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Thinking the Unthinkable: Civil Defense

The December 15, 2010 edition of *The New York Times* ran a report on new government efforts to update the nation's response to a nuclear attack. We tend to view major newspapers like the Times as quasi-state organs; in other words, policymakers use these papers to signal changes in policy or to float proposals. Thus, the fact that this story appeared in the Times suggests that the Obama administration is beginning to readdress the nuclear threat, shifting from a Cold War preparedness program to deal with more pertinent threats.

In this report, we will discuss the evolution of the nuclear threat, the civil defense responses to this threat and renewed interest in this issue in light of the changes in the nuclear threat. As always, we will discuss general market implications from this issue.

The Evolving Nuclear Threat

On August 6, 1945, the U.S. dropped a nuclear device on the Japanese city of Hiroshima. Three days later, another device was detonated over Nagasaki. These attacks changed the nature of warfare. The initial blast from nuclear weapons are not only incredibly destructive, the radiation spewed from the explosion pollutes the bombing area for some time after the event. Essentially, nuclear weapons are the ultimate retaliatory device; any state in possession of these weapons with reliable delivery systems can ensure the destruction of an enemy.

For centuries, warfare was considered an extension of diplomacy. Throughout history, small wars were common. In the first half of the 20th century, wars became global in scale, as shown by World Wars One and Two. However, the use of nuclear weapons completely changed the calculus of war. The weapons offered a relatively cheap way of defending a nation, in that only a suicidal opponent would consider a significant attack on a nuclear power. If that power were threatened with a defeat that could undermine its existence, the nuclear nation could retaliate with devastating effect.

After World War II, the U.S. was the only nation with nuclear weapons and only possessed a small number. In 1946, the Truman administration offered to turn over all its fissile materials and formulas to the U.N. in exchange for all nations opening themselves up for nuclear inspections. Inspections were designed to prevent a nation from developing a clandestine nuclear program. However, the Soviet Union vetoed the proposal in the U.N. Security Council, arguing that nuclear weapons should be part of general disarmament. Three years later, it became obvious why the Soviets opposed the U.S. offer—they detonated their own weapon.

Nuclear weapons technology improved and spread in the following years. The U.S. developed the hydrogen bomb in 1952, dramatically increasing the power of nuclear weapons.

The bomb dropped on Hiroshima caused a blast equivalent of 13 kilotons (13 tons of TNT). Modern nuclear weapons can achieve much higher destructive capacity. The Soviets tested a massive hydrogen bomb (the Tsar Bomba) with a yield of 50 megatons (million tons of TNT). Very large weapons were designed to be delivered by bombers.

Over time, weapons designers changed their focus to deliverability. Bombers were slow and were generally easy targets for jet fighters or surface to air missiles. To ensure that the weapons could strike their targets, warheads that could fit on intercontinental ballistic missiles (ICBM) were developed. The aircraft-delivered bombs put a premium on size, on the assumption that the bomb would not be very accurate. Bombers needed to travel some distance away from the blast to escape the shock waves which required the bomb to be dropped from high elevations or with parachute dampeners. These factors tended to reduce accuracy which was offset by size. However, missiles were much more accurate and thus smaller bombs were feasible.

Although a number of states developed nuclear weapons, the U.S. and U.S.S.R. developed a massive inventory of warheads and missiles. Over time, a strategy evolved called “mutually assured destruction” or MAD which meant that no nuclear state would opt for first use against another nuclear state because of devastating retaliation. The U.S. and U.S.S.R. created an intricate system to reduce the possibility of accidental launches from mistakes and political changes. For example, the leaders of both the U.S. and U.S.S.R. had a special telephone (the “hotline”) that would allow for direct communication with each other as a way to prevent mistaken attacks. In addition, both sides created detailed

protocols for launching a nuclear attack to prevent a rogue general from starting a nuclear exchange without orders. Overall, the program worked—the Cold War ended without a nuclear exchange—however, there were some close calls. The Cuban Missile Crisis in 1962 had several incidents where nuclear strikes were almost signaled. One of the more famous near misses occurred in 1983 when a Soviet early warning system mistakenly signaled that ICBMs were approaching. Lieutenant Colonel Stanislav Petrov, who was in command of the station, should have reported the event to his superiors. However, he surmised that the computers were probably in error. First, the computers were considered unreliable (a rather chilling thought) and second, Petrov reasoned a real attack would involve hundreds of missiles, not the five that the computer was indicating. Although Petrov was not in charge of launch codes and could not have ordered a missile strike, by not sending the event up the chain of command, he insured that his superiors would not have mistakenly caused a nuclear holocaust.

With the fall of the Soviet Union, the nuclear threat shifted from the potential of a massive nuclear exchange between two superpowers to nuclear proliferation. To date, there is no evidence to suggest that a non-state actor has ever developed or acquired a nuclear device or weapon (a device is essentially a testing vehicle whereas a weapon is deliverable). Even advanced nations struggle to develop deliverable nuclear weapons. The technology is difficult and requires massive levels of spending. Still, there is an allure to having a weapon. In the aftermath of the Cold War, the U.S. became the world’s sole superpower, which essentially means that only America has a global military footprint. What nations discovered is that the U.S. has the power to unilaterally intervene. The two

wars in Iraq, the action in Afghanistan and the intervention in Kosovo suggest that the U.S. has to power to move against a conventionally armed nation and will not be restrained by the U.N. Thus, a growing number of nations have concluded that the only way to prevent the U.S. from taking up arms against them is to possess nuclear weapons. Note that two of the three nations that comprised President Bush's "Axis of Evil" either have detonated a nuclear device (North Korea) or is believed to be actively seeking to develop nuclear weapons (Iran).

