © 2007 - ISBN 9789264034549; Bank of Israel (http://www.bankisrael.gov.il/deptdata/mehkar/indic/eng_f01.htm on tax revenue; state's budget expenditures information for 2011-2012 http://www.mof.gov.il/BudgetSite/StateBudget/Budget2011_2012/Lists/20112012/Attachments/1/Budget2011_2012.pdf)

Statistical analysis



Sources: Mitchell, 2006; US Budget historical tables



	Variables	
1	Military expenses as % of general federal expenses; as GDP share	dependent
2	Social expenses as GDP share	dependent
3	Big war	independent (1812; Civil war; WWI, WWII)
4	Local war	independent
5	Political history marks: Public sector unions: creation, right to bargain collectively (federal, by states) Civil service reform Act (1883) & Grover Cleveland out of office (since 1897) PSU formation; first strikes (1920) Carl Hatch Act, 1939 indicates (1938 elections)	independent

	experience) polarization of civil service problem Amendment XXIV (1964) Article XXIV. Proposed 1962; Ratified 1964	
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To be described

Civil Defense

Clearly, the ideal defense against nuclear attack is to intercept all enemy missiles. This solution, however, may be not feasible. Robert Harney writes:

“The United States should give careful consideration to implementing any National Missile Defense beyond that needed to defend against the minimal threat (terrorist, renegade, or accidental launches). Any capability beyond the minimum may inspire an adversary to engage in a one-missile-for-one-interceptor arms escalation that could favor the adversary from an economic perspective.” [\[18\]](#)

On the other hand, civil defense can be expected to be extremely efficient, decreasing the number of casualties by factor of 20 or more – which can easily be the difference between victory and collapse. The US Strategic Bombing Survey (SBS) report, compiled at the onset of the nuclear age and based on the initial data collected after the use of nuclear weapons against Japan, stated:

“The experience of both the Pacific and European wars emphasizes the extent to which civilian and other forms of passive defense can reduce a country's vulnerability to air attack. Civilian injuries and fatalities can be reduced, by presently known techniques, to one-twentieth or less of the casualties which would be suffered were these techniques not employed. This does not involve moving everything underground, but does involve a progressive evacuation, dispersal, warning, air-raid shelter, and post-raid emergency assistance program, the foundations for which can only be laid in peacetime. The analysis of the effects of the atomic bombs at Hiroshima and Nagasaki indicates that the above statement is just as true and much more terrifyingly significant in an age of atomic bombs than it was in an age of conventional weapons. Similarly, economic vulnerability can be enormously decreased by a well worked out program of stockpiles, dispersal and special construction of

particularly significant segments of industry. Such a program in the economic field can also be worked out satisfactorily only in peacetime.” [19]

The above estimation of civil defense efficiency factor as 20-fold, should be considered as conservative rather than optimistic. This is demonstrated by the following simple calculation. Let us first consider the best available protection – underground shelter. For 20KT nuclear explosion, such shelter is destroyed and all its inhabitants die at distance of no more than about 200 m from the explosion point [20]. At larger distances, the shelter suffers at most light damage with near-zero casualties. On the other extreme of no civil defense actions at all (out-of-the-blue strike), as it was with the two nuclear bombings of Japan, the distance of 50% mortality was estimated as 1,300 m [21]. For the purpose of rough estimation let us assume that all people closer that 1,300 m are killed, while all the rest are spared (this assumption fits well the estimation, made by the British mission to Japan in 1946, that the total number of killed by an out-of-the-blue Hiroshima-scale nuclear strike in London will be about 50,000 [3]). Then the surface of 1,300-m-radius circle (those killed in case of no civil defense) is larger than the surface of 200-m-radius circle (those killed in case of fully-employed civil defense) by the factor of about 40 (since $[1,300/200]^2 > 40$). And this is before we speak about progressive evacuation and dispersion.

Still years later, the value of civil defense was questioned, culminating probably in an ambivalent and implicitly unfavorable chapter in the report prepared by the US Congress Office of Technology Assessment (OTA) in 1979 [22]. The OTA cited many technical problems pertaining to civil defense but, the truth to be said, failed to pinpoint any unsolvable problems.