The other area of concern with proliferation is that a non-state actor, a criminal or terrorist enterprise, could acquire nuclear weapons. Although the West and the Soviet Union built some tactical nuclear weapons, they were never used and reports suggest that they were considered impractical for battlefield use. However, the fear is that a non-state actor might acquire a "suitcase bomb" and use it for terrorism or extortion. To date, this fear has not been realized and it is probably not likely that a non-state actor could actually deploy such a weapon. More likely is a radiological bomb ("dirty bomb") where a group acquires nuclear material and "wraps" it around a conventional explosive device. Although these bombs do not have the destructive power of a fission weapon, they would cause great fear in a population.

Essentially, the nuclear threat seems to have evolved from the potential for complete annihilation to localized threats. And, this change affects civil defense.

Civil Defense

For any American of school age in the 1960s, civil defense drills were simply part of the landscape. The advice to "duck and cover" was part of the civil defense program. The U.S. government created posters and movies showing citizens how to

protect themselves from an unexpected nuclear attack.



(Source: Wikipedia)

This image is from a poster based on the civil defense movie. In the early 1960s, Americans were encouraged to build home bomb shelters and large buildings were retrofitted to offer protection from nuclear radiation. In fact, President Kennedy published an open letter in the September 1961 issue of Life magazine, encouraging the use of personal fallout shelters.

The thinking in the 1950s and 1960s about civil defense assumed the following:

- Delivery systems were relatively slow. Bombers were lumbering and could be identified by radar and even ICBMs offered a few minutes to prepare for a blast. Thus, it was expected that there would be time for people to find shelters.
- Initially, the number of nuclear weapons held by the U.S. and U.S.S.R. were relatively small, meaning that evacuation was an option. One of the reasons for building the interstate highway system was to make it easier for the military to move equipment around the nation quickly. It could also support those fleeing a potential target.

- Since avoiding fallout, even for a few days, greatly increases one's survivability, finding shelter could save a significant number of citizens.

Into the 1970s, the thinking on civil defense began to change. First, both the U.S. and U.S.S.R. greatly increased the number and deliverability of nuclear warheads, meaning that more parts of the nation would be subject to direct attack. Simple fallout shelters don't offer significant protection in close proximity to ground zero. Second, some popular scientists, e.g., Carl Sagan, suggested that a full scale nuclear holocaust would cause a "nuclear winter" greatly cooling the earth and making the entire planet uninhabitable. A certain fatalism developed around a nuclear exchange that led to citizens abandoning the notion that civil defense was effective. If surviving a nuclear exchange meant living in an inhospitable world, what was the point of going to a shelter? Third, the amount of time from warning to missile strike shrank with new technology. Cruise missiles were generally undetectable by radar and submarine-launched missiles could strike offshore, meaning that citizens would face an attack without warning. Traditional civil defense relied on at least a few minutes to find shelter and that window had essentially closed.

At this juncture, most Americans have probably adopted the notion that a nuclear attack isn't survivable and thus have neglected the idea of civil defense. However, the aforementioned article suggests the Obama administration has been rethinking civil defense, reacting to new threats. Instead of facing a multiple warhead attack, the odds of a few warheads against selected cities or a terrorist-delivered bomb have probably increased. These

weapons would probably be of relatively lower power, meaning that with proper civil defense measures, survivability rates would be high.

The problem for the U.S. government is to raise awareness without increasing alarm. Public discussions of nuclear civil defense will first need to overcome the fatalism that developed at the end of the Cold War. In addition, these discussions will boost concerns that the government believes the odds of such an attack are increasing, which will bring calls to prevent such an attack. Missile defense might protect against a missile strike from North Korea or Iran...or it might not.

The problem with nuclear proliferation is that the new nuclear states don't know the rules of deployment, security and engagement when it comes to nuclear weapons. The U.S. and U.S.S.R. developed signaling and engagement methods. For example, anti-ballistic missile defenses were outlawed by treaty because both sides feared that if one state felt it could prevent an effective retaliatory strike, it might be tempted to make a first strike in order to "win" the Cold War. In addition, as mentioned earlier, hotlines were installed to allow for communication to prevent an accidental attack. These don't exist with the new nuclear states, and so the likelihood of a rogue attack will increase especially as these states develop their missile delivery systems.

Interestingly enough, a single weapon attack with a moderately sized warhead, while causing major damage at ground zero, isn't necessarily devastating for the surrounding population. A 10 KT weapon, roughly the size of the bomb dropped on Hiroshima, has the force of 5,000 truck bombs used on the Murrah Building in Oklahoma City in 1995. Clearly, in the immediate blast area, damage

would be significant with few survivors. Fallout patterns would be driven by wind and weather factors; however, the worst of the radiation effects diminish within 24 hours. Modern research suggests that instead of evacuating, citizens would be better off staying in a basement or office building for a week to avoid the worst effects of an attack. The problem is educating the public about this issue; in general, a single warhead on a major city, while devastating, is probably manageable if handled correctly.

Ramifications

From a market perspective, this is a low probability, high immediate cost event. However, the reality of such an event would probably prove to be less devastating than the current consensus would suggest. Thus, we would expect a reaction similar to 9/11; an initial selloff in equity markets with an eventual strong recovery.

Of course, a nuclear strike on the U.S. from Iran, Pakistan or North Korea would invite a massive counterstrike that would likely end the existence of the nation that launched the initial attack. This counterstrike carries its own ramifications that are beyond the scope of this particular article. Overall, it appears that policymakers are coming to the conclusion that the odds of a terrorist or rogue state nuclear attack on the U.S. are increasing. This would be a terrible, but survivable, event. We would expect further media coverage on this issue in the coming months which has the potential to be mildly negative for risk assets.

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