The OTA analysis was based on two implicit assumptions: 1) No long-term civil defense effort will be made. 2) In case of nuclear emergency, social order will collapse as soon as the government fails to provide enough consumables and police. Both assumptions are at least questionable. Long-term civil defense planning during peacetime is essential, as stressed in the original SBS report cited above. The OTA concluded, for example, that “the installation of shelters in new construction, or “slanting”, is preferable [to adding shelters to existing buildings], but could take as long as 20 years.” Had the “slanting” program been started in the wake of that report, it would have been completed 10 years ago; in practice, little if any effort was made. As for the assumption of a relatively immediate collapse of social order – this is actually an unfounded accusation leveled at democratic societies which contradicts documented experience. E.g., during the recent 2006 Lebanon War, government agencies performed with questionable efficiency in the north of Israel, yet despite this there was not

even the slightest sign of a collapse of social order. In fact, a number of NGOs proved to be much more efficient at providing essential services. More generally, historical experience shows that private initiative really proves to be efficient and competitive even in some niches of pure public goods – private security, local needs to maintain legal order under emergency, self-defense based on the 2-nd Amendment right, and even outstanding cost-efficiency of some intelligence operations, like Simon Wiesenthal's Nazi hunting [\[23\]](#).

The main reservation of the OTA report regarding civil defense was that “some observers...argue that a vigorous civil defense program would induce people to believe that a nuclear war was “survivable” rather than “unthinkable”, and that such a change in attitude would increase the risk of war”. It seems obvious that today just the opposite is the case: by considering nuclear war "unthinkable", democratic societies actually provide terrorists and rogue states with an additional powerful incentive for increasing their nuclear capabilities, thus increasing the risk of war.

Civil defense activities in democratic societies need to be decentralized. The construction of shelters should, to a large extent, be the responsibility of citizenry and local government, with central government providing standards and incentives. Shelters should be dual-use for at least two reasons. Firstly, only continuous routine occupation guarantees that the shelter will be ready for emergency use; experience suggests that non-dual-use shelters tend to become filled with junk, flooded etc. Secondly, dual-use shelters are simply much cheaper. In private homes, basement floors (upgraded to very efficient shelters) may be routinely utilized for such things as home cinema systems, billiards and table-tennis. It should be noted that Israel has much practical and very positive experience with protected spaces [\[24\]](#), demanded by law in every structure and every private apartment erected since the early 1990's. Such spaces in peace time serve the function of a standard room without significant loss of functionality. Only marginally increasing overall construction costs, they not only serve the direct purpose of providing protection from shells and missiles, but also significantly increase the ability of structures to withstand seismic activity. Most, if not all, underground public areas such as subways, underground pedestrian crossings etc., can be upgraded to extremely efficient shelters with relative ease.

Finally, it should be noted that many civil defense measures yield considerable side benefits. Hardening buildings and infrastructures is beneficial not only in a nuclear warfare scenario, but also in cases of earthquake or tornado, not to mention "conventional" terror. For example: hardening electrical and electronic systems against electromagnetic pulse (EMP)

increases costs by only 1-3%, but results in improved stability and performance [25]. And dual-use underground shelters in their routine use as subway stations, pedestrian crossings, parking lots, shopping centers etc. will significantly contribute to urban space and energy saving, and therefore environment preservation and general betterment of the society.

Defense vs. Offense

To be written

Conclusion

Concessions, gestures of good will on the part of a democratic society, are seen as signs of weakness by totalitarian societies and lead only to an escalation of terror and aggression. A steadfast and determined stance – including the willingness and ability to suffer heavy losses, in both human and economic terms – is the price democratic societies must be willing to pay in order to effectively battle aggression on all levels. In the article, we considered two technical issues which are crucial for the security of a democratic society in a multi-polar nuclear world:

- 1) Targeting doctrine – targeting primarily rogue state infrastructure, rather than its military objects or population centers.
- 2) Implementing a nation-wide but decentralized civil defense policy, based on dual-use installations.

Finally,

“the best way to win a war is to prevent it from occurring. This objective is well served by insuring the strength and the security of [our society. Our society] was founded and has since lived upon principles of tolerance, freedom, and good will at home and abroad. Strength based on these principles is no threat to world peace. Prevention of war will not come from neglect of strength or lack of foresight or alertness on our part. Those who contemplate evil and aggression find encouragement in such neglect.”[26]

These words, written by officers who had just won a great war and ensured peace and security for decades to come, need to be taken to heart.

Notes

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- [4] *The Effects of Nuclear War*, p. 37
- [5] *The Effects of Nuclear War*, p. 111
- [6] *Radiation Risk at Perspective.*
- [7] *A Brief Description of the Radiation Effects Research Foundation*
- [8] *Chernobyl's Legacy: Health, Environmental and Socio-Economic Impacts and Recommendations to the Governments of Belarus, the Russian Federation and Ukraine.*
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Annex 1. Some facts about nuclear warfare

At the outset, a clarification is called for. There is no doubt that nuclear terror or nuclear warfare, even of limited scale, will be calamitous. Strategically speaking, however, the direct consequences of the limited use of nuclear weapons, especially low-yield devices most likely to be in the hands of non-state actors or irresponsible governments, would probably not be great enough to bring about significant geo-political upheavals. Casualties from a single 20-KT nuclear device are estimated at about 25,000 fatalities with a similar number of injured, assuming rather unfortunate scenario (the center of a large city, with minimal warning) [3]. Scaling the above toll to larger devices or to a larger number of devices is less than linear. For example: it has been estimated that it would take as many as 80 devices of 20-KT yield each to cause 300,000 civilian fatalities in German cities (a result actually achieved by Allied area attacks, or carpet bombings, during the Second World War). A single 1-MT device used against Detroit has been estimated to result in about 220,000 fatalities [4]. For cities built on hilly terrain, like Los Angeles or San Francisco, the death toll is anticipated to be considerably smaller, probably by a factor of two. More importantly, it is anticipated that well-prepared civil defense measures based on rather simple presently known techniques, would decrease these numbers by at least by an order of magnitude (as will be discussed later). There is little doubt that a nation determined to survive and with a strong sense of its own destiny would not succumb to such losses.

The albeit technical but extremely relevant question of the consequences of nuclear radiation must be addressed in this context. It is often argued that the fallout effects of even the limited use of nuclear weapons would be world-wide and would last for generations. This is an exaggeration. The certain deterministic consequences of exposure to high doses of nuclear radiation – radiation injuries – are very real and well-established, but limited to a relatively small area (at most several tens of square kms. for a 20-KT weapon). Estimations show that the casualties' toll from the fallout is within the anyhow large uncertainty of the

overall toll. The extent of highly dreaded cancers and mutations ("stochastic" effects) as a result of exposure to low doses of radiation is debatable. Present predictions are usually based on the so-called linear no-threshold (LNT) model. While most people still believe in LNT, the fact remains that this model is not backed by solid science or by expert consensus [5]. Both the US Health Physics Society and the American Nuclear Society claim that LNT cannot be used for quantitatively estimating damage from radiation below some reasonable threshold [6]. The following facts speak for themselves:

- in Japan, less than 1,000 excess cancer cases (i.e. above the natural occurrence) were recorded in over 100,000 survivors over the past 60 years – compared with about 110,000 immediate fatalities in the two atomic bombings. No clinical or even sub-clinical effects were discovered in the survivors' offspring; [7]

- In the Chernobyl area, only 15 cancer deaths (while LNT predicted above 4,000) can be directly attributed to fallout radiation. No radiation-related increase in congenital formations was recorded. [8]

Moreover, emerging (though not yet conclusive) scientific evidence suggests that low doses of nuclear radiation are beneficial to human health ("radiation hormesis") [9], just as ultraviolet radiation (also a form of ionizing radiation) is clearly beneficial in low doses (sun tanning) while high doses are certainly harmful (sunburns and skin cancer).